

**Detailed Course Scheme**  
**Bachelor of Science (Hons.)**  
**Agriculture**

**Semester- IV**  
**(2020- 21)**

DOC202002250018



**RNB GLOBAL UNIVERSITY**

RNB Global City, Ganganagar Road,  
Bikaner, Rajasthan 334601

## **OVERVIEW**

RNB Global University follows Semester System along with Choice Based Credit System as per latest guidelines of University Grants Commission (UGC). Accordingly, each academic year is divided into two semesters, **Odd (July-December) and Even (January-June)**. Also, the university follows a system of continuous evaluation along with regular updating in course curricula and teaching pedagogy.

The Curriculum for B. Sc Agriculture Program along with examination pattern is as follows:

### **Course Scheme**

#### **Semester -IV**

| <b>S.No.</b> | <b>Course Code</b> | <b>Course Name</b>  | <b>L</b> | <b>T</b> | <b>P</b> | <b>Credits</b> |
|--------------|--------------------|---|----------|----------|----------|----------------|
| 1.           | 20014200           | Crop Production Technology -II (Rabi Crops)                         | 1        | 0        | 0        | 1              |
| 2.           | 20014300           | Crop Production Technology -II (Rabi Crops) Lab                     | 0        | 0        | 2        | 1              |
| 3.           | 20014400           | Production Technology for Ornamental Crops, MAP and Landscaping     | 1        | 0        | 0        | 1              |
| 4.           | 20014500           | Production Technology for Ornamental Crops, MAP and Landscaping Lab | 0        | 0        | 2        | 1              |
| 5.           | 20014600           | Renewable Energy and Green Technology                               | 1        | 0        | 0        | 1              |
| 6.           | 20014700           | Renewable Energy and Green Technology Lab                           | 0        | 0        | 2        | 1              |
| 7.           | 20014800           | Problematic Soils and their Management                              | 2        | 0        | 0        | 2              |
| 8.           | 20014900           | Production Technology for Fruit and Plantation Crops                | 2        | 0        | 0        | 1              |
| 9.           | 20015000           | Production Technology for Fruit and Plantation Crops Lab            | 0        | 0        | 2        | 1              |
| 10.          | 20015100           | Principles of Seed Technology                                       | 1        | 0        | 0        | 1              |
| 11.          | 20015200           | Principles of Seed Technology lab                                   | 0        | 0        | 4        | 2              |
| 12.          | 20015300           | Plant Biotechnology   | 2        | 0        | 0        | 2              |
| 13.          | 20015400           | Plant Biotechnology Lab   | 0        | 0        | 2        | 1              |
| 14.          | 20015500           | Agricultural Marketing Trade & Prices                               | 2        | 0        | 0        | 2              |
| 15.          | 20015600           | Agricultural Marketing Trade & Prices Lab                           | 0        | 0        | 2        | 1              |
| 16.          | 20015700           | Fundamentals of Agriculture Extension Education                     | 2        | 0        | 0        | 2              |
| 17.          | 20015800           | Fundamentals of Agriculture Extension Education Lab                 | 0        | 0        | 2        | 1              |

|              |          |                                       |           |          |           |           |
|--------------|----------|---------------------------------------|-----------|----------|-----------|-----------|
| 18.          | -        | Elective-I                            | 2         | 0        | 0         | 2         |
| 19.          | -        | Elective Lab-I                        | 0         | 0        | 2         | 1         |
| 20.          | 20015900 | Ability and Skill Enhancement IV      | 2         | 0        | 0         | 2         |
| 21.          | 99002800 | Workshops & Seminars                  | -         | -        | -         | 1         |
| 22.          | 99002700 | Human Values & Social Service/NCC/NSS | -         | -        | -         | 1         |
| <b>Total</b> |          |                                       | <b>19</b> | <b>0</b> | <b>18</b> | <b>29</b> |

### Electives

| Elective          | Course Code | Course Name                   |
|-------------------|-------------|-------------------------------|
| <b>Elective I</b> | 20016000    | Agribusiness Management       |
|                   | 20016100    | Agribusiness Management Lab   |
|                   | 20016200    | Agrochemicals                 |
|                   | 20016300    | Agrochemicals Lab             |
|                   | 20016400    | Commercial Plant Breeding     |
|                   | 20016500    | Commercial Plant Breeding Lab |
|                   | 20016600    | Landscaping                   |
|                   | 20016700    | Landscaping Lab               |

### EVALUATION SCHEME - THEORY

The evaluation of the theory paper of B.Sc. Agriculture program would be based on Internal and External Assessments. Internal Assessment would consist of 50% of the marks (50 marks) and external assessment (in form of End Term Exam) would consist of remaining 50% marks (50 marks). Detailed scheme of Internal and External Assessments as follows:

#### Internal Assessment

The distribution of Internal Assessment Marks is as follows:

| Type   | Details   | Marks     |
|--|---|-----------|
| Mid Term   | Two Mid-term Sessional of 15 marks each (15+15) | 30        |
| Marks obtained in various Tests, Assignments, Presentations, Quiz, Tutorials, etc. | Average of marks obtained                       | 15        |
| Attendance   | 75%+ : 5 marks                                  | 5         |
| <b>TOTAL</b>   |   | <b>50</b> |

### **External Assessment**

| Type   | Marks |
|--------|-------|
| Theory | 50    |

### **EVALUATION SCHEME - PRACTICAL**

The evaluation of the practical paper of B.Sc. Agriculture program would be based on Internal and External Assessments. Internal Assessment would consist of 50% of the marks (50 marks) and external assessment (in form of End Term Exam) would consist of remaining 50% marks (50 marks). Detailed scheme of Internal and External Assessment is as follows:

#### **Internal Assessment**

| Type  | Details                   | Marks |
|---|---------------------------|-------|
| Marks obtained in various manuals, practical file, participation, any model prepared, output of practical | Average of marks obtained | 45    |
| Attendance  | 75%+ : 5 marks            | 5     |
| <b>TOTAL</b>  | <b>50</b>                 |       |

#### **External Assessment**

| Type      | Marks |
|-----------|-------|
| Practical | 50    |

### **EVALUATION SCHEME- WORKSHOPS & SEMINARS & NCC/NSS**

1. NCC/NSS will be completed from Semester I – Semester IV. It will be evaluated internally by the institute. The credit for this will be given at the end of Semester.
2. The students have to join club/clubs with the active participation in different activities of club. The students would be continuously assessed from Semester-I to Semester-IV and credits and marks would be given after the end of Semester.

## **CURRICULUM**

### **Course Name: Crop Production Technology –II (Rabi Crops)**

**Course Code: 20014200**

#### **Course Outline**

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-rape seed, mustard and sunflower; sugar crops-sugarcane; medicinal and aromatic crops-mentha, lemon grass and citronella, Forage crops-berseem, lucerne and oat.

### **Course Name: Crop Production Technology –II (Rabi Crops) Lab**

**Course Code: 20014300**

#### **Course Outline**

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

### **Course Name: Production Technology for Ornamental Crops, MAP and Landscaping**

**Course Code: 20014400**

#### **Course Outline**

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, liliun 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.

**Course Name: Production Technology for Ornamental Crops, MAP and Landscaping Lab**

**Course Code: 20014500**

**Course Outline**

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

**Course Name: Renewable Energy and Green Technology**

**Course Code: 20014600**

**Course Outline**

**Unit I**

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.

**Unit II**

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.

**Course Name: Renewable Energy and Green Technology Lab**

**Course Code: 20014700**

**Course Outline**

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, To study solar drying system.
10. To study solar distillation and solar pond.

**Course Name: Problematic Soils and their Management**

**Course Code: 20014800**

**Course Outline**

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.

**Course Name: Production Technology for Fruit and Plantation Crops**

**Course Code: 20014900**

**Course Outline**

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.

**Course Name: Production Technology for Fruit and Plantation Crops  
Lab**

**Course Code: 20015000**

**Course Outline**

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

## **Course Name: Principles of Seed Technology**

**Course Code: 20015100**

### **Course Outline**

#### **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. Seed drying, processing and their steps, seed testing for quality assessment, seed treatment, its importance, method of application and seed packing.

#### **Unit III**

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.

## **Course Name: Principles of Seed Technology Lab**

**Course Code: 20015200**

### **Course Outline**

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. Seed production in important vegetable crops
4. Seed sampling and testing: Physical purity, germination, viability, etc.
5. Seed and seedling vigour test. Genetic purity test:
6. Grow out test and electrophoresis.
7. Seed certification: Procedure, Field inspection, Preparation of field inspection report.



8. Visit to seed production farms, seed testing laboratories and seed processing plant.

## **Course Name: Plant Biotechnology**

**Course Code: 20015300**

### **Course Outline**

#### **Unit I**

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, applications. Somaclonal variation: Types, Reasons: Somatic embryogenesis and synthetic seed production technology; Protoplast isolation, culture, manipulation and fusion; products of somatic hybrids and cybrids.

#### **Unit II**

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.

### **Suggested Readings**

1. Singh, B D, 2004. *Biotechnology Expanding Horizons* 2nd Edn. Kalyani Publishers, New Delhi.
2. Gupta, P.K., 2015. *Elements of Biotechnology* 2nd Edn. Rastogi and Co., Meerut.
3. Razdan M K, 2014. *Introduction to plant Tissue Culture* 2nd Edn. Science Publishers, inc. USA.
4. Gautam V K, 2005. *Agricultural Biotechnology*. Sublime Publications
5. Thomar, R.S., Parakhia, M.V., Patel, S.V. and Golakia, B.A., 2010. *Molecular markers and Plant biotechnology*, New Publishers, New Delhi.
6. Gupta, P.K. 1994. *Elements of biotechnology*. Rastogi Pub. Meerut.
7. Chahal, G.S. and Gosal, S.S. 2003. *Principles and procedures of plant approaches breeding Biotechnological and conventional*. Narosa Publishing House, New Delhi

## **Course Name: Plant Biotechnology Lab**

**Course Code: 20015400**

### **Course Outline**

1. Requirements of Plant tissue culture laboratory:
2. Techniques in Plant tissue culture- Media

3. Components and preparation; sterilization techniques and inoculation of various explants, callus
4. induction and plant regeneration;
5. Demonstration of Micropropagation, Anther culture, embryo culture,
6. Hardening/ Acclimatization of regenerated plants, somatic embryogenesis and synthetic seed production,
7. Demonstration of isolation and culture of protoplast,
8. demonstration of isolation of DNA, gene transfer technique and gel electrophoresis techniques

### **Suggested Readings:**

1. Purohit, S.S., 2004. *A Laboratory Manual of Plant Biotechnology* 2nd Edn. Agribios, India.
2. Singh, B.D. 2012. *Plant biotechnology*. Kalyani publishers, Ludhiana
3. Gupta, P.K. 1994. *Elements of biotechnology*. Rastogi Pub. Meerut.
4. Chahal, G.S. and Gosal, S.S. 2003. *Principles and procedures of plant approaches breeding Biotechnological and conventional*. Narosa Publishing House, New Delhi

## **Course Name: Agricultural Marketing Trade & Prices**

### **Course Code: 20015500**

### **Course Outline**

#### **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); Market functionaries and marketing channels: Types and importance of agencies involved in agricultural marketing; meaning and definition of marketing channel; number of channel levels;

### **Unit III**

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 ,

### **Suggested Readings**

1. Ghosal, SN., Agricultural Financing in India, Asia Publishing House, Bombay, 1966
2. Johi, S.S. and C.V.Moore., Essentials of Farm Financial Management, Today and Tomorrow's Printers and Publishers, New Delhi, 1970
3. John, J.Hamprton., Financial Decision Making: Concepts, Problems and Cases, Prentice-Hall of India , New Delhi, 1983
4. Kenneth, Duft D., Principles of Management in Agribusiness, Reston Publishing Company, Reston, 1979
5. Mamoria, C.B. and R.D. Saksena., Co-operation in India, Kitab Mahal, Allahabad, 1973
6. Mamoria, C.B. and Saxena., Agricultural Problems in India, Kitab Mahal, Allahabad
7. Mukhi, H R. 1983. Cooperation in India and Abroad. New Heights Publishers, New Delhi.
8. Muniraj, R., Farm Finance for Development, Oxford & IBH Publishing Company Private Ltd., New Delhi, 1987
9. Subba Reddy, S. and P.Raghuram., Agricultural Finance and Management, Oxford & IBH Publishing Company Private Ltd., New Delhi, 2005
10. Subba Reddy, S., P.Raghu ram., P. Sastry, T.V.N. and Bhavani Devi I. 2010. Agricultural Economics., Oxford & IBH Publishing Company Private Ltd., New Delhi, 2010
11. William, G. Murray and Nelson Aarson, G., Agricultural Finance, The Iowa State University Press, Ames, Iowa, 1960

**Course Name: Agricultural Marketing Trade & Prices lab**

**Course Code: 20015600**

### **Course Outline**

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; Computation of marketable and marketed surplus of important commodities; Study of price behaviour over time for some selected commodities;
3. Construction of index numbers; Visit to a local market to study various marketing functions performed by different agencies,
4. identification of marketing channels for selected commodity, collection of data regarding marketing costs, margins and price spread and presentation of report in the class;
5. Visit to market institutions – NAFED, SWC, CWC, cooperative marketing society, etc. to study their organization and functioning;
6. Application of principles of comparative advantage of International Trade

**Course Name: Fundamentals of Agriculture Extension Education**

**Course Code: 20015700**

**Course Outline**

Syllabus to be shared at a later stage.

**Course Name: Fundamentals of Agriculture Extension Education lab**

**Course Code: 20015800**

**Course Outline**

Syllabus to be shared at a later stage.

**Course Name: Agribusiness Management**

**Course Code: 20016000**

**Course Outline**

Transformation of agriculture into agribusiness, various stakeholders and components of

agribusiness systems. Importance of agribusiness in the Indian economy and New Agricultural Policy. Distinctive features of Agribusiness Management: Importance and needs of agro-based industries, Classification of industries and types of agro based industries. Institutional arrangement, procedures to set up agro based industries. Constraints in establishing agro-based industries.

Agri-value chain: Understanding primary and support activities and their linkages. Business environment: PEST & SWOT analysis. Management functions: Roles & activities, Organization culture. Planning, meaning, definition, types of plans. Purpose or mission, goals or objectives, Strategies, policies procedures, rules, programs and budget. Components of a business plan, Steps in planning and implementation. Organization staffing, directing and motivation. Ordering, leading, supervision, communications,

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

### **Course Name: Agribusiness Management Lab**

**Course Code:20016100**

#### **Course Outline**

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

### **Course Name: Agrochemicals**

**Course Code: 20016200**

#### **Course Outline**

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. 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. 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 potassium chloride, potassium sulphate and potassium nitrate.

Mixed and complex fertilizers: Sources and compatibility-preparation of major, secondary

and micronutrient mixtures. Complex fertilizers: Manufacturing of ammonium phosphates,

nitro phosphates and NPK complexes. Fertilizer control order. Fertilizer logistics and marketing.

Plant bio-pesticides for ecological agriculture, Bio-insect repellent.

### **Course Name: Agrochemicals Lab**

**Course Code: 20016200**

#### **Course Outline**

1. Sampling of fertilizers and pesticides.
2. Pesticides application technology to study about various pesticides appliances. Quick tests for identification of common fertilizers.
3. Identification of anion and cation in fertilizer. Calculation of doses of insecticides to be used.
4. To study and identify various formulations of insecticide available in market. Estimation of nitrogen in Urea.
5. Estimation of water soluble P<sub>2</sub>O<sub>5</sub> and citrate soluble P<sub>2</sub>O<sub>5</sub> in single super phosphate. Estimation of potassium in Murexite of Potash/ Sulphate of Potash by flame photometer. Determination of copper content in copper oxychloride.
6. Determination of sulphur content in sulphur fungicide. Determination of thiram. Determination of ziram content.

### **Course Name: Commercial Plant Breeding**

**Course Code: 20016300**

#### **Course Outline**

Types of crops and modes of plant reproduction. Line development and maintenance breeding in self- and cross-pollinated crops (A/B/R and two line system) for development of hybrids and seed production. Genetic purity test of commercial hybrids. Advances in hybrid seed production of maize, rice, sorghum, pearl millet, castor, sunflower, cotton pigeon pea, Brassica etc. Quality seed production of vegetable crops under open and protected environment. Alternative strategies for the development of the line and cultivars: haploid inducer, tissue culture techniques and biotechnological tools. IPR issues in commercial plant breeding: DUS testing and registration of varieties under PPV & FR Act. Variety testing, release and notification systems in India. Principles and

techniques of seed production, types of seeds, quality testing in self- and cross-pollinated crops.

### **Course Name: Commercial Plant Breeding lab**

**Course Code: 20016400**

#### **Course Outline**

1. Floral biology in self- and cross-pollinated species, selfing and crossing techniques. Techniques of seed production in self- and cross-pollinated crops using A/B/R and two line system.
2. Learning techniques in hybrid seed production using male-sterility in field crops. Understanding the difficulties in hybrid seed production,
3. Tools and techniques for optimizing hybrid seed production.
4. Concept of rouging in seed production plot.
5. Concept of line its multiplication and purification in hybrid seed production.
6. Role of pollinators in hybrid seed production.
7. Hybrid seed production techniques in sorghum, pearl millet, maize, rice, rapeseed-mustard, sunflower, castor, pigeon pea, cotton and vegetable crops.
8. Sampling and analytical procedures for purity testing and detection of spurious seed.
9. Seed drying and storage structure in quality seed management.
10. Screening techniques during seed process.

### **Course Name: Landscaping**

**Course Code: 20016500**

#### **Course Outline**

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.

## **Course Name: Landscaping lab**

**Course Code: 20016600**

### **Course Outline**

1. Identification of trees, shrubs, annuals, pot plants;
2. 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.
3. Use of computer software, visit to important gardens/ parks/ institutes.

## **Course Name: Ability and Skill Enhancement Module IV**

**Course Code:20015900**

### **Course Outline - Final Assessment – Mock Interviews & PI Kit Submission**

#### **Unit I : Tele – Etiquettes**

Receiving Calls, Placing a call, Ending Calls, Transferring calls, Taking Message/ Voice Mails, Placing call on hold, Handling Complaints.

#### **Unit II: Confidence Building & Brain Storming**

How to build confidence by positive thinking, identifying negative thoughts, how to control negative thoughts entering our mind, identifying personal talents, and its ways to improve, how to develop good habits and having principles and follow them at all times.

Need to learn new things, ideas and skills, what is brain storming, why do we need it, what are the different ways of brain storming through logics and reasoning, Brain Storming Session.

#### **Unit III: PI Kit**

What is resume, Format of Resume, Formatting, Resume Preparation, Covering Letter, PI Kit.

#### **Unit IV: Interview Skills**

Mastering the art of giving interviews in - selection or placement interviews, web /video conferencing, Mock Interview, HR Expert Mock Interview, Telephonic Interviews.



**Unit V: Internship Preparation: Company Specific Research and Presentation**

Identifying domain specific industries, researching the industry, Industry analysis, Presentation on specific industry/company.

**Note:** The review of Syllabus happens on periodic basis for the benefit of the students. In case there are changes in curriculum due to review, students would be intimated in writing.

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