

**INTRODUCTION TO PLANT BIOTECHNOLOGY****Unit I**

Definition, scope and importance of plant biotechnology. Outlines of basic steps involved in plant, biotechnology/genetic engineering such as:

- (a) Isolation of plant DNA and vector DNA
- (b) Restriction of DNA by endonucleases.
- (c) Electrophoresis of restricted DNA fragments.

**Unit II**

Cloning vectors for recombinant DNA such as -

- (a) Ti-plasmid vector for higher plants.
- (b) Plant viruses such as cauliflower mosaic virus (Ca MV), Tobacco mosaic virus (TMV) and Gemini virus as vectors.

**Unit III**

Application of plant genetic engineering in crop improvement.

**Unit IV**

Plant Tissue culture:

- (i) Culture media used in plant tissue culture.
- (ii) Somaclonal and Gametoclinal variation in plants.
- (iii) Micro-propagation of plants.
- (iv) Application of plant tissue culture in crop improvement.

Practical

1. Isolation of plant DNA
2. Preparation of culture media
3. Method of sterilizations.
4. Electrophoreses
6. Visit of different biological labs and Institution.

**PRINCIPLE OF FOOD SCIENCE AND HUMAN NUTRITION****Unit I**

Milk and its secretion, composition of colostrums and milk of different species. Physical Properties of colostrums, cow and buffalo milk. Factors affecting the quantity and quality of milk.

**Unit II**

Clean milk production, Microorganism of milk and their functions. Agencies engaged in handling and transportation of milk. Pricing of milk.

**Unit III**

Processing the milk. Filtration, Clarification, bactofugation, pasteurization, ultra high temperature treatment, homogenization, sterilization.

**Unit IV**

Cooling and chilling of milk. Membrane filtration and reverse osmosis processes. Common Adulterants and preservatives used in milk and their detection.

**Practical**

1. Sampling of milk
2. Determination of specific gravity by lactometer and west phal balance. Fat Test by Gerber's method total solid and SNF percentage by Richmond's scale and formula.
3. Assessment of quality of milk by simple casts like CO.B. Alcohol test, and Sediment test.
4. Determination of acidity of milk.
5. Calculations on Standardization and adulteration of milk.
6. Detection of common milk adulterants

**POST HARVEST MANAGEMENT OF FRUITS AND VEGETABLES**

**Unit I**

Importance and scope of post harvest management of fruits and vegetables; Post harvest deterioration of fruits and vegetables techniques and their control. Prolonging the life of fruits and vegetables.

**Unit II**

Handling, grading and packing of fruits and vegetables. Principles and methods of fruit and vegetables preservation.

**Unit III**

Dehydration of fruits and vegetables. Canning of pea, Tomato products.

**Unit IV**

Jam, Jelly and Squash: Preserve of Aonla, Pickles of Mango, Citrus, Chillies and mixed vegetables.

**Practical**

Practical knowledge of harvesting, handling, grading, precooling waxing and use of chemicals to prolong the post harvest life of fruits and vegetables. Visit to storage and centres carrying improved practices of post harvest handling.

Battling of green peas; Dehydration of seasonal fruits and vegetables; Preparation of apple jam, guava and karonda jellies; Preparation of lime and orange squashes, Aonla and bael preserve. Tomato juice and ketchup.

**CROPS PESTS AND INTEGRATED PEST MANAGEMENT****Unit I**

Methods of insect control including mechanical, physical, cultural, biological legal and chemical control. Use of insecticides, repellents and antifeedants, attractants, chemosterilants, pheromones, insect growth regulators.

**Unit II**

Basic concept of integrated pest Management. Basic Principles of pest out-breaks and their economic status. Plant protection organization at the State and National level.

**Unit III**

Pesticide application appliances and their safe handling: Sprayers, dusters and miscellaneous equipments. Pesticidal pollution and hazards, and their management.

**Unit IV**

General account of non-insect pests with particular reference to rodents. Nematodes, mites and mollusca. Insect vectors transmitting plant diseases.

**Practical**

1. Collection and preservation of established predators and parasites.
2. Field and laboratory acquaintance with non-insect pests and their damaged materials.
3. Numerical problem of pesticide.
4. Calibration of plant protection equipment.

**PLANT PATHOLOGY: CROP DISEASES AND THEIR MANAGEMENT**

**Unit I**

General symptoms of plant diseases and their classification. Methods of plant disease control. Elementary knowledge of different groups of fungicides.

**Unit II**

**Cereals and millets disease:** Green ear, Ergot and smut of Bajra, Stripe disease, Covered smut, Blast and Kharia disease of paddy. Carnal bunt, rusts, Powdery mildew, loose smut of wheat.

**Unit III**

**Oil Seed and Puls crop disease:** White rust of Curcifers, Rust of linseed, Tikka disease of groundnut and Wilt of Arhar

**Unit IV**

**Fruits, Vegetable and cash crop diseases:** Early and late blights of potato, Red rot of sugarcane, Citrus canker, Black tip of mango, Tobacco mosaic, Yellow vein mosaic of bhindi, Little leaf of brinjal, Bean and potato mosaic.

**Practical**

- (i) Diagnosis of important symptoms of plant diseases.
- (ii) Microscopic examination of diseased parts.
- (iii) Preparation of Bordeaux
- (iv) Practical record
- (v) Viva voce.

**WEED MANAGEMENT**

**Unit I**

Definition, classification and general characteristics of weeds, Losses caused by weeds.

**Unit II**

Principles and methods of solving weed problem. Weed control schedules for important field crops of U.P.

**Unit III**

Integrated weed management system and its importance.

**Unit IV**

Control of Abnoxious weeds viz. Sedge grass, kans, Baisuri and Satyanasi.

**Practical**

1. Identification and preservation of important weeds of locality.
2. Calculation on quantities of herbicides, weed control efficiency and weed index.
3. Calculation of cost involved in different weed control schedules.

**SOIL FERTILITY, FERTILIZERS AND INTEGRATED NUTRIENT  
MANAGEMENT****Unit I**

Soil fertility concept, soil productivity, factors influencing soil fertility, maintenance of soil productivity's. Essential plant nutrients, Criteria of essentiality; functions, deficiency symptoms, critical levels of deficiency and toxicity.

**Unit II**

Mechanism of uptake and transport of mineral salts in plants. Soil fertility evaluation, soil and plant analysis, tissue tests. Mineralization and immobilization of N and fixation and availability of P and K in soil.

**Unit III**

Fertilizers - definition, classification, characteristics, reactions of fertilizer in soil, Important fertilizer elements - Nitrogen, phosphorus, potassium, sulphur, zinc. Mixed and complex fertilizers. Manufacture of urea, ammonium sulphate, superphosphate and muriatic of potash. Organic sources of nutrients, Digested sludge, manure, compost and green manures.

**Unit IV**

Integrated nutrient management (INM) concept, Elementary idea of INM models, Integrated nutrient management and soil health. Elementary idea of bio-fertilizers.

**Practical**

Analysis of N, P and K in fertilizers. Determination of availability of NPK and S in soil. Elementary idea of determination of micronutrients in soil. Plant Tissue tests.