**CURRICULUM PLAN 2021-22**

**(Even Semesters: II, VI, VII)**

**Dr. Naghma Praween**

**B. Sc. (H) Botany, Medicinal Botany (Semester VI)**

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| **Practical** | **Allocation of Lectures** | **Month wise schedule** | **Tutorial/Assignment/ Presentation** | **Reading suggestions** |
| **1. Identification** and medicinal value of locally available medicinal plants in the field.  **2. Study of organoleptic**, macroscopic and microscopic parameters of any two plant drugs. Sections and powder microscopic evaluation.  **3. Isolation of bioactive** compounds in the lab and phytochemical analysis of the crude extract of various parts of medicinal plants.  **4. Study of ingredients** and medicinal uses of common polyherbal formulations used in the traditional systems of medicine.  **5. Project Report** based on visit to Pharmaceutical Industries and/or Institutes.  **6. E-presentations :** Traditional Systems of Medicine, Contribution of medicinal plants to alternative and modern medicine, Conservation strategies of medicinal  plants, Nutraceuticals, Rasayana drugs, Medicinal plants and non-communicable diseases, Cultivation, marketing and utilisation of medicinal plants.  **7. Laboratory Records** |  | January-2022  February -2022  March 2022  April 2022 | **e- presentation** | Trivedi, P.C. (2006). Medicinal Plants Traditional Knowledge. |

**B. Sc. (Prog.) Life Science**

**Economic Botany and Biotechnology: ( Sem VI): Theory**

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| **Unit 8 :**  Introduction to Plant Biotechnology  **Unit 9** :Tissue Culture Technology (9 lectures) Introduction; nutrient media; aseptic and culture conditions; developmental pathways: direct and indirect organogenesis and embryogenesis; single cell and protoplast culture.  **Unit 10** : Recombinant Technology (18 lectures) Molecular techniques: Blotting techniques (Southern, Northern and Western); PCR; Molecular DNA markers (RAPD, RFLP, SNPs) and DNA fingerprinting in plants, Genetic Engineering Techniques: Gene cloning vectors (pUC 18, pBR322, BAC, YAC, Tiplasmid); construction of genomic and C-DNA libraries; screening for gene of interest by DNA probe hybridisation, complementation; Insertion of genes into plant tissues (Agrobacterium mediated, electroporation, micro-projectile bombardment); selection of recombinants by selectable marker and reporter genes (GUS, luciferase, GFP). Applications: Bt cotton, Roundup ready soybean, Golden rice, Flavr-Savr tomato, edible vaccines, industrial enzyme production, Bioreactors Applications: Micropropagation, androgenesis, gynogenesis, embryo and endosperm culture, secondary metabolite production, germplasm conservation. | 1 lecture  (9 lectures)  (18 lectures) | January 2022  February 2022  March 2022  April 2022 | Assignment | Glick, B.R., Pasternak, J.J. (2003). Molecular Biotechnology- Principles and Applications.  Glick, B.R., Pasternak, J.J. (2003). Molecular Biotechnology- Principles and Applications. |

**Practicals of Economic Botany and Biotechnology**

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| 1. Study of economically important plants: Wheat, Gram, Soybean, Black pepper, Clove Tea, Cotton, Groundnut through specimens, sections and micro chemical tests 2. Familiarization with basic equipment’s in tissue culture. 3. Study through photographs: Anther culture, somatic embryogenesis, endosperm and embryo culture; micropropagation. 4. Study of molecular techniques: PCR, Blotting techniques, AGE and PAGE |  | January 2022  February 2022  March 2022  April 2022 | File record | Kochhar, S.L. (2011). Economic Botany |

**Semester – II (Semester System)**

**B.Sc. Prog. Life Science**

**Core Paper : Plant Ecology & Taxonomy**

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| .**Practical :**  1. Study of instruments used to measure microclimatic variables: Soil thermometer, maximum and minimum thermometer, anemometer, psychrometer, hygrometer, rain gauge and lux meter.  2. Determination of pH, and analysis of two soil samples for carbonates, chlorides, nitrates, sulphates, organic matter and base deficiency by rapid field test.  1.3 (a) Study of morphological adaptations of hydrophytes and xerophytes (four each).  2. (b)Study of biotic interactions of the following: Stem parasite (Cuscuta), Root parasite (Orobanche), Epiphytes, Predation (Insectivorous plants)  3. Determination of minimal quadrat size for the study of herbaceous vegetation in the college campus by species area curve method. (species to be listed)  4. Quantitative analysis of herbaceous vegetation in the college campus for frequency and comparison with Raunkiaer’s frequency distribution law  5. Study of vegetative and floral characters of the following families (Description, V.S. flower, section of ovary, floral diagram/s, floral formula/e and systematic position according to Bentham & Hooker’s system of classification):Brassicaceae - Brassica,Alyssum / Iberis; Asteraceae -Sonchus/Launaea, Vernonia/Ageratum, Eclipta/Tridax; Solanaceae -Solanumnigrum, Withania; Lamiaceae -Salvia, Ocimum; Liliaceae - Asphodelus / Lilium / Allium.  6. Mounting of a properly dried and pressed specimen of any wild plant with herbarium label (to be submitted on the herbarium sheet with appropriate label.)  **Theory:**  **Unit 8:** Taxonomic evidences from palynology, cytology, phytochemistry and molecular data.  **Unit 12** : Biometrics, numerical taxonomy and cladistics Characters; variations; OTUs, character weighting and coding; cluster analysis; phenograms, cladograms (definitions and differences) |  |  |  | Singh, G. (2012). Plant Systematics: Theory and Practice.  Bendre and Kumar  Practical book  Volume II  Bendre and Kumar  Practical book  Volume II  Singh, G. (2012). Plant Systematics: Theory and Practice. |

**Plant Ecology and Taxonomy: Generic Elective : Sem II**

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| **Unit 6** : Introduction to plant taxonomy Identification, Classification, Nomenclature. **Unit 7:** Identification Functions of Herbarium, important herbaria and botanical gardens of the world and India; Documentation: Flora, Keys: single access and multi-access **Unit 8:** Taxonomic evidences from palynology, cytology, phytochemistry and molecular data.  **Unit 9:** Taxonomic hierarchy Ranks, categories and taxonomic groups.  **Unit 10:** Botanical nomenclature (6 lectures) Principles and rules (ICN); ranks and names; binominal system, typification, author citation, valid publication, rejection of names, principle of priority and its limitations.  **Unit 11:** Classification (6 lectures) Types of classification-artificial, natural and phylogenetic.Bentham and Hooker (up to series), Engler and Prantl (up to series).  **Unit 12:** Biometrics, numerical taxonomy and cladistics Characters; variations; OTUs, character weighting and coding; cluster analysis; phenograms, cladograms (definitions and differences). | 1 lecture  5 lectures)  (6 lectures  (2 lectures)  6 lectures)  (6 lectures)  (4 lectures) | April 2022  May 2022  June 2022  July 2022 | Assignment | Singh, G. (2012). Plant Systematics: Theory and Practice. |