NATIONAL UNIVERSITY OF LESOTHO

BIOLOGY DEPARTMENT

B1401: Introductory Biology 1

Introductory Plant Diversity Outline

Introductory Biology 1 (B1401) is one of the introductory courses to the field of Biology. Plant Diversity module is one of the two parts that make up the Introductory Biology 1. Introductory Plant diversity involves the study of plants and the evolutionary trends and relationships among the major groups of plants. This part introduces and exposes students to basic concepts fundamental to plants. The focus is on general characteristics (morphology), structure (anatomy), function (physiology), adaptations to life on land, life cycles and the importance of major plant groups. This module aims at stimulating students' interest in plant science and to motivate those students who want to pursue a career path in botany (plant biology) related fields. The module begins by introducing plant taxonomy, particularly systems of classification, hierarchical classification, binomial system of nomenclature and the species concept. The module also introduces the general life cycle of a plant and alternation of generations in plants. The general characteristics, major groups and economic importance of algae are also addressed. The module then explores the general characteristics, structure, life cycles, adaptations to life on land and importance of bryophytes, early tracheophytes (seedless vascular plants), gymnosperms and angiosperms.

The module is practical in nature and therefore, has laboratory sessions which are compulsory. The course (B1401) is the pre-requisite for all other Biology courses in the department of Biology.

COURSE OBJECTIVES
After participating in this course students should be able to: 1. Describe the systems of classification, including taxonomic hierarchy, nomenclature and the species concept 2. Appreciate the diversity of plants 3. Draw the general life cycle of a plant and describe alternation of generations in plants 4. Describe the evolutionary trends and the associated characteristics of plants, from algae to angiosperms 5. Describe the general characteristics, structure, life cycles, adaptations to life on land and the importance of the major groups of plants 6. Distinguish between: dicotyledons and monocotyledons; insect-pollinated and wind-pollinated flowers

COURSE CONTENT

1. **Introduction to plant taxonomy**
   - 1.1 Systems of classification, including the five kingdom Classification
   - 1.2 Taxonomic hierarchy
   - 1.3 Binomial system of nomenclature, including advantages of scientific names
   - 1.4 Species Definition

2. **Introduction to Plant Diversity**

3. **General life cycle and alternation of generations in plants**

4. **Algae**
   - 4.1 General characteristics
   - 4.2 Grouping of algae – Green and Brown Algae
   - 4.3 Characteristics and examples in each group
   - 4.4 Economic importance of Algae

5. **Bryophytes**
   - 5.1 Plant Diversity in general
   - 5.2 General characteristics
   - 5.3 A brief account of the structure (Bryophyte gametophyte and sporophyte)
   - 5.4 Liverworts, Hornworts and Mosses (characteristics, structure and examples)
   - 5.5 Life cycle of a moss
   - 5.6 Adaptations to life on land
   - 5.7 Economic importance of Bryophytes

6. **Pteridophytes/ Early Tracheophytes (seedless vascular plants)**
   - 6.1 General characteristics and examples of the different groups
   - 6.2 A brief account of the structure of a fern (gametophyte and sporophyte)
   - 6.3 Evolution of roots and leaves
   - 6.4 Sporophylls and spore variation (Homospory and Heterospory)
   - 6.5 Life cycle of a Fern
   - 6.6 Adaptations of ferns to life on land
   - 6.7 Economic importance of seedless vascular plants

7. **Gymnosperms (Ginkgo, Cycads, Gnetophytes and Conifers)**
   - 7.1 General characteristics and the four phyla
   - 7.2 Adaptations to life on land
   - 7.3 A brief account of structure of Conifers
   - 7.4 A brief account of reproduction
   - 7.5 Life cycle of pine
   - 7.6 Gnetophytes - link to Angiosperms
   - 7.7 Economic importance of Gymnosperms

8. Angiosperms (Flowering plants)

8.1 General characteristics
8.2 Adaptations of angiosperms to life on land
8.3 A brief account of structure
8.4 The Flower
8.5 Reproduction in angiosperms, including double fertilization
8.6 Life cycle of angiosperms
8.7 Fruits
8.8 Dicotyledons and monocotyledons
8.9 Insect-pollinated and wind-pollinated flowers
8.10 Economic importance of Angiosperms

9. Revision and Conclusion

NB. Laboratory practicals are compulsory and are to be conducted as described in the laboratory manual. The final test will be given towards the end of the lectures.

Recommended References

1. Campbell, N. A., Reece, J. B., Urry, L. A., Cain, M. L., Wasserman, S. A., Minorsky, P. V. and Jackson, R. B. (2008). Biology, 8th Ed. Benjamin Cummings, San Franscisco. USA.

2. Taylor, D. J., Green, N. P. O., and Stout, G. W. (2005). Biological Science, 3rd edn. Cambridge University Press, UK.