DEPARTMENT OF BOTANY, ST. XAVIER'S COLLEGE (Autonomous), Mumbai.
S. Y. B. Sc. Botany Syllabus (2016-2017)

SEMESTER-IV Course: S.BOT.4.01 PLANT DIVERSITY- III

LEARNING OBJECTIVES

The students will learn-

- The life cycles of the individuals belonging to Bryophyta, Pteridophyta and Gymnosperms.
- The geological time periods and the plants of past.
- The different methods of fossilization.

Unit I: BRYOPHYTA: Structure, life cycle and systematic position of *Anthoceros* and *Funaria;* Thallus organization in Bryophyta, Apogamy and apospory in Bryophytes.

Unit II: PTERIDOPHYTA: Classification of Pteridophyta up to class, Salient features of Psilophyta, Lepidophyta, Calamophyta and Pterophyta, Structure, life cycle and systematic position of *Selaginella*, *Equisetum* and *Adiantum;* Heterospory and origin of seed.

Unit III: GYMNOSPERMS AND PALAEOBOTANY : Classification of Gymnosperms up to class; Structure, life cycle and systematic position of *Cycas and Gnetum;* Economic importance of Gymnosperms. Palaeobotany- Geological time scale, fossil formation. Birbal Sahani Institute of Paleobotany – Lucknow, Study of Form Genera- *Lepidodendron, Lyginopteris.*

Practicals- Course: S.BOT PR.4.01

1. Study of stages in the life cycle of *Anthoceros.*
2. Study of stages in the life cycle of *Funeria.*
3. Study of stages in the life cycle of *Selaginella.*
4. Study of stages in the life cycle of *Equisetum, Adiantum.*
5. Study of stages in the life cycle of *Cycas.*
6. Study of stages in the life cycle of *Gnetum.*
7. Study of form genus *Lepidodendron, Lyginopteris.*

CIA- multiple choice questions / assignments / presentation / test.

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SEMESTER-IV Course: S.BOT.4.02 ANGIOSPERMS- II

LEARNING OBJECTIVES :

The students will learn-

- The taxonomical terminology and understand the meaning of the same.
- The various classification systems and understand the reasoning behind the same.
- Basics of Nomenclature.

Unit I: MORPHOLOGY AND ECONOMIC BOTANY: Morphology of fruits, Economic botany: Fiber yielding plants, Paper yielding plants; Spices and condiments.

Unit II: ANGIOSPERM FAMILIES: Study of the following angiosperm families – emphasis to be given to the peculiar structures found in plants and economic importance of these species – as per Bentham and Hooker's System: Anacardiaceae, Rutaceae, Combretaceae, Myrtaceae, Apiaceae, Rubiaceae, Apocynaceae, Arecaceae,.

Unit III: TAXONOMIC LITERATURE, NOMENCLATURE AND HERBARIUM TECHNIQUES: Taxonomic structure; Major and Minor Categories, Taxonomic Literature, Characters of Taxonomic importance – Anatomy, Palynology and Embryology. Herbarium – Blatter Herbarium; techniques used in preparation of herbarium specimens.

Practicals- Course: S.BOT PR.4.02

1. Study of Fruit morphology.
2. Study of two anatomical characters of Taxonomic importance to distinguish any two families.
3. Study of two palynological characters of Taxonomic importance to distinguish any two families.
4. Study of Embryological characters of Taxonomic importance .
5. Study of the following families, their morphological peculiarities and economic importance: Anacardiaceae, Rutaceae, Combretaceae, Myrtaceae, Apiaceae, Rubiaceae, Apocynaceae , Arecaceae.
5. Preparation of 10 herbarium sheets
6. Visit to Blatter Herbarium and preparation of a report on the same.
7. Field excursion.

CIA- moodle / assignment / presentation / field report / test.

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SEMESTER-IV Course: S.BOT.4.03 MEDICINAL BOTANY AND TOOLS OF ANALYSIS

LEARNING OBJECTIVES

The students will learn-

- The methods of evaluation of crude drugs and the adulterants used.
- The working and use of instruments in plant science.
- The important websites and databases available on the internet.
- To compare the significant difference/s in 2 or more samples.

Unit I: MEDICINAL BOTANY: Classification of crude drugs, Pharmacognosy – definition and scope, Analytical Pharmacognosy – Drug adulteration, methods of drug evaluation, phytochemical investigations. Bio-prospection of plant species in relation to medicinal plants, Plants used in treatments of various ailments – Ginger, Turmeric, Tulsi, Garlic, Cinnamon, Nutmeg, Clove; Herbal cosmetics.

Unit II: INSTRUMENTATION: Principle, working and applications of: pH meter , Colorimeter, Light, phase contrast microscopy, Chromatography - Paper, Thin layer and Column chromatography, Gel electrophoresis - techniques of protein staining.

Unit III: BIOSTATISTICS: Frequency distribution- graphical representation, distribution of data in Biology; Standard deviation; Testing of hypothesis: Student's t-test (paired and unpaired) and Correlation. BIOINFORMATICS : Introduction to bioinformatics, internet and its uses, world wide web, Tools used in bioinformatics related to biotechnology; NCBI data models and other data bases, services offered by NCBI and EBI.

Practicals- Course: S.BOT PR.4.03

1. Determination of extractive values of crude drugs.
2. Determination of swelling factor.
3. Organoleptic study, macroscopic and microscopic characters of plant drug- Leaf drug *Adhtoda vasica;* Rhizome drug *Zingiber officinale;* Bark drug *Cinnamomum zylanicum.*
4. Preliminary tests for alkaloids, tannins essential oils and glycosides.
5. Study of plants used in various ailments - Vernacular name, Botanical name, Family plant part used of the following plants: Ginger, Turmeric, Tulsi, Garlic, Cinnamon, Nutmeg, Clove.
6. Study of Phase contrast microscope.
7. Separation of curcuminoids by TLC (demonstration)
8. Separation of carotenoids by column chromatography (Demonstration).
9. Measure of central tendency, frequency distribution and Standard deviation.
10. *t* –test analysis.
11. Use of BLAST to identify similar sequences with respect to a query sequence.
12. To retrieve and study nucleotide and protein sequence from NCBI database.

CIA- assignments / presentation / project / test.