Bot-414 & 415 PLANT NUTRITION AND SOIL FERTILITY Credit Hours: 3(2+1)
THEORY

Introduction of the Course:

The course is organized to provide an adequate knowledge about plant nutrition and soil fertility. Soil fertility is the ability or the quality of a soil that enables it to provide chemical elements in quantities and proportions for plant growth. Soil fertility and plant nutrition, therefore, cannot be divorced from each other. Plant nutrition involves the study of chemical elements necessary for plant growth.

Course Objectives:

The course is designed:

1. To provide an adequate knowledge about basic concepts of plant nutrition and soil fertility.
2. To provide the knowledge about different mineral plant nutrition, their requirements, and deficiency symptoms in plants. It also explains the soil fertility evaluation methods for soil and plants.

Contents:

1. **Mineral Plant Nutrition:**
   - 1.1 Introduction
   - 1.2 Scope and history of mineral plant nutrition **2. Macronutrient and Micronutrient Elements:**
   - 2.1 Introduction
   - 2.2 Inorganic components of plants
   - 2.3 Essential and other mineral elements
   - 2.4 Macronutrient and micronutrient elements requirements of higher plants
   - 2.5 Deficiency symptoms of individual elements
3. **Media of Plant Nutrition:**
   - 3.1 The variety of nutrient media
   - 3.2 Soil
   - 3.3 Solution culture
   - 3.4 Chemical composition of nutrient solutions
   - 3.5 Modified solution culture
   - 3.6 Culture solutions compared with soil solutions
4. **Soil Fertility:**
   - 4.1 Introduction
   - 4.2 Soil fertility evaluation
5. **Soil and Fertilizer:**
   - 5.1 Introduction
   - 5.2 Soil and fertilizer N.P.K. Ca, Mg, S, Fe and trace elements
   - 5.3 Liming and use of Gypsum; Fertilizers and efficient use of water

Practicals:

1. Preparation of standard acid, alkali and indicator solutions **2.** Preparation of fertilizer mixtures.

3. Study of deficiency symptoms of macro and micro nutrient elements.

4. Phenotypic adaptations of plants to nutrients, deficiency and methods of growth analysis.

5. Determination of macro and micro nutrient elements of Plant tissues.

6. Determination of macro and micro nutrient elements of soil.
7. Determination of total water requirement of a crop by using climatic data (Blaney & Criddle formula will be used).

Teaching-learning Strategies:

1. Lectures
2. Group Discussion
3. Laboratory work
4. Seminar/ Workshop **Learning Outcome:**

1. Students are expected to get familiarized with the morphological and systematic knowledge about different plant groups.
2. They will be able to describe, apply and integrate the basic concepts of Cell Biology including Genetics and Evolution, Biochemistry, Physiology as well as Structure and Functions of different Organelles.
3. This will enable them qualify for basic to moderate level jobs involving knowledge of plants and their environment.
4. The obtained knowledge shall also enable the students to enter into various entrepreneurial activities involving general introduction to Botany.

Assessment Strategies:

1. Lecture Based Examination (Objective and Subjective)
2. Assignments
3. Class discussion
4. Quiz
5. Tests

Recommended Readings:

1. Epstein, F., Mineral Nutrition of plants: Principles and perspectives. 1972. John Wiley & sons, Inc. 1971.
2. Treshow, M. Environment and plant response McGraw Hill, 1970.
3. Wallace, T., The diagnosis of mineral deficiencies in plants. Her Majesty's Stationery Office London, 1961.
4. Tisdale, S. and W. Nelson, Soil Fertility and Fertilizers. 3rd ed. Mchillans, 1975.

****