



**B.Sc. (Hons.) Agriculture**  
**SEMESTER-IV**  
**Syllabus: Environmental Science**  
**Paper Code: ES201**  
**w.e.f. Session 2015-16**

**2 (1+1)**

Scope and importance of environmental studies. Natural resources: Renewable and non-renewable resources. Forest, Water, Food, energy and land resources. Ecosystems: Definition, concept, structure and functions. Producers, consumers and decomposers of an ecosystem. Energy flow in the ecosystem. Types of ecosystems. Bio-diversity: Definition, classification, threats to biodiversity and its conservation. Environmental pollution: Causes, effects and control of air, water, soil, thermal, noise and marine pollution. Causes, effects and management of soil nuclear hazards and industrial wastes. Disaster management, Floods, earthquakes, cyclones and landslides. Social issues and the environment, unsustainable to sustainable development. The Environment Protection Act, The Air Act, The water Act, The Wildlife Protection. Act and Forest Conservation Act. Woman and child welfare, HIV/AIDS and Role of information technology on environment and human health.

**Practical:** Collection, processing and storage of effluent samples; Determination of Bio-Chemical oxygen demand (BOD) in effluent sample; Determination of chemical oxygen demand (COD) in effluent sample; Estimation of dissolved oxygen in effluent samples; Determination of sound level by using sound level meter; Estimation of respirable and non-respirable dust in the air by using portable dust sampler; Determination of total dissolved solids (TDS) in effluent samples; Estimation of species abundance of plants; Estimation of nitrate contamination in ground water; Analysis of temporary and total hardness of water sample by titration; Estimation of pesticide contamination in Agro-Ecosystem; Visit to Social Service Organization/Environmental Education Centre; Crop adaptation to environmental variables, soils conditions; Study of transpiration and water balance in plants; Visit to a local polluted site. Observations and remedial measures; Assessment of chlorophyll content of fresh water/sea water ecosystem.

**B.Sc. (Hons.) Agriculture**  
**SEMESTER-IV**  
**Syllabus: Diseases of Horticultural Crops and Their Management**  
**Paper Code: HT223**  
**w.e.f. Session 2015-16**

**3(2+1)**

Economic Importance, symptoms, cause, disease cycle and integrated management of diseases of: citrus, mango, banana, grapevine, pomegranate, papaya, guava, sapota, apple, chilli, brinjal, bhendi, potato, crucifers, cucurbits, tomato, beans, onion, coconut, oil palm, betelvine, mulberry, coffee, tea, rose, chrysanthemum and jasmine.

**Practical:** Diseases of beans, citrus, guava, & sapota; Diseases of papaya, banana, pomegranate & ber; Diseases of mango, grapes & apple; Diseases of chilli, brinjal & bhendi; Diseases of potato, tomato & crucifers; Diseases of cucurbits, onion & betelvine; Diseases of oil palm, coconut, tea, coffee & mulberry; Diseases of rose, chrysanthemum and jasmine. Field visits at appropriate time during the semester.

**B.Sc. (Hons.) Agriculture**  
**SEMESTER-IV**  
**Syllabus: Principles of Plant Biotechnology**  
**Paper Code: AG206**  
**w.e.f. Session 2015-16**

**3(2+1)**

Concepts of Plant Biotechnology: History of Plant Tissue Culture and Plant Genetic Engineering; Scope and importance in Crop Improvement: Totipotency and Morphogenesis, Nutritional requirements of *in-vitro* cultures; Techniques of *in-vitro* cultures, Micro propagation, Anther culture, Pollen culture, Ovule culture, Embryo culture, Test tube fertilization, Endosperm culture, Factors affecting above *in-vitro* culture; Applications and Achievements; Somaclonal variation, Types, Reasons: Somatic embryogenesis and synthetic seed production technology; Protoplast isolation, Culture, Manipulation and Fusion; Products of somatic hybrids and cybrids, Applications in crop improvement. Genetic engineering; Restriction enzymes; Vectors for gene transfer – Gene cloning – Direct and indirect method of gene transfer – Transgenic plants and their applications. Blotting techniques – DNA finger printing – DNA based markers – RFLP, AFLP, RAPD, SSR and DNA Probes – Mapping QTL – Future prospects. MAS, and its application in crop improvement.

**Practical:** Requirements for Plant Tissue Culture Laboratory; Techniques in Plant Tissue Culture; Media components and preparations; Sterilization techniques and Inoculation of various explants; Aseptic manipulation of various explants; Callus induction and Plant Regeneration; Micro propagation of important crops; Anther, Embryo and Endosperm culture; Hardening / Acclimatization of regenerated plants; Somatic embryogenesis and synthetic seed production; Isolation of protoplast; Demonstration of Culturing of protoplast; Demonstration of Isolation of DNA; Demonstration of Gene transfer techniques, direct methods; Demonstration of Gene transfer techniques, indirect methods; Demonstration of Confirmation of Genetic transformation; Demonstration of gel-electrophoresis techniques.

**B.Sc. (Hons.) Agriculture**  
**SEMESTER-IV**  
**Syllabus: Dimensions of Agricultural Extension**  
**Paper Code: AG207**  
**w.e.f. Session 2015-16**

**2(1+1)**

Education – Meaning, Definition, Types – Formal, Informal and Non-formal education and their Characteristics. Extension Education and Agricultural Extension – Meaning, Definition, Concepts, Objectives and Principles. Rural development – Meaning, Definition, Concepts, Objectives, Importance and Problems in rural development. Developmental programmes of pre-independence era – Sriniketan, Marthandam, Gurgaon experiment and Gandhian constructive programme. Development programmes of Post independence era, Firka Development, Etawah – Pilot project and Nilokheri Experiment. Community Development Programme – Meaning, Definition, Concepts, Philosophy, Principles, Objectives, Differences between Community Development and Extension Education, National Extension service. Panchayat Raj system – Meaning of Democratic – Decentralization and Panchayat Raj, Three tiers of Panchayat Raj system, Powers, Functions and Organizational setup. Agricultural Development Programmes with reference to year of start, objectives & salient features – Intensive Agricultural District Programme (IADP), High Yielding Varieties Programme (HYVP), Institution Village Linkage Programme (IVLP), Watershed Development Programme (WSDP), National Agricultural Technology Project (NATP), ATMA, ATIC. Social Justice and Poverty alleviation programmes – Integrated Tribal Development Agency (ITDA), Integrated Rural Development Programme (IRDP), Swarna Jayanthi Gram Swarojgar Yojana (SGSY), Prime Minister Employment Yojana (CMEY). New trends in extension, privatization. Women Development programmes – Development of Women and Children in Rural Areas (DWCRA), Rashtriya Mahila Kosh (RMK), Integrated Child Development Scheme (ICDS) and Mahila Samridhi Yojana (MSY). Reorganized extension system (T&V System) – Salient features, Fort night Meetings, Monthly workshops, Linkages, Merits and Demerits, Emergence of Broad Based Extension (BBE).

**Practical:** Visits to a village and kisan mandal to study the ongoing development programmes. Visits to Panchayat Raj Institutions to study the functioning of Gram Panchayat (GP) & Zilla Praja Parishad (ZPP). Visit and study the District Rural Development Agency (DRDA). Participation in monthly workshops of Training and Visit (T & V) System. Visit to Watershed Development Project area. Visit to a village to study the Self Help Groups (SHGs) of DWCRA. Visit to a voluntary organization to study the developmental activities. Organizing PRA techniques in a village to identify the agricultural problems. Visit to villages.

**B.Sc. (Hons.) Agriculture**  
**SEMESTER-IV**  
**Syllabus: Agricultural Marketing, Trade and Prices**  
**Paper Code: BM231**  
**w.e.f. Session 2015-16**

**2(1+1)**

Agricultural Marketing: Concepts and Definition, Scope and subject matter, Market and Marketing: Meaning, Definitions, Components of a market, Classification. Market structure, Conduct, performance. Marketing structure, Market functionaries or agencies, Producer's surplus: Meaning, Types of producers surplus, marketable surplus. Marketed surplus, importance, Factors affecting Marketable surplus. Marketing channels: Meaning, Definition, Channels for different products. Market integration, Meaning, Definition, Types of Market Integration. Marketing efficiency: Meaning, Definition, Marketing costs, Margins and price spread, Factors affecting the cost of marketing, Reasons for higher marketing costs of farm commodities, Ways of reducing marketing costs. Theories of International Trade: Domestic Trade, Free trade, International Trade, GATT, WTO, Implications of AOA. Market access, Domestic support, Export subsidies, EXIM-Policy & Ministerial conferences. Cooperative Marketing. State Trading. Ware Housing Corporation; Central and State, Objectives, Functions, Advantages. Food Corporation of India: Objectives and Functions. Quality Control, Agricultural Products, AGMARK. Price Characteristics of agricultural product process, Meaning, Need for Agricultural Price Policy. Risk in Marketing: Meaning and importance, Types of Risk in Marketing. Speculations and Hedging, Futures trading, Contract farming.

**Practical:** Identification of marketing channels; Study of Rythu Bazars, Regulated markets; Study of unregulated markets; Study of livestock markets; Price spread analysis; Visit to market institutions, NAFED; Study of SWC, CWC and STC; Analysis of information of daily prices; Marketed and marketable surplus of different commodities.

**B.Sc. (Hons.) Agriculture**  
**SEMESTER-IV**  
**Syllabus: Production Technology of Vegetables and Flowers**  
**Paper Code: HT224**  
**w.e.f. Session 2015-16**

**3(2+1)**

Importance of Olericulture, vegetable gardens, vegetable classification. Origin, area, production, varieties, package of practices for fruit vegetables –, tomato, brinjal, chillies, and okera; Cucurbitaceous vegetables cucumber, ridge gourd, ash gourd, snake gourd, bottle gourd, bitter gourd and melons, Cole crops – cabbage, cauliflower and knol-khol. Bulb crops – onion and garlic. Beans and peas – French beans, cluster beans, dolichos beans, peas and cowpea. Tuber crops – potato, sweet potato, tapioca, colocasia, yams; Root crops – carrot, radish, turnip and beet root; Leafy vegetables – amaranthus, palak, gogu; Perennial vegetables – drumstick, coccinia and curry leaf. Importance of ornamental gardens. Planning of ornamental gardens. Types and styles of ornamental gardens. Use of trees, shrubs, climbers, palms, houseplants and seasonal flowers in the gardens. Package of practices for rose, jasmine, chrysanthemum, crossandra, marigold and tuberose.

**Practical:** Planning and layout of kitchen garden; 2 Identification of important vegetable seeds and plants; Raising of vegetable nurseries; Identification of ornamental plants (trees, shrubs, climbers, house plants, palms, etc.) and development of garden features; Transplanting of vegetable seedlings in main field; Layout of lawns and maintenance; Seed extraction in tomato and brinjal; Depotting, repotting and maintenance of house plants; Visit to commercial vegetable farms; Training and pruning of rose (standards, hybrid ‘T’ roses cented roses) and chrysanthemum (pinching and disbudding); Planning and layout of gardens and garden designs for public and private areas; Intercultural operations in vegetable plots; Seed production in vegetable crops; Harvesting indices of different vegetable crops; Grading and packing of vegetables; Prolonging the shelf life of cut flowers

**B.Sc. (Hons.) Agriculture**  
**SEMESTER-IV**  
**Syllabus: Manures, Fertilizers and Agro-Chemicals**  
**Paper Code: AG208**  
**w.e.f. Session 2015-16**

**3(2+1)**

Introduction – Raw materials – Manures – Bulky and concentrated – FYM, Composts – Different methods, Mechanical compost plants, Vermicomosting, Green manures, Oil cakes, Sewage and sludge – Biogas plant slurry, Plant and animal refuges. Fertilizers – classifications, Manufacturing processes and properties of major nitrogenous (ammonium sulphate, urea, calcium ammonium nitrate, ammonium nitrate, ammonium sulphate nitrate) phosphatic (single super phosphate, enriched super phosphate, diammonium phosphate, ammonium poly phosphate), potassic and complex fertilizers their fate and reactions in the soil, Secondary and micronutrients fertilizers, Amendments. Fertilizer Control Order, Fertilizer storage; Biofertilizers and their advantage, Organic chemistry as prelude to agro chemicals, Diverse types of agrochemicals, Botanical insecticides (Neem), Pyrethrum, Synthetic pyrethroids. Synthetic organic insecticides, Major classes, Properties and uses of some important insecticides under each class. Herbicides – Major classes – Properties and uses of 2, 4-D, atrazine, glyphosate, butachlor benthiocarb; Fungicides – Major classes – Properties and uses of carbendazim, carboxin, captan, tridemorph and copper oxychloride – Insecticides Act, Plant growth regulators.

**Practical:** Total nitrogen and phosphorus in manures / composts – Ammoniacal and nitrate nitrogen – Water soluble P<sub>2</sub>O<sub>5</sub>, potassium, calcium, sulphur and zinc contents of fertilizers COD in organic wastes – Adulteration in fertilizer. Argentimetric and iodometric titrations – their use in the analysis of lindane metasystox, endosulfan, malathion, copper and sulphur fungicides – Compatibility of fertilizers with pesticides.



**B.Sc. (Hons.) Agriculture**  
**SEMESTER-IV**  
**Syllabus: Livestock Production and Management**  
**Paper Code: AG209**  
**w.e.f. Session 2015-16**

**3(2+1)**

Place of livestock in the national economy, different livestock development programmes of Govt. of India. Important exotic and Indian breeds of cattle, buffalo, sheep, goat and swine. Measures and factors affecting fertility in livestock, reproductive behaviour like oestrus, parturition, farrowing etc. Milk secretion, milking of animals and factors affecting milk yield and composition. Selection and breeding of livestock for higher milk and meat production. Feeding and management of calves, growing heifers and milch animals and other classes and types of animals, housing principles, space requirements for different species of livestock. Disease control measures, sanitation and care, breeding, feeding and production records. Breed characteristics of poultry, their methods of rearing, breeding, feeding and management, incubation, hatching and brooding, vaccination and prevention of diseases, preservation and marketing of eggs, its economics and keeping quality. Cost of production of milk, economical units of cattle, buffalo, sheep, goat and swine.

**Practical:** Identification, handling and restraining of animals; Judging and culling; Feeding and ration formulation; Hatching, housing and management of poultry; Visit to livestock farms and Economics of livestock production.