

Program: B.Sc. (Hons.) Agriculture

Semester: Fourth

Course: Crop Production Technology – II (Rabi crops)

Course Code: 13A.258

L	T	P	C
1	0	2	2

Course Objective:

- To know the Origin, geographical distribution, economic importance, soil and climatic requirements, varieties, cultural practices and yield of *rabi* crops
- Identify weeds in rabi season crops
- To understand the yield attributing characters of kharif crops and Estimate yield of kharif crops

Unit I:

Origin, geographical distribution, economic importance, soil and climatic requirements, varieties, cultural practices and yield of Rabi crops; Cereals –wheat and barley

Unit II:

Pulses-chickpea, lentil, peas; oilseeds-rapeseed, mustard and sunflower; sugar crops-sugarcane

Unit III:

Medicinal and aromatic crops-mentha, lemon grass and citronella

Unit IV:

Forage crops-berseem, lucerne and oat.

Practical:

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

Suggested Reading:

1. *Rajendra Prasad. Textbook of Field Crops Production*
2. *Mukund Joshi. Textbook of Field Crops*
3. *Singh, Chhidda; Singh P. and Singh, R. 2003. Modern Techniques of Raising Field Crops, Oxford & IBH Publishing Co., New Delhi.*
4. *Singh, S.S. 1998, Crop Management: Under irrigated and rainfed conditions.*
5. *Singh, S.S. 1993, Principles and Practices of Agronomy, Kalyani Publishers, New Delhi.*
6. *Reddy, T.Y. and Reddi, G.H.S. 1993. Principles of Agronomy, Kalyani Publishers, New Delhi.*

7. Maiti, S. Hedge, M.R. and Chhattachopadhyay, S.B. 1988. *Handbook of Annual Oilseed Crops*. Oxford & IBH Publishing Co., New Delhi.
8. Jaiswami, L.H. and Baldeo, B. 1990. *Advances in Pulse Production Technology*, ICAR, New Delhi.
9. Thakur, C. 1979. *Crop Production, Vol. I & II*. Metropolitan Book Pvt. Ltd., New Delhi.
10. Ahlawat, I.P.S. , Sharma, O.P. & Saini., G.S. 1998 *Scientific Crop Production in India*. Aman Publishing House, Madhu Market, Budhana gate, Meerut.
11. Rathore, P.S. 1999-2000. *Techniques and Management of Field Crop Production*. Agrobios (India), Jodhpur.
12. Rathore, P.S. and Sharma, S.K. 2003. *Scientific Pulse Production*. Yash Publishing House, Bikaner.
13. Sharma, Kalicharan 1990 *Bharat ki promokh faslea*. G.B. Pant Agricultural & Technology University, Nanital.
14. Reddy, S.R. 2004. *Agronomy of Field Crops*. Kalyani Publishers, New Delhi.

Program: B.Sc. (Hons.) Agriculture

Semester: Fourth

Course: Production Technology for Ornamental Crops, MAP and Landscaping

Course Code: 13A.259

L	T	P	C
1	0	2	2

Course Objective:

- To enhance knowledge on the cultivation practices of various ornamental crops
- To impart knowledge about importance of Ornamentals in Landscaping and beautification.
- To impart technical skills through practical approach required to raise and manage ornamental crops

Unit I:

Importance and scope of ornamental crops, medicinal and aromatic plants and landscaping. Principles of landscaping. Landscape uses of trees, shrubs and climbers.

Unit II:

Production technology of important cut flowers like rose, gerbera, carnation, liliium 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.

Unit III:

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.

Unit IV:

Processing and value addition in ornamental crops and MAPs produce.

Practical:

1. Identification of Ornamental plants.
2. Identification of Medicinal and Aromatic Plants.
3. Nursery bed preparation and seed sowing.
4. Training and pruning of Ornamental plants.
5. Planning and layout of garden.
6. Bed preparation and planting of MAP.
7. Protected structures – care and maintenance.
8. Intercultural Operations in flowers and MAP.
9. Harvesting and post harvest handling of cut and loose flowers.
10. Processing of MAP.
11. Visit to commercial flower/MAP unit.

Suggested Reading:

1. G.S Randhawa. *Floriculture in India*
2. K.L. Chadha. *Handbook of Horticulture*

3. *J.S. Arora. Introductory Ornamental Horticulture*

Program: B.Sc. (Hons.) Agriculture

Semester: Fourth

Course: Renewable Energy and Green Technology

Course Code: 13A.260

L	T	P	C
1	0	2	2

Course Objective:

- To familiarize with different forms of bio-energy sources and their contribution in agricultural sectors
- To teach about gasifier, bio-fuel, solar light, solar pumping, solar fencing, solar drying, etc.

Unit I:

Classification of energy sources, contribution of these of sources in agricultural sector

Unit II:

Familiarization with biomass utilization for biofuel production and their application, Familiarization with types of biogas plants and gasifiers, bio-gas, bio-alcohol, biodiesel and bio-oil production and their utilization as bio-energy resource

Unit III:

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,

Unit IV:

Introduction of wind energy and their application.

Practical:

1. Familiarization with renewable energy gadgets.
2. To study biogas plants
3. To study gasifier
4. To study the production process of biodiesel
5. To study briquetting machine
6. To study the production process of bio-fuels.
7. Familiarization with different solar energy gadgets.
8. To study solar photovoltaic system: solar light, solar pumping, solar fencing.
9. To study solar cooker
10. To study solar drying system.
11. To study solar distillation and solar pond.

Suggested Reading:

1. *Rai, G.D. 2004. Non-conventional Energy Sources. Khanna Publishers, New Delhi.*
2. *Rajput, R. K. 2012. Non-conventional Energy Sources. S. Chand Publishers.*
3. *Ojha, T.P. and Michael, A.M. Principles of Agricultural Engineering. Vol. I, Jain Brothers, New Delhi.*

4. Rathore, N.S., Mathur, A.N. and Kothari, S. *Alternate Sources of Energy*. ICAR Publication.
5. Chakravarty, A. and Amalendu Chakraverty. 1989 *Biotechnology and Other Alternative Technologies for Utilization of Biomass-Agricultural Wastes*. 1st edition, Oxford and IBH. Publishers, New Delhi

Program: B.Sc. (Hons.) Agriculture
Semester: Fourth
Course: Problematic Soils and their Management
Course Code: 13A.261

L	T	P	C
2	0	0	2

Course Objective:

- To impart knowledge regarding soil health/quality and distribution of waste land/problematic soils in India
- To acquaint with methods reclamation of various problematic soils with respect to plant growth and utilization of saline water in agriculture
- To know the concepts of remote sensing and GIS in diagnosis and management of problematic soils

Unit I:

Soil quality and health, Distribution of Waste land and problem soils in India. Their categorization based on properties.

Unit II:

Reclamation and management of Saline and sodic soils, Acid soils, Acid Sulphate soils, Eroded and Compacted soils, Flooded soils, Polluted soils.

Unit III:

Irrigation water – quality and standards, utilization of saline water in agriculture.
Remote sensing and GIS in diagnosis and management of problem soils.

Unit IV:

Multipurpose tree species, bio remediation through MPTs of soils, land capability and classification, land suitability classification. Problematic soils under different Agro-ecosystems

Suggested Reading:

1. *Indian Society of Soil Science. 2012. Fundamentals of Soil Science, IARI, New Delhi.*
2. *Das, D. K. 2015. Introductory Soil Science. 4th Edition, Kalyani publishers, New Delhi*
3. *Soils of Andhra Pradesh, Monograph of I.V. Subbarao.*

Program: B.Sc. (Hons.) Agriculture

Semester: Fourth

Course: Production Technology for Fruit and Plantation crops

Course Code: 13A.262

L	T	P	C
1	0	2	2

Course Objective:

- To teach about basic concepts and fundamental aspects of production technology of fruits and plantation crops
- To impart skills to design nursery lay out, orchard establishment, vegetative propagation techniques, care and maintenance of important fruits and plantation crops

Unit I:

Importance and scope of fruit and plantation crop industry in India; Importance of rootstocks;

Unit II:

Production technologies for the cultivation of major fruits-mango, banana, citrus, grape, guava, litchi, papaya, sapota, apple, pear, peach, walnut, almond and;

Unit III:

Minor fruits- date, ber, pineapple, pomegranate, jackfruit, strawberry,

Unit IV:

Plantation crops-coconut, arecanut, cashew, tea, coffee & rubber.

Practical:

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

Suggested Reading:

1. *Amar Singh. Fruit Physiology and Production*
2. *R.S. Singh. Diseases of Fruit Crops*
3. *K.L. Chadha. Handbook of Horticulture*
4. *Bose, T.K. and Mitra, S.K. 1990. Fruits – Tropical and Sub-tropical. Naya Prakashan, Calcutta.*
5. *Chattopadhyay, P. K. Year.Text Book on Pomology (Fundamentals of Fruit Growing). Kalyani Publishers, Ludhiana.*
6. *Bijendra Singh. 2012. Horticulture at a Glance. Kalyani Publishers, Ludhiana*
7. *Parthasarathy, V. A., P.K.Chattopadhyay and Bose, T.K. 2006. Plantation Crops. Vol I and II. Parthasankar basu Naya Udyog, Kolkata.*

8. *Kumar, N., Abdul Khader, J.B.M, Rangaswamy, P. and Irulappan, I. 2004. Introduction to Spices, Plantation crops, Medicinal and Aromatic Crops. Oxford and IBH publishing Co, New Delhi.*

Program: B.Sc. (Hons.) Agriculture
Semester: Fourth
Course: Principles of Seed Technology
Course Code: 13A.263

L	T	P	C
1	0	4	3

Course Objective:

- To understand the concepts of seed science and technology and impart training for entrepreneurship in commercial seed production of various crops.
- To initiate basic research related to the genetic purity, seed health and seed storage
- To learn about seed certification procedure, seed drying, processing, cleaning, testing, packaging, storage, marketing, seed laws IPR issues and PPVFR Act to cater the needs of fast growing seed sector.
- To perform laboratory tests to determine the seed's vigor, viability, etc.

Unit I:

Seed and seed technology: introduction, definition and importance. Deterioration causes of crop varieties and their control; Maintenance of genetic purity during seed production, seed quality; Definition, Characters of good quality seed, different classes of seed. Foundation and certified seed production of important cereals, pulses, oilseeds, fodder and vegetables.

Unit II:

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.

Unit III:

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.

Unit IV:

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:

1. Seed production in major cereals: Wheat, Rice, Maize, Sorghum, Bajra and Ragi.
2. Seed production in major pulses: Urd, Mung, Pigeonpea, Lentil, Gram, Field bean, pea.
3. Seed production in major oilseeds: Soybean, Sunflower, Rapeseed, Groundnut and Mustard.
4. Seed production in important vegetable crops.
5. Seed sampling and testing: Physical purity, germination, viability, etc.
6. Seed and seedling vigour test.
7. Genetic purity test: Grow out test and electrophoresis.

8. Seed certification: Procedure, Field inspection, Preparation of field inspection report.
9. Visit to seed production farms, seed testing laboratories and seed processing plant.

Suggested Reading:

1. *Nepal Singh, D.K. Singh. Vegetable Seed Production Technology*
2. *Agarwal, P.K. 1994. Principles of Seed technology. ICAR, New Delhi.*
3. *Agarwal, P.K. and Dadlani, M. 1986. Techniques in Seed Science and Technology. South Asian Publishers, New Delhi.*
4. *Agarwal, R.L. 1995. Seed Technology. Oxford and IBH Publication Co., New Delhi.*
5. *Dhirendra Khare and Mohan S. Bhale. 2007. Seed Technology. Scientific Publishers (India), Jodhpur.*
6. *Thomson, J.R. 1979. An introduction of Seed Technology. Leonard Hill, London.*

Program: B.Sc. (Hons.) Agriculture

Semester: Fourth

Course: Farming System & Sustainable Agriculture

Course Code: 13A.264

L	T	P	C
1	0	0	1

Course Objective:

- To learn the fundamental principles of farming systems and sustainable agriculture and how to improve the economic condition of the farmer
- To impart skills involved in vermi-culture, seri-culture, dairying, poultry, composting and bio-control of pests
- To prepare sustainable cropping patterns and farming system to be adopted by the farmer

Unit I:

Farming System-scope, importance, and concept, Types and systems of farming system and factors affecting types of farming, Farming system components and their maintenance, Cropping system and pattern, multiple cropping system, Efficient cropping system and their evaluation, Allied enterprises and their importance, Tools for determining production and efficiencies in cropping and farming system;

Unit II:

Sustainable agriculture-problems and its impact on agriculture, indicators of sustainability, adaptation and mitigation, conservation agriculture strategies in agriculture, HEIA, LEIA and LEISA and its techniques for sustainability,

Unit III:

Integrated farming system-historical background, objectives and characteristics, components of IFS and its advantages, Site specific development of IFS model for different agro-climatic zones,

Unit IV:

Resource use efficiency and optimization techniques, Resource cycling and flow of energy in different farming system, farming system and environment, Visit of IFS model in different agro-climatic zones of nearby states University/ institutes and farmers field.

Suggested Reading:

1. C. Jayanthi. *Farming System Principles and Practices*
2. Arun K. Sharma. 2006. *A hand book of organic farming - Agrobios (India) Jodhpur*
3. Jayanthi C, Devasenapathy P and Vinnila, C. 2008. *Farming systems principles and practice. Satish serial publishing house, Delhi*
4. Panda.S.C. 2011. *Cropping and farming systems. Agrobios (India) Jodhpur.*
5. Ruthenburg, H. 1980. *Farming systems in the tropics. Oxford university press.*

Program: B.Sc. (Hons.) Agriculture

Semester: Fourth

Course: Agricultural Marketing Trade & Prices

Course Code: 13A.265

L	T	P	C
2	0	2	3

Course Objective:

- To impart understanding of the complexities involved and the identification of bottlenecks with a view to providing efficient services in the transfer of farm products and inputs from producers to consumers.
- To impart knowledge of agriculture marketing, different systems, price analysis and trades, finance policy in Agriculture.

Unit I:

Agricultural Marketing: Concepts and definitions of market, marketing, agricultural marketing, market structure, marketing mix and market segmentation, classification and characteristics of agricultural markets; demand, supply and producer's surplus of agri-commodities: nature and determinants of demand and supply of farm products, producer's surplus – meaning and its types, marketable and marketed surplus, factors affecting marketable surplus of agri-commodities;

Unit II:

Product life cycle (PLC) and competitive strategies: Meaning and stages in PLC; characteristics of PLC; strategies in different stages of PLC; pricing and promotion strategies: pricing considerations and approaches – cost based and competition based pricing; market promotion – advertising, personal selling, sales promotion and publicity – their meaning and merits & demerits; 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);

Unit III:

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;

Unit IV:

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:

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

Suggested Reading:

1. *Richard L. & Others. Marketing of Agricultural Products*
2. *K. Prabhakar Rajkumar. Agricultural Finance in India*
3. *S S Acharya and N L Agarwal. 2012. Agricultural Marketing in India. Oxford & IBH Publications Co. Pvt. Ltd., New Delhi.*
4. *S S Acharya and N L Agarwal. Agricultural Price: Analysis and Policy. Oxford & IBH Publications Co. Pvt Ltd., New Delhi.*
5. *Subba Reddy, S., P.Raghu Ram., Sastry, T.V.N and Bhavani Devi, I. 2016. Agricultural Economics. Oxford & IBH Publishing Company Private Ltd., New Delhi,*
6. *Kahlon, A.S and Tyagi.D S. 1983. Agricultural Price Policy in India. Allied Publishers Pvt. Ltd., New Delhi.*
7. *Mamoria, C.B. and Joshi. R L.1995. Principles and Practices of Marketing in India. Kitab Mahal, Allahabad*

Program: B.Sc.(Hons.) Agriculture

Semester: Fourth

Course: Introductory Agro-meteorology & Climate Change

Course Code: 13A.266

L	T	P	C
1	0	2	2

Course Objective:

- To impart knowledge regarding atmosphere and its weather variables
- To provide exposure to agro-meteorological observatory

Unit I:

Meaning and scope of agricultural meteorology; Earth atmosphere- its composition, extent and structure; Atmospheric weather variables; Atmospheric pressure, its variation with height; Wind, types of wind, daily and seasonal variation of wind speed, cyclone, anticyclone, land breeze and sea breeze;

Unit II:

Nature and properties of solar radiation, solar constant, depletion of solar radiation, short wave, longwave and thermal radiation, net radiation, albedo; Atmospheric temperature, temperature inversion, lapse rate, daily and seasonal variations of temperature, vertical profile of temperature, Energy balance of earth;

Unit III:

Atmospheric humidity, concept of saturation, vapor pressure, process of condensation, formation of dew, fog, mist, frost, cloud; Precipitation, process of precipitation, types of precipitation such as rain, snow, sleet, and hail, cloud formation and classification; Artificial rainmaking. Monsoon- mechanism and importance in Indian agriculture, Weather hazards - drought, floods, frost, tropical cyclones and extreme weather conditions such as heat-wave and cold-wave.

Unit IV:

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:

1. Visit of Agrometeorological Observatory, site selection of observatory, exposure of instruments and weather data recording.
2. Measurement of total, shortwave and longwave radiation, and its estimation using Planck's intensity law.
3. Measurement of albedo and sunshine duration, computation of Radiation Intensity using BSS.
4. Measurement of maximum and minimum air temperatures, its tabulation, trend and variation analysis.
5. Measurement of soil temperature and computation of soil heat flux.
6. Determination of vapor pressure and relative humidity.
7. Determination of dew point temperature.
8. Measurement of atmospheric pressure and analysis of atmospheric conditions.
9. Measurement of wind speed and wind direction, preparation of wind rose.

10. Measurement, tabulation and analysis of rain.
11. Measurement of open pan evaporation and evapo-transpiration.
12. Computation of PET and AET.

Suggested Reading:

1. *V. Radha Krishna Murthy. Terminology on Agricultural Meteorology and Agronomy*
2. *G.S L.H.V Prasada Rao. Agriculture Meteorology*
3. *Radha Krishna Murthy, V.2016. Principles and practices of agricultural disaster management. B.S Publications, Koti, Hyderabad.*
4. *Reddy, S.R.2014. Introduction to Agriculture and Agrometeorology. Kalyani Publishers, Ludhiana, Punjab.*
5. *Radha Krishna Murthy, V. 2002. Basic Principles of Agricultural meteorology. B.S Publications, Koti, Hyderabad.*

ELECTIVES

Program: B.Sc. (Hons.) Agriculture

Semester: Fourth

Course: Agrochemicals

Course Code: 13A.271

L	T	P	C
2	0	2	3

Course Objective:

- To impart advanced knowledge about fertilizers and pesticides
- To understand the calculation of concentration and dosage of fertilizers and pesticides.
- To impart knowledge regarding fertilizer logistics and marketing

Unit I:

An introduction to agrochemicals, their type and role in agriculture, effect on environment, soil, human and animal health, merits and demerits of their uses in agriculture, management of agrochemicals for sustainable agriculture. Herbicides-Major classes, properties and important herbicides. Fate of herbicides. Fungicides - Classification – Inorganic fungicides - characteristics, preparation and use of sulfur and copper, Mode of action-Bordeaux mixture and copper oxychloride. Organic fungicides- Mode of action-Dithiocarbamates-characteristics, preparation and use of Zineb and maneb.

Unit II:

Systemic fungicides- Benomyl, carboxin, oxycarboxin, Metalaxyl, Carbendazim, characteristics and use. Introduction and classification of insecticides: inorganic and organic insecticides Organochlorine, Organophosphates, Carbamates, Synthetic pyrethroids Neonicotinoids, Biorationals, Insecticide Act and rules, Insecticides banned, withdrawn and restricted use, Fate of insecticides in soil & plant. IGRs Biopesticides, Reduced risk insecticides, Botanicals, plant and animal systemic insecticides their characteristics and uses.

Unit III:

Fertilizers and their importance. Nitrogenous fertilizers: Feedstocks and Manufacturing of ammonium sulphate, ammonium nitrate, ammonium chloride, urea. Slow release N-fertilizers. Phosphatic fertilizers: feedstock and manufacturing of single superphosphate. Preparation of bone meal and basic slag. Potassic fertilizers: Natural sources of potash, manufacturing of potassiumchloride, potassium sulphate and potassium nitrate.

Unit IV:

Mixed and complex fertilizers: Sources and compatibility–preparation of major, secondary and micronutrient mixtures. Complex fertilizers: Manufacturing of ammonium phosphates, nitrophosphates and NPK complexes. Fertilizer control order. Fertilizer logistics and marketing. Plant bio-pesticides for ecological agriculture, Bio-insect repellent.

Practical:

1. Sampling of fertilizers and pesticides.
2. Pesticides application technology to study about various pesticides appliances.
3. Quick tests for identification of common fertilizers.

4. Identification of anion and cation in fertilizer.
5. Calculation of doses of insecticides to be used.
6. To study and identify various formulations of insecticide available in market.
7. Estimation of nitrogen in Urea.
8. Estimation of water soluble P_2O_5 and citrate soluble P_2O_5 in single super phosphate.
9. Estimation of potassium in Muriate of Potash/ Sulphate of Potash by flame photometer.
10. Determination of copper content in copper oxychloride.
11. Determination of sulphur content in sulphur fungicide.
12. Determination of thiram.
13. Determination of ziram content.

Program: B.Sc. (Hons.) Agriculture
Semester: Fourth
Course: Bio-pesticides & Bio-fertilizers
Course Code: 13A.271

L	T	P	C
2	0	2	3

Course Objective:

- To familiarize about bio- pesticides and botanicals
- To impart skill of mass production of bio- pesticides

Unit I:

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.

Unit II:

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.

Unit III:

Biofertilizers - Introduction, status and scope. Structure and characteristic features of bacterial biofertilizers- Azospirillum, Azotobacter, Bacillus, Pseudomonas, Rhizobium and Frankia; Cyanobacterial biofertilizers- Anabaena, Nostoc, Hapalosiphon and fungal biofertilizers- AM mycorrhiza and ectomycorrhiza. Nitrogen fixation -Free living and symbiotic nitrogen fixation. Mechanism of phosphate solubilization and phosphate mobilization, K solubilization.

Unit IV:

Production technology: Strain selection, sterilization, growth and fermentation, mass production of carrier based and liquid biofertilizers. 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:

1. Isolation and purification of important biopesticides Trichoderma Pseudomonas, Bacillus, Metarhizium etc. and its production.
2. Identification of important botanicals.
3. Visit to biopesticide laboratory in nearby area.
4. Field visit to explore naturally infected cadavers.
5. Identification of entomopathogenic entities in field condition.
6. Quality control of biopesticides.
7. Isolation and purification of Azospirillum, Azotobacter, Rhizobium, P-solubilizers and cyanobacteria.
8. Mass multiplication and inoculum production of biofertilizers.
9. Isolation of AM fungi -Wet sieving method and sucrose gradient method.
10. Mass production of AM inoculants.

Program: B.Sc. (Hons.) Agriculture

Semester: Fourth

Course: Weed Management

Course Code: 13A.271

L	T	P	C
2	0	2	3

Course Objective:

- To familiarize with different weeds
- To understand different herbicides and their application, compatibility and resistance.

Unit I:

Introduction to weeds, characteristics of weeds their harmful and beneficial effects on ecosystem. Classification, reproduction and dissemination of weeds.

Unit II:

Herbicide classification, concept of adjuvant, surfactant, herbicide formulation and their use. Introduction to mode of action of herbicides and selectivity.

Unit III:

Allelopathy and its application for weed management. Bio-herbicides and their application in agriculture. Concept of herbicide mixture and utility in agriculture.

Unit IV:

Herbicide compatibility with agro-chemicals and their application. Integration of herbicides with non chemical methods of weed management. Herbicide Resistance and its management.

Practical:

1. Techniques of weed preservation.
2. Weed identification and their losses study.
3. Biology of important weeds.
4. Study of herbicide formulations and mixture of herbicide.
5. Herbicide and agro-chemicals study.
6. Shift of weed flora study in long term experiments.
7. Study of methods of herbicide application, spraying equipments.
8. Calculations of herbicide doses and weed control efficiency and weed index.

Program: B.Sc.(Hons.) Agriculture

Semester: Fourth

Course: NSS

Course Code: 13AP.117

L	T	P	C
0	0	4	0

NSS

Unit I:

Youth and crime

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

Unit II:

Civil/self defence

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

Unit III:

Resource mobilisation

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

Unit IV:

Additional life skills

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