**Add-on Course**
**Department of Botany**
**I. Organic farming practices and plant protection in tea**

*The objective of this course is to expose the students to production of different non-chemical organic farming practices and their application in tea and to introduce them to significant disease problems in tea in N. E. India and sustainable management practices*

**(Credits: Theory-1, Practical-1)**

**THEORY**
**Lectures: 40**

**Unit 1: Introduction to organic farming** **(12 lectures)**

Scope and Significance, Traditional farming practices, Role of organic farming in developing eco-agriculture, Principal systems and methods in organic farming and benefits, Factors affecting in green manure production, Recycling of agricultural and other biodegradable domestic, municipal, and industrial wastes-quality manure production, Types of vermicomposting and uses, Microbial fortification during composting and production of value added quality compost-field applications, Microbial biofertilizers, Mineral fertilizers, Significance of organic farming in crop diversity and soil conservation.

**Unit 2: Tea and its physiology** **(7 lectures)**

Origin and cultivation of tea, Morphology of tea bush and economic value, World recognization of tea as potent non-alcoholic beverage yielding perennial plant of significant health benefits, Traditions in tea gardening and practices (conventional and non-conventional methods in tea farming and practices), Management of young tea.

**Unit 3: Climate, topography and Soil** **(10 lectures)**

Importance of climatic variables and topography in tea plantation, Significance of soil as macrohabitat in tea cultivation, Soil nutrient management and infills, Chemical methods of soil replenishment, Land degradation and threats to soil, Methods to explore in minimizing the load of chemicals in tea soil, Non-chemical and sustainable approaches to maintain soil health, nutrient allocation and prosperity (Use of biofertilizers, *Rhizobium*, *Azotobacter*, *Azospirillum*, *Trichoderma*, *Bacillus*, Mycorrhizal association, etc.), Potential of cellulolytic microbes and actinorhizal symbiosis in soil restoration activities.

**Unit 4: Introduction to significant tea diseases and management approaches (11 lectures)**

Microclimate responsible for disease introduction in tea, Significant tea diseases and their threat and losses to the global tea industry, Glimpse of tea diseases in N. E. India (Black rot, Blister blight, *Fusarium* die-back, *Poria* branch canker, Red rust, Charcoal stump rot, Brown root rot, Black root rot etc.) and symptoms under field condition, Cultural, biological and chemicals methods of disease management, Plant protection code (PPC), Integrated disease management (IDM) approaches in tea and sustainability development.

## Practical

1. Study of soil properties.
2. Studies on methods of production of quality organic manure.
3. Isolation of beneficial microbes from soil and functional characterization (P-solubilizing microbes, K-solubilizing microbes, $N_2$-fixing microbes, Zn-solubilizing microbes, cellulose degrading microbes etc.).
4. Studies on microbial fortification in production of value-added compost.
5. Identification of significant tea diseases under field condition and preparation of disease album.