II Semester /Botany Core Course – 2

Basics of Vascular plants and Phytogeography

(Pteridophytes, Gymnosperms, Taxonomy of Angiosperms and Phytogeography)

(Total hours of teaching – 60 @ 02 Hrs./Week)

Theory:

Learning Outcomes:

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

- Classify and compare Pteridophytes and Gymnosperms based on their morphology, anatomy, reproduction and life cycles.
- Justifyevolutionary trends in tracheophytes to adapt for land habitat.
- Explain the process of fossilization and compare the characteristics of extinct and extant plants.
- Critically understand various taxonomical aids for identification of Angiosperms.
- Analyze the morphology of the most common Angiospermplants of their localitiesand recognize their families.
- Evaluate the ecological, ethnic and economic value of different tracheophytes and summarize their goods and services for human welfare.
- Locate different phytogeographical regions of the world and India and can analyze their floristic wealth.

Unit – 1:Pteridophytes **12 Hrs.**

1. General characteristics of Pteridophyta; classification of Smith (1955) uptodivisions.
2. Occurrence, morphology,anatomy, reproduction (developmental details are notneeded) and life historyof (a) *Lycopodium* (Lycopsida) and (b) *Marsilea* (Filicopsida).
3. Stelar evolution in Pteridophytes;
4. Heterospory and seed habit.

Unit – 2:Gymnosperms **14 Hrs.**

1. General characteristics of Gymnosperms; Sporneclassification uptoclasses.
2. Occurrence, morphology, anatomy, reproduction (developmental details are not needed) and life history of (a) *Cycas*(Cycadopsida) and (b) *Gnetum* (Gnetopsida).
3. Outlines of geological time scale.
4. A brief account on *Cycadeoidea.*

Unit – 3:Basic aspects of Taxonomy **13Hrs.**

1. Aim and scope of taxonomy; Species concept: Taxonomic hierarchy, species, genus and family.
2. Plant nomenclature: Binomial system, ICBN- rules for nomenclature.
3. Herbarium and its techniques,BSI herbarium and Kew herbarium; concept of digital herbaria.
4. Bentham and Hooker system of classification;
5. Systematic description and economic importance of the following families:
   (a) Annonaceae (b) Curcurbitaceae

Unit – 4: Systematic Taxonomy **13 Hrs.**

1. Systematic description and economic importance of the following families:
   (a) Asteraceae (b) Asclepiadaceae (c)Amaranthaceae(d) Euphorbiaceae
   (e) Arecaceaeand (f) Poaceae
2. Outlines of Angiosperm Phylogeny Group (APG IV).

Unit – 5:Phytogeography **08 Hrs.**

1. Principles of Phytogeography, Distribution (wides, endemic, discontinuous species)
2. Endemism – types and causes.
3. Phytogeographic regions of World.
4. Phytogeographic regions of India.
5. Vegetation types in Andhra Pradesh.

Text books:

- Botany – I (Vrukshasastram-I) : Telugu Akademi, Hyderabad
- Botany – II (Vrukshasastram-II) : Telugu Akademi, Hyderabad
- Acharya, B.C., (2019) *Archchegoniates,* Kalyani Publishers, New Delhi
- Bhattacharya, K., G. Hait&Ghosh, A. K., (2011) *A Text Book of Botany, Volume-II,* New Central Book Agency Pvt. Ltd., Kolkata
- Hait,G., K.Bhattacharya&A.K.Ghosh (2011) *A Text Book of Botany, Volume-I,* New Central Book Agency Pvt. Ltd., Kolkata
- Pandey, B.P. (2013)*College Botany, Volume-I,* S. Chand Publishing, New Delhi
- Pandey, B.P. (2013)*College Botany, Volume-II,* S. Chand Publishing, New Delhi

Books for Reference:

- Smith, G.M. (1971)*CryptogamicBotanyVol. II*., Tata McGraw Hill, New Delhi
- Sharma,O.P.(2012)Pteridophyta. Tata McGraw-Hill, New Delhi
- Kramer, K.U.&P. S. Green (1990) *The Families and Genera of Vascular Plants, Volume –I*: *Pteridophytes and Gymnosperms*(Ed.K.Kubitzki) Springe-Verlag, New York
- Bhatnagar, S.P. &AlokMoitra (1996)*Gymnosperms*. New Age International, New Delhi
- Coulter, J.M. &C.J.Chamberlain(1910) *Morphology of Gymnosperms,*The University of Chicago Press, Chicago, Illinois
- Govil, C.M. (2007)*Gymnosperms : Extinct and Extant*. KRISHNA Prakashan Media (P) Ltd.Meerut& Delhi
- Sporne, K.R.(1971)*The Morphology of Gymnosperms.*Hutchinsons Co. Ltd., London
- Arnold, C.A., (1947) *An introduction to Paleobotany*McGraw –Hill Book Company,INC, New York
- Stewart,W.N., and G.W.Rothwell (2005) *Paleobotany and the evolution of plants* Cambridge University Press, New York
- Lawrence, George H.M. (1951) *Taxonomy of Vascular Plants.* The McMillan Co., New York
- Heywood, V. H. and D. M. Moore (1984)*Current Concepts in Plant Taxonomy.* Academic Press, London.

- Jeffrey, C. (1982)*An Introduction to Plant Taxonomy.* Cambridge University Press, Cambridge. London.
- Sambamurty, A.V.S.S. (2005)*Taxonomy of Angiosperms* I. K .International Pvt. Ltd., New Delhi
- Singh, G. (2012*). Plant Systematics: Theory and Practice.*Oxford & IBH Pvt. Ltd., NewDelhi.
- Simpson, M.G. (2006). *Plant Systematics.* Elsevier Academic Press, San Diego, CA,U.S.A.
- Cain, S.A . (1944)*Foundations of Plant Geography*Harper & Brothers, N.Y.
- Good, R. (1997)*The Geography of flowering Plants (2nd Edn.)*Longmans, Green &

  Co., Inc., London & Allied Science Publishers, New Delhi
- Mani, M.S (1974)*Ecology & Biogeography of India*Dr. W. Junk Publishers, The Haque

Practical syllabus of Botany Core Course – 2/ Semester –

IIBasics of Vascular plants and Phytogeography

(Pteridophytes, Gymnosperms, Taxonomy of Angiosperms and Phytogeography)(Total hours of laboratory exercises 30 Hrs. @ 02 Hrs. /Week)

Course Outcomes:

On successful completion of this course students shall be able to:

1. Demonstrate the techniques of section cutting, preparing slides, identifying of the material and drawing exact figures.
2. Compare and contrast the morphological, anatomical and reproductive features of vascular plants.
3. Identify the local angiosperms of the families prescribed to their genus and species level and prepare herbarium.
4. Exhibit skills of preparing slides, identifying the given twigs in the lab and drawing figures of plant twigs, flowers and floral diagrams as they are.
5. Prepare and preserve specimens of local wild plants using herbarium techniques.

Practical Syllabus:

1. Study/ microscopic observation of vegetative, sectional/anatomical and reproductive structures of the following using temporary or permanent slides/ specimens/ mounts :
   a. Pteridophyta : *Lycopodium* and *Marselia*
   b. Gymnosperms : *Cycas*and *Gnetum*
2. Study of fossil specimens of *Cycadeoidea* and *Pentoxylon*(photographs /diagrams can be shown if specimens are not available).
3. Demonstration of herbarium techniques.
4. Systematic / taxonomic study of locally available plants belonging to the familiesprescribed in theory syllabus. (Submission of 30 number of Herbarium sheets ofwild plants with the standard system is mandatory).
5. Mapping of phytogeographical regions of the globe and India.