B.Sc.I 2013-14

SHIVAJI UNIVERSITY, KOLHAPUR

Proposed Syllabus of B. Sc.-I-BOTANY

(Semester pattern to be implemented from June-2013)

For each semester there will be two papers of 50 marks each.
The pattern of the papers will be as follow:

Semester I

Paper I : Diversity in Non vascular Plants
Paper II : Plant Biochemistry, Physiology and Ecology

Semester II

Paper III : Diversity in Vascular Plants
Paper IV : Cytology, Genetics and Utilization of Plants

Semester I

Paper – I : Diversity in Non Vascular Plants 40 SKN

Unit - 1 **Basic concept of non vascular plants.** 10
Sub-unit 1.1 Diversity – Concept and Importance.

Sub-unit 1.2 Diversity in non vascular plants with respect to a) Habitat b) Form c) Nutrition and d) Ecological role.

Unit - 2 **Algae** 10 JVS
Sub-unit 2.1 General characters, classification (as per G.M. Smith) upto classes and economic importance.

Sub-unit 2.2 Important features and life history (excluding developmental stages) of following types :
a) *Nostoc* (Myxophyceae)
b) *Spirogyra* (Chlorophyceae)

Unit - 3 **Fungi** 10
Sub-unit 3.1 General characters, classification (as per Ainsworth) upto classes and economic importance KDG

Sub-unit 3.2 Important features and life history (excluding developmental stages) of the following types :

a) *Mucor* (Zygomycotina)
b) *Cercospora* (Deuteromycotina)

Unit - 4 **Bryophytes** 10 SKN
Sub-unit 4.1 General characters, classification (as per G.M.Smith) upto classes.
Sub-unit 4.2 Important features and life history (excluding developmental stages) of *Riccia* (Hepaticopsida)

Paper II - Plant Biochemistry, Physiology and Ecology 40

Unit 1 - **Cell Biochemistry** 10 SKN

Sub-unit 1.1 Cell as a biochemical entity

Sub-unit 1.2 Covalent and non covalent interactions, electrostatic and hydrophobic interactions, Van-der Waal's forces and their significance.

Sub-unit 1.3 Structure, properties and biological significance of water.

Sub-unit 1.4 pH and Buffers -Significance of pH, pH scale, inorganic and organic buffers and their significance.

Sub-unit 1.5 ATP- The energy currency.

Unit 2 - **Enzymes** 12 JVS

Sub-unit 2.1 Introduction and Nomenclature.

Sub-unit 2.2 Properties of enzymes

Sub-unit 2.3 Classification of enzymes.

Sub-unit 2.4 Mechanism of enzyme action.

Sub-unit 2.5 Cofactors, coenzymes and isozymes.

Sub-unit 2.6 Factors affecting enzyme activity - temperature and pH.

Unit 3 – **Plant Water Relations** 10 VRD

Sub-unit 3.1 Water transport processes – Mechanism of water absorption [Active and Passive].

Sub-unit 3.2 Ascent of sap – Transpiration pull theory.

Sub-unit 3.3 Transpiration – Definition, Types, structure of stomata Mechanism of stomatal movement (Starch-sugar hypothesis), Significance.

Sub-unit 3.4 Guttation and Wilting

Unit 4. **Ecology** 08 JVS.

Sub-unit 4.1 Introduction

Sub-unit 4.2 Ecological factors – a) Climatic, b) Edaphic.

Semester II

Paper III : Diversity in Vascular Plants 40

Unit: 1. **Basic concept of vascular plants.** 02
Sub-unit 1.1 Diversity with respect to a) Habitat b) Ecological role.

Unit: 2. **Pteridophytes** 08
Sub-unit 2.1 General characters, classification (as per G.M. Smith) upto classes.
Sub-unit 2.2 Important features and life history (excluding developmental stages) of *Selaginella* (Lycopsida)
Sub-unit 2.3 Heterospory and seed habit.

Unit: 3. **Gymnosperms** 08
Sub-unit 3.1 General characters, classification (according to Sporne, 1965) up to classes and economic importance
Sub-unit 3.2 Important features and life history (excluding developmental stages) of Cycas (Cycadopsida).

Unit : 4. **Angiosperms** 12
Sub-unit 4.1 General characters.
Sub-unit 4.2 Importance and Functions of taxonomy.
Sub-unit 4.3 Morphology of root, stem and leaf.

Unit: 5. **Anatomy** 10
Sub-unit 5.1 Types of tissues
a) Meristematic (Characterstics and Classification based on position)
b) Permanent (Simple and Complex)
Sub-unit 5.2 Types of vascular bundles.

Paper IV : Cytology, Genetics and Utilization of Plants 40

Unit 1 - **The Cell and Cell Division** 10
Sub-unit 1.1 Characteristics of prokaryotic and eukaryotic cell.
Sub-unit 1.2 Mechanism of Cell cycle.
Sub-unit 1.3 Mitosis - Stages and significance.
Sub-unit 1.4 Apoptosis.

Unit 2. **Mendelism** 08
Sub-unit 2.1 Introduction and Basic terminology in genetics.
Sub-unit 2.2 Mendel's laws of inheritance.
Sub-unit 2.3 Back Cross and Test Cross

Unit-3. **Gene Interactions** 06
Sub Unit 3.1 Introduction
Sub Unit 3.2 Complementary and Supplementary genes interactions.
Sub Unit 3.3 Dominant epistasis.

Unit 4. **Utilization of plants** 16
Sub Unit 4.1 Introduction.
Sub Unit 4.2 Cereals: Botanical name, morphology, sources and economic importance of Jowar (*Sorghum bicolor*), Wheat (*Triticum aestivum*).
Sub Unit 4.3 Legumes: Botanical name, morphology, sources and economic importance of Chick pea (*Cicer arietinum*), Red gram (*Cajanus cajan*).
Sub Unit 4.4 Oil crop: Botanical name, morphology, sources and economic importance of Sunflower (*Helianthus annuus*). Groundnut (Arachis hypogeae)
Sub Unit 4.5 Plant perfumes and cosmetics: Botanical name, morphology, sources and economic importance of – Rose *(Rosa indica),* Henna *(Lawsonia inermis).*
Sub Unit 4.6 Ornamental plants: *Lagerstroemia reginae, Ixora chinensis, Dieffenbachia picta, Quisqualis indica.*

Details of Practical Examination

A) Every candidate must produce a certificate- from Head of the Dept. in his /her college, stating that he / she has completed practical course in satisfactory manner as per guidelines laid down by Academic Council on the recommendations of Board of Studies in Botany. The student should record his / her observations and report of each experiment should be written in the journal. The journal is to be signed periodically by teacher in charge and certified by the Head of the Department at the end of year. Candidates have to produce their certificate journal and tour report at the time of practical examination. Candidate is not "allowed to appear" for the practical examination without a certified journal / a certificate from Head of the Botany Dept. regarding the same.

B) Practical Examination shall be of Five hours duration and shall test a candidate in respect of the following.

1. Practical study of external and internal structures of different plant types and their classification. Making temporary stained preparations and identification.
2. Identification and setting of physiological and biochemical experiments.
3. Study of plant families as per syllabus,
4. Spotting of the specimens as per syllabus.

Botanical Excursions

One teacher along with a batch not more than 20 students be taken for botanical excursion to places of Botanical interest, one in each term. If there are female students in a batch of twenty students, one additional lady teacher is permissible for excursion. Each excursion will not be more than three days during college working days. T.A. and D.A. for teachers and non-teaching staff participating in excursions should be paid as per rules. Tour report duly certified by teacher concerned and Head of the Department should be submitted at the time of practical examination.

Practical Course

B. Sc. I Botany Practical course is to be covered in twenty eight practicals. These practicals are to be performed by the students. Each practical is to be supplemented by permanent slides preserved / fresh specimens / materials, charts, herbarium sheets wherever necessary.

List of Practicals

Practicals based on Paper I and II of both the semesters.

1) **Bacterial types (P. S.)**
2) **Study of *Nostoc***
3) **Study of *Spirogyra***
4) **Study of *Mucor***
5) **Study of *Cercospora.***
6) **Study of *Riccia.***
7) **Study of *Selaginella.***
8) **Study of *Cycas.***

9 & 10) Study of morphology and modifications of root.
11 & 12) Study of morphology and modifications of stem.
13 & 14)Study of morphology and modifications of leaf.

15) Determination of soil pH (Any two samples).
16) Effect of pH on enzyme activity – / Dehydrogenase
17) Effect of temperature on enzyme activity – Catalase
18) Study of mitosis in onion root tips/ any other suitable plant material.
19) To study structure of stomata and to determine the stomatal density.
20) To study stomatal and cuticular transpiration
21) To study meristematic tissue – Root apex and Shoot apex (P. S.).
22) To study simple and complex tissue (P. S.).
23) To study types of vascular bundles (P. S).
24) Study of morphology, source and economic importance in cereals – Jowar and wheat.
25) Study of morphology, source and economic importance in legumes - Chickpea and red gram.
26) Study of morphology, source and economic importance in oil crops – Sunflower and Groundnut.
27) Study of perfumes and cosmetics yielding plants- Rose and Lawsonia.
28) Study of ornamental plants (As per theory).

Important Note: Major stress should be given on reproductive characters/features in respect of the plant types.

Distribution of Marks for B. Sc. I- BOTANY Practical

Sr. No.	Name of the Topic	Marks
1.	Bacteria	02
2.	Algae and Fungi	06
3.	Bryophytes and Pteridophyes	06
4.	Gymnosperms	03
5.	Utilization of plants	06
6.	Cytology	04
7.	Angiosperms	06
8.	Biochemistry/Physiology/Ecology	05
9.	Journal	05
10.	Tour report	05

Reference Books

1. A Hand book of Lichens - D. D. Awasthi (2000)
2. A Text book of Algae - Chopra G. L. (1969)
3. A Text book of Algae - Kumar H. D., Singh H. N. (1977)
4. A Text book of Botany - V. Singh, P. C. Pandey, Jain D. K. (1999)
5. A Text book of Botany Vol. I – Pandey S. N., S. P. Misra, P. S. Trivedi (1982)
6. A Text book of Pteridophyte – S. N. Pandey, P. S. Trivedi, S. P. Misra (1995)
7. A Treatise on Algae - K. N. Bhatia (1980)
8. An Introduction to Embryophyta - Parihar N. S. (1961)
9. An Introduction to Fungi - Dube H. C. (1990
10. An Introduction to Palaeobotany - Andrews H. N. (1961)
11. An Introduction to Palaeobotany - Arnold C. A. (1972)
12. An Introduction to Pteridophytes - Rashid A. (1978)
13. An Introduction to Pteridophyta (Diversity and Differentiation) -A.Rashid (1976)
14. Algae - Kumar H. D. and H. N. Singh (1991)
15. Algae - Sharma O. P. (1986)
16. Algae - Pandey B. P. (1994)
17. Anatomy of Seed Plants - Esau K. (1964)