

NOVA COLLEGE-WIDE COURSE CONTENT SUMMARY  
BIO 110 - GENERAL BOTANY (4 CR.)

**Course Description**

Emphasizes plant life cycles, anatomy, morphology, taxonomy, and evolution. Considers the principles of genetics, ecology, and physiology. Lecture 3 hours. Recitation and laboratory 3 hours. Total 6 hours per week.

**General Course Purpose**

This is a transferable one-semester, freshman-level course designed to:

- provide the student with both a classical and practical understanding of plant science
- provide the prerequisite to higher level courses in plant science curricula
- offer an alternative to BIO 102 - "General Biology II" by presenting similar topics from a botanical point of view

**Course Prerequisites/Co-requisites**

Prerequisite is placement into ENG 111.

**Course Objectives**

Upon completion of this course, the student will be able to:

- describe evolutionary trends in the Kingdom Plantae and list differences between major taxonomic groups
- describe the significance of evolutionary trends: from non-vascular to vascular plants; and from non-flowering to flowering plants
- describe haplontic, diplontic and diplohaplontic life cycles
- use vegetative structures of vascular plants as examples to describe, identify or know the functions of:
  - primary tissues, primary growth, secondary tissues, secondary growth
  - root morphology, root physiology and root modifications
  - stem morphology, stem physiology including modified stems
  - leaf morphology and physiology, modified leaves
  - vegetative reproduction: cuttings, grafts, tissue culture
- describe the process of photosynthesis, including the anatomical structures involved, the physical components and the biochemical pathways
- describe the morphology and adaptations of reproductive structures:
  - Anthophyta (angiosperms): flowers, modifications, pollination, fertilization, life cycle
  - Non-flowering plants: reproductive mechanisms, life cycles
- describe seed morphology, seed germination and the factors which affect germination
- describe the development of a vascular plant from seed to adult
- describe the function and control of plant-soil-water relationships, including essential nutrients, soil, water movement, cohesion, adhesion, transpiration, stomatal regulation, and adaptations to reduce water loss
- apply nutrient and growth requirements to plant health/vigor: light, temperature, fertilizer, water and soil
- cite the action of certain plant growth factors or hormones: auxins, cytokinins, gibberellins, abscisic acid, ethylene, phytochrome, hormone interactions, plant tropisms
- give examples of typical plants in various biomes, ex. tropical rain forests
- give examples of the ecological roles of plants: ex. on climate, the biosphere, oxygen-carbon dioxide balance, the carbon, nitrogen and water cycles, trophic levels, food chains, food webs, ecological succession and recolonization

- cite examples of importance of plants to humankind in economics, aesthetics and recreation, science and technology, sociopolitical considerations, the world food supply, conservation and environmental quality
- Plant evolution: cite index fossils of major phylogenetic trends.

### **Major Topics to be Included**

- Introduction to botany
- Classification of the major groups of plants and organisms traditionally regarded as plants
- The Vegetative Body of Vascular Plants: primary tissues, primary growth; secondary tissues, secondary growth
- Root morphology, root physiology and root modifications
- Stem morphology, physiology, modified stems
- Leaf morphology and physiology
- Photosynthesis
- Vegetative reproduction: cuttings, grafts, tissue culture
- The flower: reproductive structures of Anthophyta (Angiosperms); modifications, pollination, fertilization, life cycles
- Reproductive mechanisms of non-flowering plants; life cycles
- Fruit and seed development in Anthophyta (Angiosperms); morphology and physiology
- Seed morphology and germination; factors governing
- Development of vascular plants from seed to adult
- Plant-soil-water relationships: essential nutrients, soil, water movement, cohesion, adhesion, transpiration, stomatal regulation, and adaptations to reduce water loss
- Nutrient and growth requirements of plants: light, temperature, fertilizer, water and soil
- Plant growth factors or hormones: auxins, cytokinins, gibberellins, abscisic acid, ethylene, phytochrome, hormone interactions, plant tropisms
- A survey of the Plant Kingdom: vascular and non-vascular plants
- Plant evolution: major phylogenetic trends; index fossils
- Biomes of the world
- The ecological role of plants on climate, the biosphere, oxygen-carbon dioxide balance, the carbon, nitrogen and water cycles, trophic levels, food chains, food webs, ecological succession, and recolonization.
- The importance of plants to humankind: economics, aesthetics and recreation, science and technology, sociopolitical considerations, the world food supply, conservation and environmental quality

### **Laboratory Topics**

Laboratory topics will coincide with lecture topics.

### **Extra Topics which may be Included**

- A collection of plants identified by using a dichotomous key and properly mounted as herbarium specimens
- Plant hybridization: techniques, importance
- Field trips