

Program on Organic Farming
Course code D02

Hours: 36

1. A. What is Organic Farming?
B. Why Organic Farming?
Detrimental effects of currently chemical dependent farming.
 - i) Reduction of crop production due to depletion of soil Health.
 - ii) Pesticide contamination and human health hazard.
 - iii) Contamination of food products by pesticides & chemicals.
 - iv) Environmental (soil, water, air) pollution.
 - v) Reduction of natural enemies of crop pests.
 - vi) Threat to Bio diversity.
2. i) Historical development of Organic Agriculture in India.
ii) Present status of Organic Agriculture in West Bengal.
iii) Feasibility of adoption of organic Agriculture in West Bengal and its difficulties.
3. Types of Farming (Advantage & disadvantage of each system):
 - Pure Organic Farming – Definition, Concept & Benefits
 - Integrated Farming system (Combination of Organic and Inorganic)
 - Mixed Farming
4. Concept of different cropping systems in relation to Organic Farming (Inter cropping etc)
5. Organic Farming (Process)
 - Concept of farming system
 - Developing organic farms
 - Important steps & methods
6. Plant Nutrients:
 - Name of plant Nutrients
 - Functions of Nutrients in plant growth and Development
7. Nutrient uptake and Utilization by plant:
 - From Organics
 - From Inorganics
8. Balanced Nutrients supply:
 - a) For Organic Farming system using nutrients from Organic sources.
 - b) For conventional Farming system using nutrients from Organic and inorganic sources.
9. Sources of nutrients for Organic Agriculture:
 - o Organic Manure –
 - FYM/Rural compost, City compost, Oil cakes,
 - Animal wastes, Vermi composts, etc
 - Characterization and Nutrients content of the above sources (Data Chart)
 - o Green Manure –
 - Green Manure with Leguminous crops in crop rotation. In-situ incorporation of crop residues -Benefits
 - o Liquid Manure
 - o Bio fertilizers and their method of use
 - Nitrogenous
 - Phosphatic

- Potassic
- Availability of Nutrients from above sources
- Other Nitrogen contributing plants

10. Recycling of Organic matter in organic Agriculture

- Transformation of organic substances in soil

11. Preparation of Compost:

- Different Methods
- Enrichment of compost
- Nutrient composition

12. Preparation of vermin compost:

- Pit construction
- Raw materials
- Availability of specific species of earth worm
- Method of preparation
- Quality improvement of finished vermin compost

Certificate course in Bioinformatics

Course code D03

Hours: 50

UNIT I

Major Bioinformatics Resources: NCBI, EBI, ExPASy, RCSB

Various databases and bioinformatics tools available at these resources, organization of databases: data contents and formats, purpose and utility in Life Sciences

Open access bibliographic resources and literature databases: Open access bibliographic resources related to Life Sciences viz., PubMed, BioMed Central, Public Library of Sciences (PLOS)

UNIT II Sequence databases : Formats, querying and retrieval.

Nucleic acid sequence databases: GenBank, EMBL, DDBJ;

Protein sequence databases: Uniprot-KB: SWISS-PROT, TrEMBL, PIR-PSD Repositories for high throughput genomic sequences: EST, STS GSS, etc.; Genome Databases at NCBI, EBI, TIGR, SANGER

UNIT III

Sequence Analysis

File formats: Various file formats for bio-molecular sequences: GenBank, FASTA, GCG, MSF etc

Basic concepts: Sequence similarity, identity and homology, definitions of homologues, orthologues, paralogues

Scoring matrices: Basic concept of a scoring matrix, Matrices for nucleic acid and proteins sequences, PAM and BLOSUM series, principles based on which these matrices are derived

UNIT IV

Pairwise sequence alignments: Basic concepts of sequence alignment: local and global alignments, Needleman and Wunsch, Smith and Waterman algorithms for pairwise alignments, gap penalties, use of pairwise alignments for analysis of Nucleic acid and protein sequences and interpretation of results

Multiple sequence alignments (MSA): The need for MSA, basic concepts of various approaches for MSA (e.g. progressive, hierarchical etc.). Algorithm of CLUSTALW and PileUp and their application for sequence analysis (including interpretation of results), concept of dendrogram and its interpretation

UNIT V

Database Searches: Keyword-based searches using tools like ENTREZ and SRS Sequence-based searches: BLAST and FASTA

ENVIRONMENTAL MANAGEMENT

Course code D04

Hours: 30

WASTEWATER MANAGEMENT

AIR POLLUTION MANAGEMENT

SOLID WASTE & HAZARDOUS WASTE MANAGEMENT

ENVIRONMENTAL IMPACT ASSESSMENT

INTERNATIONAL TRADE IN AGRICULTURE

Course code D05

Hours: 40

- Unit – I: Importance of Agriculture in development, trade and agriculture, Inter-regional versus international trade importance of trade, case for free trade and for protectionism- globalization and agriculture.
- Unit – II: Trade policy of developing economies- Import substituting industrialization and export oriented industrialization.
- Unit – III: Overview of Foreign Trade and trade policy of India, Indian agricultural trade-trends and features, Agricultural Trade policy- Competitiveness of Indian Agriculture, - policy recommendations.
- Unit – IV: Export and import procedures and documentations: Introduction to international business- definition of international business.
- Unit – V: World agricultural trade: changing structure and pattern - status of developing economies - multilateralism and regionalism – impact on trade.

RECOMBINANT DNA TECHNOLOGY

Course code D06

Hours: 50

UNIT I

Heterologous protein expression of cloned DNA in E.coli: Expression vectors optimization of protein expression Fusion proteins, cell-free translation systems. RNAi vectors.

DNA transformation in yeast: methods of gene transfer to yeast ,YIp, YEp, YCp, YRp, shuttle vectors), optimization of protein expression.

UNIT II

Gene transfer to plants: Biolistics, protoplast mediated, electroporation, Agrobacterium mediated transfer (Ti plasmid, disarmed vectors, cointegrate vectors, binary vectors), virus mediated transfer (CaMV), in planta transformation, signals for optimization of protein synthesis.

UNIT III

Characterization of cloned DNA : Restriction mapping, DNA sequencing, chemical degradation, pyrosequencing, shotgun sequencing and contig assembly).

Polymerase Chain Reaction and its applications: components of the PCR, importance of primer designing, various thermostable enzymes vs Taq polymerase. RAPD etc

UNIT IV

Modification of cloned DNA : Site directed mutagenesis(cassette mutagenesis, primer extension method, overlap extension method, megaprimer method), selection against parental phenotype. Protein engineering

UNIT V

Applications of recombinant DNA technology : Transgenic animals, Transgenic plants, Gene therapy, Pharmaceutical products.

Introduction to Agri-Business

Course code D07

Hours: 35

- Unit I: Scope, nature and significance of agricultural business.
- Unit II: Agro processing industries- Sugar industries, Oilseeds, Dairy processing, other agri- processing industries
- Unit III: Horticulture and Floriculture- importance of horticulture and floriculture processing of horticulture and floriculture, medicinal plants; Mashroom cultivation and sericulture: production, marketing, economics of mashroom and sericulture
- Unit IV: Input supply industries- Seeds, Seedling, Fertilizers, Bio-fertilisers, Pesticides, Implements

Personality Development

Course code D08

Hours: 35

- I. Introduction to Personality Development
- a. What is personality?
 - b. Why does it matter?
 - c. We are all unique.
- II. The Developing Personality
- a. How do personalities develop?
 - b. Multiple theories in psychology.
 - c. Three main influences cited:
 - i. Heredity
 - ii. Environment
 - iii. Situations
- III. Stages of Development
- a. Freudian stages of development
 - b. Erik Erickson's stages of development
- IV. 'Need' a little personality?

- a. How needs impact personality
- b. Maslow's hierarchy of needs
- V. Basic Personality Traits
 - a. Values
 - b. Beliefs
 - c. Interactions
 - d. Experiences
 - e. Environmental influences
 - f. The big five dimensions
- VI. Moral Development
 - a. As related to personality
 - b. Kohlberg's stages
- VII. What's your personality type?
 - a. What are the basic personality types?
 - b. Quiz to determine personality type
 - c. Learning about yourself through type
- VIII. Hearing Jung Out
 - a. Who was Carl Jung
 - b. His contribution to personality development theory
- IX. Personality and Career Choice
 - a. Matching your career and personality
 - b. Why it matters
 - c. Self efficacy
- X. Changing Your Personality
 - a. Can personalities change?
 - b. Being yourself, being adaptable
 - c. Positive attitude
 - d. Individuality
 - e. Controlling emotions
- XI. Personality Disorders
 - a. What they are and why understanding them matters
 - i. Paranoid, schizoid, antisocial, borderline, narcissistic, avoidant, dependent, obsessive
 - ii. Symptoms
 - iii. Causes
 - iv. Treatments
- XII. Do opposites really attract?
 - a. Getting like personalities together, as well as opposites
 - b. What can happen
 - c. Multiple personalities on the same team
- XIII. Personal Growth

- a. Ways you can try to improve
 - b. Helpful tools and exercises
 - c. Benefits of keeping a journal
 - d. Setting goals, focusing on positives
- XIV. Working on Personality Changes
- a. Focusing on attitude
 - b. Staying motivated
 - c. Increasing confidence
 - d. Watching body language
 - e. Handling other people
- XV. Putting it all together
- a. Knowing your own personality strengths and weaknesses
 - b. Being able to identify other people's personality traits
 - c. Using that in your home, career and relationships

Water Resources Planning and Management

Course code D09

Hours: 35

Chapter 1: Assessment of Ground water and Surface Water Resources

- 1.1 Hydrologic Cycle
- 1.2 Groundwater Resources
 - 1.2.1 Types of Aquifers
 - 1.2.2 Groundwater Flow
 - 1.2.3 Groundwater as a Storage Medium
- 1.3 Surface Water Resources
- 1.4 Water Balance
- 1.5 Available Renewable Water Resources
 - 1.5.1 Water Scarcity
 - 1.5.2 A Rainbow of Water
 - 1.5.3 The Water Balance as a Result of Human Interference
- 1.6 Brief about Water Resources in Palestine
 - 1.6.1 Introduction
 - 1.6.2 Aquifer Basins in the West Bank and Gaza Strip
 - 1.6.3 Groundwater Aquifer Systems in the West Bank
 - 1.6.4 Groundwater Aquifer in the Gaza Strip
 - 1.6.5 Surface Catchments
- 1.7 Worked Examples on Chapter One Chapter

2: Water Resources Planning

- 2.1 Planning Concepts and Definitions.
- 2.2 Aim of Water Resources Planning
- 2.3 Levels of Water Resources Planning
- 2.4 Measurement of Objectives (Utility Trade-off Analysis)
- 2.5 Function and Role of Water Resources
- 2.6 Risk and Uncertainty
- 2.7 Phases of Water Resources Planning
- 2.8 Water Master Planning
- 2.9 Data Requirements for Water Resources Planning
- 2.10 Determination of Sustainable Yield
- 2.11 Methods of Forecasting Population
- 2.12 Storage Reservoirs Chapter

3: Water Resources Management

- 3.1 Functions of Water Resources Management
- 3.2 Water Scarcity and its impacts
- 3.3 Water Shortages vs. WRM
- 3.4 Water Resources Management in India
- 3.5 Evaluation of Water Resources Management Options in India.

Chapter 4: Water Demand Management

- 4.1 Concept
- 4.2 Potential Stresses on Water Demand
- 4.3 The Demand Management Approach
- 4.4 Water Demand and Water Quality Management

Chapter 5: Integrated Water Resources Management

- 5.1 Definition of IWRM
- 5.2 IWRM Principles
- 5.3 How to Implement IWRM
- 5.4 Legislative and Organizational Framework
- 5.5 Types and Forms of Private Sector Involvement

Chapter 6: Water Resource Systems

- 6.1 Optimization - General model for water resources
- 6.2 Reservoir Operation
- 6.3 Linear Programming - General applications
- 6.4 Optimal Design of Water Distribution Networks
- 6.5 Groundwater Management - Basics and Principles
- 6.6 Groundwater Management - Lumped Parameter Models
- 6.7 Optimization in Water Quality Management

Practical Aspects of Organic Agriculture

Course code D10

Hours: 30

1. Soil:

- Soil and its physical characters
- Soil types:-Alluvial, Laterite, Clay, Loam etc..
- Physical testing and assessment of soil types, weighment, water movement, etc.

2. Soil Conditioners:

- Lime, Dolomite, Gypsum, Basis slag, Organic Manures, etc.
- Use of soil conditioners for better management of soil, dosages by soil types,etc.
- Interaction

3. Preparation of FYM/Rural Compost / vermicompost

- Preparation of compost pit at appropriate location.
- Lining of pit with brick, polythene sheet
- Collection and accumulation of raw materials
- Aerated /Non aerated pits for quality manure production
- Collection of rotten manure and post treatment
- Interaction

4. Preparation of seed bed & raising of seedlings:

- Wet seedbed, manuring, sowing (broadcasting)
- Dry seed bed, bed size,manuring, soil treatment ,actual sowing in line/broadcasting,
- weeding, watering, hardening of seedling, time requirement for seedling growth, uprooting seedlings

5. Land preparation:

- Opening of land, removal of stubbles, weeds and other unwanted materials
- Preparation of final plot for sowing/transplanting & Drum Seeder
- Transplanting - i) General Method ii) SRI Method
- Other methods

6. Raising Seedlings in pots/seed pans:

- Preparation of potting mixture, its treatment.
- Seed treatment, making seeds ready for planting in seed pans.
- Seed sowing, very small seed, medium and large seeds.
- Aftercare – germination till seedlings are ready for planting through hardening

7. Undertaking Pot/Container Culture of Flowers, Vegetable and Fruit plants:

Preparation of potting mixture, planting seedlings, sapling and their maintenance for performance.

8. Practice Training on Interculture operations including:

- Field crops
- Pot grown crops for optimum growth and water use efficiency

9. Performance Trial of Pot grown Vegetables & Flowers by the Students

INTELLECTUAL PROPERTY RIGHTS

Course code D11

Hours: 30

INTRODUCTION TO INTELLECTUAL PROPERTY RIGHTS, LAWS AND ACTS

PATENTS, DESIGNS, COPYRIGHTS, AND TRADE MARKS

INTELLECTUAL ISSUES IN BIOTECHNOLOGY, HERBAL AND PHARMACEUTICAL PRODUCTS

PLANT VARIETIES PROTECTION, BIODIVERSITY AND GEOGRAPHICAL INDICATIONS

Training Program on Disaster Management

Course code - D12

Hours: 30

1. Emergency planning procedures
2. Hazards, risks and disasters
3. Technological development, environmental and sustainable development
4. Law and management fundamentals
5. Political, international and social issues
6. Roles of key agencies
7. Relief co-ordination and planning
8. Field skills
9. Disaster theory, statistics and logistics
10. Disaster mitigation, preparedness and response Earth catastrophes, fire and explosion
11. Physical, psychological and social reconstruction of disaster-affected communities

Program on medical laboratory technique

Course code - D13

Hours: 30

UNIT 1: Blood grouping and transfusion

Gist of day 1

- Blood has two main components: **serum** and cells. In 1900 Karl Landsteiner, a physician at the University of Vienna, Austria, noted that the sera of some individuals caused the red cells of others to **agglutinate**.
- This observation led to the discovery of the ABO blood group system, for which Landsteiner received the Nobel Prize.
- Based on the reactions between the red blood cells and the sera, he was able to divide individuals into three groups: A, B, and O.

Grouping

Blood group A

Blood group A, have A antigens on the surface of your red blood cells and B antibodies in blood plasma.

Blood group B

Blood group B, have B antigens on the surface of red blood cells and A antibodies in blood plasma.

Blood group AB

Blood group AB, have both A and B antigens on the surface of red blood cells and no A or B antibodies at all in blood plasma.

Blood group O

Blood group O (null), you have neither A or B antigens on the surface of red blood cells but have both A and B antibodies in blood plasma.

UNIT 2: Blood poisoning – Bacterial infection (6 Hours)

Gist of day 2

Blood poisoning is a serious infection. It occurs when bacteria are in the bloodstream. Despite its name, the infection has nothing to do with poison. Although not a medical term, “blood poisoning” is used to describe bacteremia, septicemia, or sepsis. Sepsis is a serious, potentially fatal infection. Blood poisoning can progress to sepsis rapidly. Prompt diagnosis and treatment are essential for treating blood poisoning, but understanding your risk factors is the first step in preventing the condition.

The symptoms of blood poisoning include:

- chills
- moderate or high fever
- weakness
- rapid breathing
- increased heart rate or palpitations
- paleness of the skin, especially in the face

Diagnosis:

- Blood culture testing
- Blood oxygen levels
- Blood count
- Clotting factor
- Urine tests including urine culture
- Chest X-ray



UNIT 3: Human anatomy (Circulatory system) (6 Hours)

Gist of day 3

The blood circulatory system, also called the cardiovascular system, consists of the heart and the blood vessels that run throughout the body. It delivers nutrients and oxygen to all cells of the body.

- There are many different circulatory system diseases all of which interrupt this complex process of distributing blood around the body.

Few heart disorders and its conditions:

- Atherosclerosis is a hardening of the arteries.
- Myocardial infarction (MI) is the technical term for a heart attack.
- Mitral valve prolapse means the mitral valve bulges out or prolapses because it does not close evenly.
- Angina pectoris means "pain in the chest" and occurs if the heart is not receiving enough blood.
- Arrhythmia and dysrhythmia are often used interchangeably, and both refer to abnormal heart rates and rhythms.
- Cardiac ischemia means the heart muscle is not getting enough oxygen to function properly.

UNIT 4: Blood Donation and Blood Banking (6 Hours)

Gist of day 4

- Blood banking is the process that takes place in a laboratory to ensure that the donated blood or blood products are safe before they are used in blood transfusions and other medical procedures.

- Blood banking includes typing the blood for compatibility and testing for infectious diseases.

A donor must be

- must be at least 16 to 17 years of age
- must be in good health
- must weigh at least 50 kg
- must pass the physical and health history examination given prior to donation

Test performed before blood banking

- typing: ABO group (blood type)
- Rh typing (positive or negative antigen)
- screening for any unexpected red blood cell antibodies that may cause problems in the recipient
- screening for current or past infections including the following:
 - hepatitis viruses B and C
 - human immunodeficiency virus (HIV)
 - human T-lymphotropic viruses (HTLV) I and II
 - syphilis
 - West Nile virus





Students performing blood grouping with their team member

Technique involved in research methodology

Course code - D14

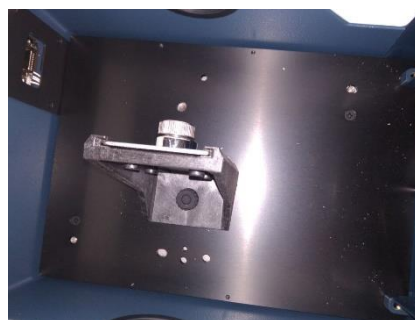
Hours: 38

UNIT : 1 UV-VIS Spectrophotometry

“SPECTROMETERS” or “SPECTROPHOTOMETERS”.



UNIT: 2 Fourier Transform Infrared (FTIR) Spectroscopy



UNIT: 3 Polymerase Chain Reaction and its Variants



Thermal Cycler (PCR)



Biostatistics

UNIT: 4

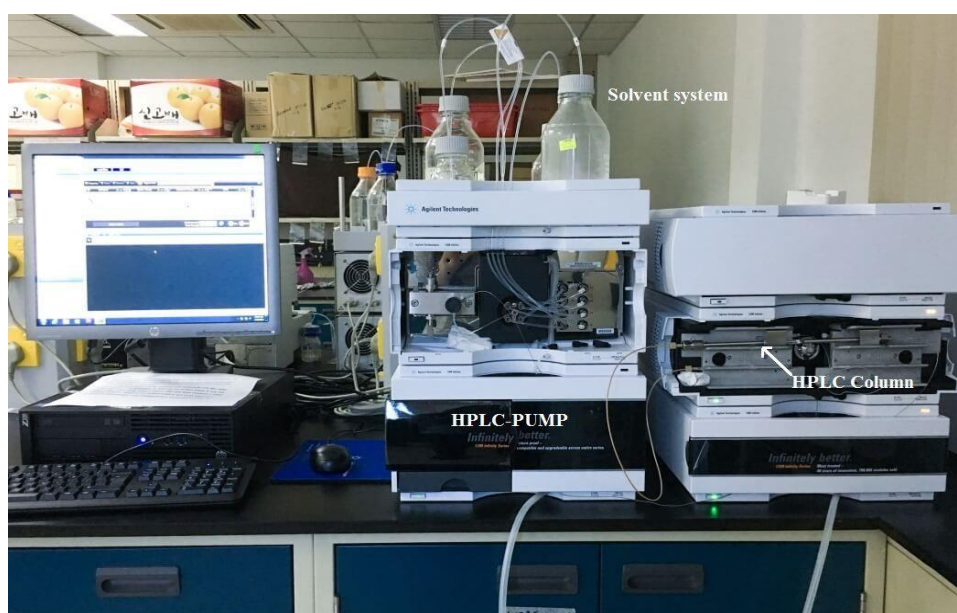
- Biostatistics is a broad discipline encompassing the application of statistical theory to real-world problems, the practice of designing and conducting biomedical experiments and clinical trials (experiments with human subjects), the study of related computational algorithms and display of data, and the development of mathematical statistical theory.
- Biostatistics is integral to the advance of knowledge in biology, health policy, clinical medicine, public health policy, health economics, proteomics, genomics, and other disciplines.

- At Vanderbilt, biostatisticians facilitate biomedical research by providing methodological expertise and by closely collaborating with scientists and physician researchers.

Standard deviation:

Definition: Standard deviation is the measure of dispersion of a set of data from its mean. It measures the absolute variability of a distribution; the higher the dispersion or variability, the greater is the SD and greater will be the magnitude of the deviation of the value from their mean.

UNIT: 5 High Performance Liquid Chromatography (HPLC)



UNIT: 6 Photoluminescence (PL)

Training Program in MATLAB

Course code - D15

Mathematical Formulas – Mathematical environments, Main elements of math mode, Mathematical symbols, Additional elements, Fine-tuning mathematics.

Introduction - Basics of MATLAB, Input – Output, File types – Platform dependence – General commands.

Interactive Computation: Matrices and Vectors – Matrix and Array operations – Creating and Using *Inline* functions – Using Built-in Functions and On-line Help – Saving and loading data – Plotting simple graphs.

Programming in MATLAB: Scripts and Functions – Script files – Functions files- Language specific features – Advanced Data objects.

Reference Books:

1. RUDRA PRATAP, Getting Started with MATLAB-A Quick Introduction for Scientists and Engineers, Oxford University Press, 2003.
2. William John Palm, Introduction to Matlab 7 for Engineers, McGraw-Hill Professional, 2005.
3. Dolores M. Etter, David C. Kuncicky, Introduction to MATLAB 7, Prentice Hall, 2004

TRAINING PROGRAMME IN LATEX

Course code - D17

Mathematical Formulas – Mathematical environments, Main elements of math mode, Mathematical symbols, Additional elements, Fine-tuning mathematics.

Introduction - Basics of MATLAB, Input – Output, File types – Platform dependence – General commands.

Interactive Computation: Matrices and Vectors – Matrix and Array operations – Creating and Using *Inline* functions – Using Built-in Functions and On-line Help – Saving and loading data – Plotting simple graphs.

Programming in MATLAB: Scripts and Functions – Script files – Functions files- Language specific features – Advanced Data objects.

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2. William John Palm, Introduction to Matlab 7 for Engineers, McGraw-Hill Professional, 2005.
3. Dolores M. Etter, David C. Kuncicky, Introduction to MATLAB 7, Prentice Hall, 2004

Programme on Validation of Medicinal Plants

Course code - D18

Hours: 32

Module 1

Introduction about Indian medicinal plants

Gist of day 1

(8 hours)

- Advanced medicines and pills have become such an important part of people's lives that Ayurveda seems to have vanished from the picture completely.
- But Ayurveda contains some medicinal plants and herbs which can effectively treat and cure multiple health problems and can be great for your overall health.
- These plants have been a part of our lives since our existence and have been used for various medicinal purposes since ancient times.
- Medicinal plants and herbs like turmeric, ginger, basil leaves, mint and cinnamon are commonly used in Indian dishes and they offer several health benefits.
- Cold and flu, relieve stress, better digestion, strong immune system and the list is simply endless.



Module 2

Phenotypical identification of Indian medicinal plants

Gist of day 2

(8 hours)

1. Adhatoda

Botanical name: *Justicia adhtoda*

Morphology of the useful plants: Leaves and roots

Applications:

- The plant is the source of drug Vasaka, particularly in the treatment of Bronchitis.
- Used for treating cold, asthma, cough and chronic bronchitis.

2. Aloe

Botanical name: *Aloe vera*

Morphology of the useful plants: Leaf

Applications:

- The pulp of the leaves is given in fever, enlargement of liver, spleen, skin diseases, jaundice and rheumatism.
- The pulp of the roasted leaves used for cough and cold.

3. Bacopa

Botanical name: *Bacopa monnieri*

Morphology of the useful plants: Whole plant

Applications:

It is a classic and nerve tonic

This leaf juice is given to children for constipation



Module 3

Phenotypical identification of Indian medicinal plants

Gist of day 3

(8 hours)

4. Catharanthus

Botanical name: *Catharanthus roseus*

Morphology of the useful plants: Roots and leaves

Application:

- Used as anticancer drugs (Vinblastine, Vincristine and leucocrostine)
- It has hypotensive, sedative and trasnquilling properties.

5. Eclipta (False Daisy)

Botanical name: *Eclipta alba*

Morphology of the useful plants: Whole plant

Application:

- Powerful liver tonic and good for hair growth
- It is used against dysentery, anemia, eye diseases, asthma, and liver cirrhosis.

6. Neem

Botanical name: *Azadirachta indica*

Morphology of the useful plants: Leaf and seeds.

Application:

- It has insecticidal and medicinal properties
- Neem has anti-bacterial properties and it is used against skin infection

Module 4

Phenotypical identification of Indian medicinal plants

Gist of day 4

(8 hours)

7. Ocimum

Botanical name: *Ocimum sanctum*

Morphology of the useful plants: Leaf and flowers

Applications:

- Leaf juice is given against Chronic fever, hemorrhage and dysentery.
- It has an anthelmintic properties

8. Phyllanthus amarus

Botanical name: *Phyllanthus amarus*

Morphology of the useful plants: Whole plant

Application:

- It is used in bronchitis, anemia, urinary problems, asthma, and also as a diuretic.
- Fresh root serves as excellent remedy for jaundice
- Used against chronic dysentery.

9. Rauvolfia

Botanical name: *Rauvolfia serpentina*

Morphology of the useful plants: Root

Application:

- It lowers blood pressure and controls schizophrenia like symptoms or mental illness.
- It has an effective remedy for hypertension
- Root decoction is given for uterine contraction





Programme on Mushroom Cultivation

Course code - D19

Hours: 48

Module 1

Making Mushroom Compost

Gist of day 1

(6 hours)

- ✦ Phase I composting is initiated by mixing and wetting the ingredients as they are stacked in a rectangular pile with tight sides and a loose center.
- ✦ Normally, the bulk ingredients are put through a compost turner.
- ✦ Water is sprayed onto the horse manure or synthetic compost as these materials move through the turner.
- ✦ Nitrogen supplements and gypsum are spread over the top of the bulk ingredients and are thoroughly mixed by the turner.
- ✦ Gypsum is added to minimize the greasiness compost normally tends to have.
- ✦ Nitrogen supplements in general use today includes corn distiller's grain, seed meals of soybeans, peanuts, or cotton, and chicken manure, among others.
- ✦ Turning and watering are done at approximately 2-3 day intervals, but not unless the pile is hot (145° to 170°F).
- ✦ When the moisture, temperature, color, and odor described have been reached, Phase I composting is completed.



Module 2

Spawning of Mushroom

Gist of day 2

(6 hours)

- ✦ As a mushroom matures, it produces millions of microscopic spores on mushroom gills lining the underside of a mushroom cap.
- ✦ These spores function roughly similar to the seeds of a higher plant.
- ✦ However, growers do not use mushroom spores to 'seed' mushroom compost because they germinate unpredictably and therefore, are not reliable.
- ✦ Fortunately, mycelium (thin, thread-like cells) can be propagated vegetatively from germinated spores, allowing spawn makers to multiply the culture for spawn production.
- ✦ Specialized facilities are required to propagate mycelium, so the mushroom mycelium remains pure.
- ✦ Mycelium propagated vegetatively on various grains or agars is known as spawn, and commercial mushroom farmers purchase spawn from companies specializing in its manufacture.



Module 3

Casing the mushroom compost

Gist of day 3

(6 hours)

- ✦ Casing is a top-dressing applied to the spawn-run compost on which the mushrooms eventually form.
- ✦ A mixture of peat moss with ground limestone can be used as casing. Casing does not need nutrients since casing acts as a water reservoir and a place where rhizomorphs form.
- ✦ Rhizomorphs look like thick strings and form when the very fine mycelium fuses together. Mushroom initials, primordia, or pins form on the rhizomorphs, so without rhizomorphs there will be no mushrooms.
- ✦ Casing should be able to hold moisture since moisture is essential for the development of a firm mushroom.
- ✦ The most important functions of the casing layer are supplying water to the mycelium for growth and development, protecting the compost from drying, providing support for the developing mushrooms and resisting structural breakdown following repeated watering.
- ✦ Supplying as much water as possible to the casing as early as possible without leaching into the underlying compost provides the greatest yield potential.

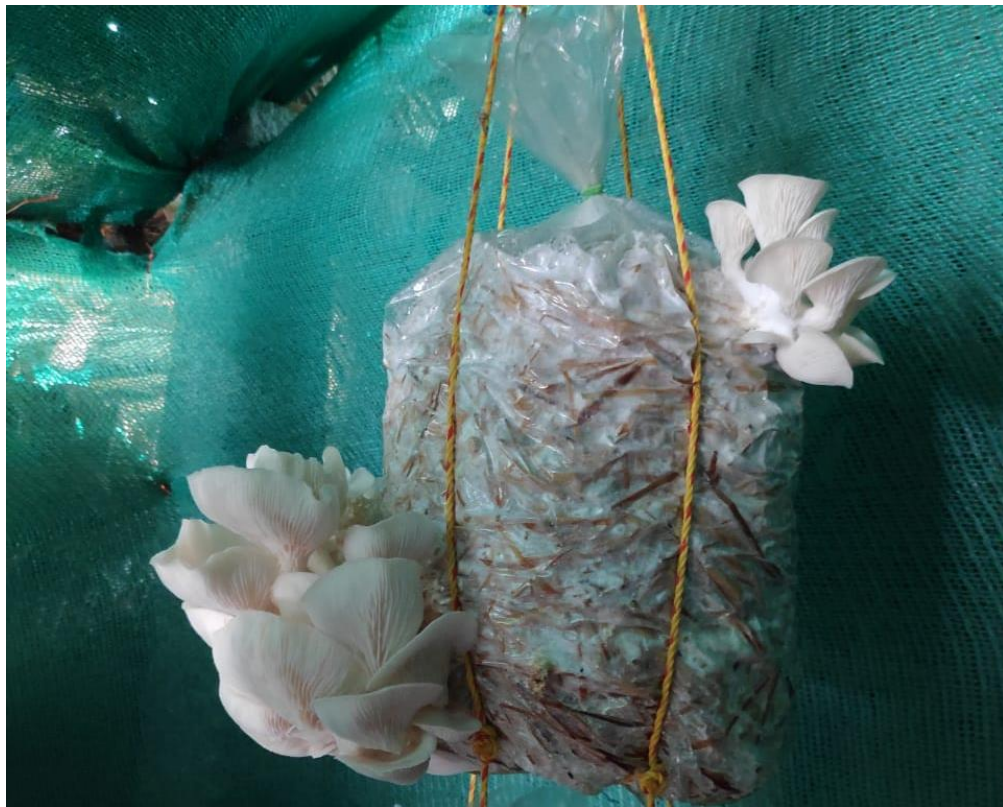
Module 4

Cropping cycle in mushroom cultivation

Gist of day 4

(6 hours)

- ✦ The terms flush, break, or bloom are names given to the repeating 3- to 5-day harvest periods during the cropping cycle; these are followed by a few days when no mushrooms are available to harvest.
- ✦ This cycle repeats itself in a rhythmic fashion, and harvesting can go on as long as mushrooms continue to mature.
- ✦ Most mushroom farmers harvest for 35 to 42 days, although some harvest a crop for 60 days, and harvest can go on for as long as 150 days.



Module 5

Introduction to Bee hives and bee keeping equipment

Gist of day 5

(6 hours)

- Honeybees live together in a highly organized group called a colony.

- When bees are managed in hives, each hive houses a single colony.
- It is the colony that matters and tasks are accomplished through division of labor.
- Every member of the colony works not for itself, but for the benefit of the colony.

Hive Accessories:

- ✦ Queen excluder
- ✦ Queen gate
- ✦ Pollen trap
- ✦ Feeder
- ✦ Comb foundation
- ✦ Colony Inspection and Maintenance Equipment Smoker
- ✦ Bee veil
- ✦ Gloves
- ✦ Bee brushes
- ✦ Wooden or bamboo swat
- ✦ Honey and Wax Processing Equipment Honey extractor
- ✦ Honey strainer, Knives
- ✦ Wax melter

Module 6

Colony inspection and swarming

Gist of day 6

(6 hours)

- ✦ Inner inspection is carried out after the outer inspection to confirm the colony status, strengths, and any abnormalities, and to perform any necessary management practices.
- ✦ The inner inspection of a colony should carry out with a clear set of objectives.
- ✦ The necessary equipment should be gathered together before inspection starts.

Observations should include the following:

- ✦ Condition of the queen
- ✦ Colony strength – number of adult bees and amount of brood (eggs, larvae, and pupae)
- ✦ Food stores (honey and pollen)
- ✦ Presence of pests and disease
- ✦ Symptoms of swarming and absconding
- ✦ Need to provide more frames with comb foundation or combs
- ✦ Cleanliness and hygiene
- ✦ Need to remove unnecessary, deformed, or additional combs built by the bees

Module 7

Transferring Bees from a Traditional Hive to a Movable Frame Hive

Gist of day 7

(6 hours)

- ✦ Transferring a Colony Preparation Collect together and prepare all the necessary materials before transferring the colony from a traditional hive to an improved hive.
- ✦ Materials include the wall or log hive with bees, an empty movable frame hive, colony inspection equipment, sharp knife, thread, and a queen cage.

- ✦ It is important to have a helper.
- ✦ The colony should be transferred during the day in the warm honey flow season.

Colony quality

- ✦ The colony to be transferred should have the following qualities:
- ✦ Strong queen-right colony
- ✦ Sufficient drones
- ✦ Sufficient stores of nectar and pollen
- ✦ Sufficient brood in the comb
- ✦ Healthy
- ✦ Active (favourable) beekeeping season

Management of the transferred colony

After the colony has been transferred from a traditional to a modern hive do the following:

- ✦ Use a queen gate.
- ✦ Use a dummy board if there are less than 8 combs.

Module 8

Honey Production, Harvesting, Processing and storage

Gist of day 8

(6 hours)

Harvesting

- ✦ Harvesting is the process of extracting honey from honeycombs taken from honeybee colonies.
- ✦ Honey can be harvested from wild bee colonies ('honey hunting') or from domesticated bees.

- ✦ Although a large amount of honey is still harvested from wild bees in the Hindu Kush-Himalayan region, the majority is now harvested from domesticated *Apis cerana* and *Apis mellifera* bees.
- ✦ To maximize income from commercial beekeeping, it is important to produce a large volume of good quality honey.

Processing

- ✦ Honey is itself a processed product. The nectar collected in the crop of forager bees is passed to house bees and mixed with different enzymes to convert the sucrose into levulose and fructose before depositing in comb cells.
- ✦ Excess water is evaporated through fanning and heating and the cells are only sealed after the honey has ripened.

Storage

The following points should be noted to ensure that honey doesn't deteriorate during storage.

Honey should be stored in food grade glass or stainless-steel containers. Honey should be stored in an airtight container. It is hygroscopic and will absorb water and odours if stored open in an atmosphere with more than 20% relative humidity. The colour and taste may also change.





TRAINING PROGRAM FOR BOOKS READING

Course code – D20

Hours: 32

Syllabus for the training programme

1. Short stories, novels, poetry from various authors
2. Magazines, Monthly magazines, fourtnight Magazines
3. Criticism of modern literature
4. How to express our views to others and discussion the thoughts of the literature
5. Social, historical approaches of the literature and how it is useful for the effective communication

TRAINING PROGRAM FOR RESEARCH ARTICLE WRITING

Course code – D21

Hours: 32

Syllabus for the training programme

1. Basic structure of the research paper
2. How to handle others quotes
3. How to handle foot notes
4. How to prepare bibliyagaphy
5. How to prepare appendix

TRAINING PROGRAM FOR STAGE DRAMA PERFORMANCE

Course code – D22

Hours: 32

Syllabus for the training programme

1. How to write drama - Social drama
2. Historical drama
3. How to Preparing for drama and theater
4. How to express our face reaction, face reading, acting
5. Body language and behavioral methods

TRAINING PROGRAM FOR MANUSCRIPTOLOGY

Course code – D23

Hours: 32

Syllabus for the training programme

1. Manuscript writing
2. Manuscript reading
3. Manuscript preservation
4. How to copy manuscript to paper or any other sources
5. How to explain the people to save the manuscript and teach the values of manuscript

TRAINING PROGRAM FOR VOCAL SONGS

Course code – D24

Hours: 35

Syllabus for the training programme

1. Type of vocal songs
2. Ragam
3. Talam
4. Saranam
5. Pallavi

TRAINING PROGRAM FOR TEACHING METHODOLOGY OF CLASSICAL TAMIL LITERATURE

Course code – D25

Hours: 30

Syllabus for the training programme

1. Types of teaching methodology
2. Types of the classical Tamil literature
3. Types epic and classical epic
4. Thirukkural and concepts
5. Concept of classical Tamil literature

MAKING SHORT FLIM

Course code – D26

Hours: 25

1. Handling of camara, cut shot,
2. Script writing, story telling
3. Direction
4. Performance

Actiting