

## BS (4 Years) for Affiliated Colleges



Code	Subject Title	Cr. Hrs	Semester
<b>BOT-405</b>	<b>Plant Nutrition and Soil Fertility</b>	<b>3</b>	<b>VII</b>
Year	Discipline		
<b>4</b>	<b>BOTANY</b>		

**Syllabus Outline:** To study composition of different nutrients, absorption, translocation and assimilation of various nutrients, Nitrogen fixation.

### Course Outline:

Introduction, Scope and History of Mineral Plant Nutrition.

The Inorganic Components of Plants, Water, Dry Matter, Mineral Competition, Essential and other Mineral Elements, Macronutrient and Micronutrient Elements, Comparative Macronutrient and Micronutrient Elements; Comparative Elemental Requirements of Higher Plants; Deficiencies and Tissue Analysis, Deficiency Symptoms of Individual Elements.

The Media of Plant Nutrition, The Variety of Nutrient Media: Soil; Solution Culture; Chemical Composition of Nutrient Solutions; Modified Solution Culture, Culture Solutions compared with Soil Solutions.

The Acquisition of Nitrogen Absorption of Nitrate and Ammonium Ions; Nitrogen Fixation, Physiology of Formation of Root Nodules, Physiology of Symbiotic Nitrogen Fixation.

Mineral Metabolism, The Functions of Nutrients, Nutrient Elements as Constituents of Metabolites and Complexes, Nutrient Elements as Activators, Cofactors or Regulators of Enzymes, Nutrient Elements in Physiological Processes.

Ecological Aspects of Plant Nutrition, Phenotypic Plasticity, The Concept of the Ecotype, Role of Mineral Elements in Plant Ecology, Interplay between Plants and their Mineral Media.

Soil Fertility Evaluation.

Soil and Fertilizer N, P, K, Ca, Mg, S, Fe and Trace Elements.

Liming and Use of Gypsum.

Fertilizers and Efficient Use of Water.

**Module Aims:** The students will be able to get an update on issues related to Plant Nutrition and Soil Fertility Integrated on Sustainable Land Use and Natural Resource Management.

**Learning Strategies:**

1. Lectures
2. Group Discussion
3. Laboratory Work
4. Seminar/ Workshop

**Learning Outcome:** The students will develop an insight into the Mineral Requirements, Media Preparations and Mineral Metabolism. All Agriculture Practices based on fertilization will be analyzed.

**Assessment Strategies:**

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

**Books Recommended:**

1. **Taiz, L.D. and Zeiger, E. (2010).** *Plant Physiology*. (5<sup>th</sup> Ed.), Sierauer Associates.
2. **Barker, A.V. and Pilbeam, D.J. (2007).** *Hand Book of Plant Nutrition*. CRC Press Washington D.C.
3. **Epstein, E. and Bloom, J.A. (2005)** *Mineral Nutrition of Plants: Principles and Perspectives*. (2<sup>nd</sup> Ed.), Sierauer Associates.
4. **Tisdale, S. and Nelson, W. (2005).** *Soil Fertility and Fertilizers*. (3<sup>rd</sup> Ed.), Mchillans.
5. **Wallace, T. (2005).** *The Diagnosis of Mineral Deficiencies in Plants*. Her Majesty's Stationery Office, London.

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