Programme	BS Botany	Course Code	BOT-413	Credit Hours	2
Course Title	Evolutionary Trends in Plants (Theory)				

Introduction

To highlight the significance of the major Evolutionary Trends in the Plant groups through exploring their Morphology, Anatomy, Reproductive Biology and other allied characters.

Learning Outcomes

On the completion of the course, the students will be able to:

- Appreciate the evolutionary forces leading to the divergence / Convergence of various plant groups.
- Understand when seed plants first appeared and why the gymnosperms became the dominant plant group
- Comprehend the two major innovations that allowed seed plants to reproduce in the absence of water
- Describe the significance and the evolution of the Angiosperms bearing both flowers and fruit, ultimately becoming the most complex and dominant vegetation on Earth.

Course Contents

- **Evolution:** Definition. Convergent, Divergent and Homoplastic evolution. Evolutionary Forces and Trends. Modern concept of Evolution.
- **Structure of the Earth**, Plate Tectonics, the Super Continent Pangea, Laurasia, Tethys and Gondwanaland.
- **Geological Time Scale**
- **Mega and Micro Plant Fossils,** Concept of Form genera and Form Species
- **Origin of Land Plants and their Form and Structure**
  - Diversification of the early Vascular Land Plants (Psilopsids, Lycopsids, Sphenopsids and Pteropsids), their morphology, reproductive biology and important modifications for adaptation on land.
  - Origin of Tree Habit, Secondary Growth and Forests
- **Origin and Evolution of Seed Habit including evidences from Palynology**
  - Transition from Homospory to Heterospory
  - Retention of Megaspores
  - Origin of ovules and seeds
- **Rise of Seed Plants**
- **Seed Ferns**: General Characters and Phylogenetic importance of
  - Palaeozoic Seed Ferns (Calamopityales, Lyginopteridales, Medulosales, and Glossopteridales)
  - Mesozoic Seed Ferns (Caytoniales)
  - *Selected Palynomorph G*enera representing above mentioned Seed Ferns and their Morphographic description.
- **Gymnosperms:** Origin of Gymnosperms, Phylogeny and Classification. Selected Palynomorph Genera representing Gymnosperms and their Morphographic description to depict evolution.
- **Angiosperms**:
  - Life cycle of an Angiosperm
  - Flower: Definition, different parts of a generalized flower.
  - Morphological Nature of flower, Different types of Placentation and their inter-relationship.
  - Origin of Angiosperms
  - Embryology: Structure of Stamen, Microsporogenesis and Structure of pollen; Structure of an Ovule, Megasporogenesis. Different types of Embryo Sacs. Nature of Endospermic Tissue. Selected Palynomorph
    genera representing various groups of Angiosperms and their Morphographic description.