Course Syllabus

Paper-I: Microbial Diversity and Early Land Plants
(w.e.f. Academic Year: 2025-2026)

Course Objectives: This course is designed to

COB 1: To increase the understanding about the microbial diversity and early land plants.
COB 2: To know the classification, structure and growth of early land plants.
COB 3: To aware about the adverse effects of pathogens, symptoms.
COB 4: To know the morphology, internal structure and reproduction in algae, fungi, bryophytes and pteridophytes.

UNIT - I: **(15 hours)**

1. Brief account of Archaebacteria, Actinomycetes and Mycoplasma with reference to Little Leaf of Brinjal and Papaya Leaf Curl.
2. **Viruses**: Structure, replication and transmission; plant diseases caused by viruses and their control with reference to Tobacco Mosaic and Rice Tungro.
3. **Bacteria**: Structure, nutrition, and reproduction. Plant diseases caused by bacteria and their control with reference to Angular leaf spot of Cotton and Bacterial blight of Rice.

UNIT-II **(15 hours)**

4. General characters, structure, reproduction and classification of Algae (Fritsch).
5. **Cyanobacteria**: General characters, cell structure their significance as biofertilizers with special reference to *Oscillatoria*, *Nostoc* and *Anabaena*.
6. **Algae**: Structure and reproduction of the following:
   Chlorophyceae – *Volvox*, and *Chara*

   Phaeophyceae – *Ectocarpus*
   Rhodophyceae - *Polysiphonia*

UNIT-III **(15 hours)**

7. General characters and classification of Fungi (Ainsworth).
8. **Fungi**: Structure, reproduction and life cycle by the following:
   (a) Mastigimycotina- *Albugo*
   (b) Zygomycotina – *Mucor*
   (c) Ascomycotina –*Penicillium*
   (d) Basidiomycotina – *Puccinia*
   (e) Deuteromycotina – *Cercospora*

9. Economic importance of Lichens

UNIT-IV **(15 hours)**

10. **Bryophytes**: Structure, reproduction, life cycle and systematic position of *Marchantia* and *Polytrichum*; Evolution of Sporophyte in Bryophytes.
11. **Pteridophytes**: Structure, reproduction, life cycle and systematic position of *Rhynia*, *Equisetum* and *Marsilea.*
12. Stelar evolution, Heterospory and Seed habit in Pteridophytes.

Course Outcome: By the end of the course, the student will be able to
CO 1: Develop the concept on microbial diversity and early land plants.
CO 2: Learn the classification, structure and growth of the organisms.
CO 3: Know the impact of pathogens, adverse effects and control measures.
CO 4: Aware about the morphology, internal structure and reproductive methods in algae, fungi, bryophytes and pteridophytes.

Paper-II: Gymnosperms, Anatomy and Embryology of Angiosperms

(w.e.f. Academic Year: 2025-2026)

Course Objectives: This course is designed to

COB 1: To understand the morphology and diversity of Gymnosperms.
COB 2: To understand about various tissues, tissue systems and growth in plants.
COB 3: To know about the scope and importance of plant anatomy
COB 4: To understand the structure, development of anther, ovule and pollination mechanisms.

UNIT - I **(15 hours)**

1. Gymnosperms: Distribution, General characters, structure, reproduction and classification (Sporne, 1965). Economic importance of Gymnosperms.
2. Morphology of vegetative and reproductive parts, systematic position and life cycle of *Pinus* and *Gnetum*.
3. Introduction to Palaeobotany, Types of fossils and fossilization, Importance of fossils.

UNIT-II **(15 hours)**

4. Meristems: Types, histological organization of shoot and root apices and theories.
5. Tissues and Tissue systems: Simple, complex and special tissues.

6. Leaf: internal structure of dicot and monocot leaf; Stomata structure and types. Epidermal outgrowths.

UNIT-III **(15 hours)**

7. Secondary growth: Vascular cambium – structure and function. Secondary growth in root
   and stem, Wood (heart wood and sapwood).

8. Anomolous secondary growth of Stem - *Achyranthes, Boerhavia, Dracaena;* Root- *Beta*

9. Wood structure: General account. Study of local timbers – Teak (*Tectona grandis*), Red sanders *(Pterocarpus santalinus*), and Neem (*Azadirachta indica*)

UNIT – IV **(15 hours)**

10. Structure of Anther, Microsporogenesis and development of male gametophyte.
11. Ovule structure and types; Megasporogenesis; types and development of female gametophyte.
12. Pollination mechanisms, Pollen – pistil interaction. Double Fertilization.
5. Types of Endosperm. Embryo structure – Dicot and Monocot; Polyembryony and Apomixis - an outline.

Course Outcome: By the end of the course, the student will be able to

CO 1: Develop the concept on morphology and diversity of Gymnosperms.
CO 2: Know the composition of body with different tissues, tissue systems and growth type.
CO 3: Come to know the scope and importance of plant anatomy.
CO 4: Understand the structure, development of anther, ovule and pollination mechanisms.

Research Articles:

1. **Suthari, S.,** Omkar, K., Reddy, G.S., Mallesh, M., Kiran, E. and Sreeramulu, N. 2025. A floristic checklist of wetland and aquatic vascular plants of Telangana, India. *Plant Science Today* 12(4): 1-6. (**Impact Factor: 0.8**) (eISSN: 2348-1900; Scopus Indexed & UGC Care List II).

2. Anishetty, S., Nellutla, N., **Suthari, S.**, Shirisha, M. and Vasanthi, A.V. 2025. An ethnobotanical and folklore study of medicinal plants in Eturnagaram wildlife sanctuary and Malluru forest, Telangana. *International Journal of Ayurveda and Pharma Research* 13(8): 53-79. (ISSN: 0011-3891)

3. Mallesh, M., Kalpana, B., **Suthari, S.** and Narsaiah, S. 2025. Evaluation of protein content of Fall armyworm (*Spodoptera frugiperda*) on maize and cotton crops in Telangana, India. *Journal of Experimental Agriculture International* 47(1): 287-291. Article No. JEAI.129881 (ISSN: 2457-0591)

4. **Suthari, S.** and Nagaraju, M. 2024. Ecological disaster in the tropical dry deciduous forests of Telangana: challenges and opportunities for restoration. *Current Science* **127**(10): 1139. (**Impact Factor: 1.1**) (ISSN: 0011-3891; UGC No. 14405) [Scopus Indexed].

5. **Suthari, S.**, Omkar, K., Jayaramulu, K., Swetha, B., Kiran, E., Naidu, M.T. and Nallella, S. 2023. Inventory of agrestals in Telangana, India: their impact and management. *Agricultural Science Digest* **Article ID**: D-5590. doi: 10.18805/ag.D-5590. (e-ISSN: 0976-0547) [SCI Journal]

6. **Suthari, S.**, Omkar, K., Devi, B.R., Prasad, C.S. and Narayana, L.S. 2023. Iron deficiency and hereditary anaemia in ethnic tribes of Mulugu district, Telangana: a case study. *Education and Society* **46**(4): 126-130 (ISSN: 2278-6864).

7. **Suthari, S.**, Omkar, K., Kiran, E., Naidu, M.T., Rao, A.R. and Nallella, S. 2023. Natural Gum and Resin bearing plant taxa in Telangana, India: a qualitative method of data collection. *The Journal of Plant Science Research* **39**(2): 153-166 (ISSN: 0970-2539).

8. Omkar, K., **Suthari, S.**, Naidu, M.T., Geetha, S., Nallella, S. 2022. Potential resources of NTFPs and socio-economic empowerment in the rural economy of Telangana, India. *The Journal of Plant Science Research* **38**(2): 589-602 (ISSN: 0970-2539).

9. Naidu, M.T., **Suthari, S**. and Yadav, P.B.S. 2021. Measuring ecological status and tree species diversity in Eastern Ghats, India. *Acta Ecologica Sinica* **43**(2): 234-244. (published online: 08-06-2021). (ISSN: 1872-2032). (1872-2032) [Scopus Indexed].

10. Omkar, K., **Suthari, S**., Rani, V.J.S., Esampally, K., Jayaramulu, K. and Naidu, M.T. 2021. Inventory of invasive alien plant taxa in Gundla Brahmeswaram wildlife sanctuary, Nallamalais: implications for monitoring and management. *International Journal of Ecology and Environmental Sciences* **3**(3): 41-48. (ISSN: 2320-5199)

11. **Suthari, S**., Priyadarshini, E.S., Esampally, K. and Nallella, S. 2021. Utility of wild food plants by indigenous tribes from Telangana State, India: An ethnobotanical perspective. *American Journal of Ethnomedicine* **8**(4:3): 1-6. (ISSN: 2348-9502).

12. **Suthari, S**., Singh, S. and Raju, V.S. 2020. Aboveground phytomass and carbon assessment of the forests of Northern Telangana, India using geospatial technique. *Biodiversity* **21**(4): 227-237. DOI: 10.1080/14888386.2020.1843541 (ISSN: 1488-8386 print; 2160-0651 online) [Scopus Indexed].

13. Jyothsna, S., Manjula, G., **Suthari, S**. and Rao, A.S.N. 2020. Trace elemental analysis of some selected anti-asthmatic medicinal plants using EDXF technique. *Heliyon* **6**: e03260. (ISSN: 2405-8440) [Scopus Indexed].

Book Chapters:

1. **Suthari, S**., Srinivas, K., Omkar, K., Gul, M.Z. and Sadanandam, A. 2021. Ethnobotanical perspectives in treatment of communicable and non-communicable diseases. (Chapter 9). In: Bhat, R.F., Hakeem, K.R. and Dervash, M.A. (eds.), Phytomedicine: A Treasure of Pharmacologically Active Products from Plants. pp: 251-289. (Elsevier) ISBN: 9780128241097[Scopus Indexed]

2. Lavudi, H.N., Ratnamma, B.K., Badithi, N., **Suthari, S**. and Durgeshwar, P. 2024. Isolation and characterization of chitin and chitosan from different Crustacean shell waste from coastal regions of Andhra Pradesh. (Chapter 3). *In*: Suthari, S. (ed.) Exploring Emerging Techniques in Plant Sciences pp. 35-48. (ISBN: 978-93-5406-563-7).

3. Lavudi, H.N. and **Suthari, S**. 2024. Biology and conservation aspects of an unremarked Cycad (Cycas sphaerica Roxb.) from Andhra Pradesh, India. (Chapter 9). *In*: Suthari, S. (ed.) Exploring Emerging Techniques in Plant Sciences pp. 102-108. (ISBN: 978-93-5406-563-7).

4. Sainuddin, F.V., Mathew, S.M., Saranya, K.R.L, **Suthari, S**., Asok, S.V. and Reddy, C.S. 2024. From Field to Map: a review of state-of-the-art approaches to estimate above-ground biomass integrating remote sensing techniques. (Chapter 16). *In*: Suthari, S. (ed.) Exploring Emerging Techniques in Plant Sciences pp. 168-181. (ISBN: 978-93-5406-563-7).

5. Naidu, M.T., **Suthari, S**., Reddy, M.S. and Yadav, P.B.S. 2024. Tree species composition and distribution pattern in five sites of tropical dry forests of Eastern Ghats, India. (Chapter 21). *In*: Suthari, S. (ed.) Exploring Emerging Techniques in Plant Sciences pp. 262-289. (ISBN: 978-93-5406-563-7).

Books authored:

(i) Microbial Diversity and Lower Plants; Gymnosperms, Angiosperm Taxonomy & Ecology: B.Sc. (CBCS), I year: Semester- I & II, Text Book **E/M**, Telugu Akademi, Hyderabad (2020). [Editor: Prof. C. Manoharachary; Authors: Prof. S. Ram Reddy, Dr D. Nagaraju and Dr **S. Suthari**].

(ii) Plant Anatomy, Embryology and Palynology: B.Sc. (CBCS), II year: Semester-III, Text Book **E/M**, Telugu Akademi, Hyderabad (2020). [Editor: Prof. C. Manoharachary; Authors: Prof. S. Ram Reddy, Dr D. Nagaraju and Dr **S. Suthari**].

(iii) Teacher Recruitment Test (DSC) – Biological Sciences-Content: Text Book **E/M & T/M**, Telugu Akademi, Hyderabad (2025). [Editor: Dr **S. Suthari**; Authors: Dr **S. Suthari**, Dr K. Omkar, Dr D. Parvathi, J. Swamy and Dr M. Mallesh].

(iv) NEET QUESTION BANK – Volume I: Text Book T/M, Telugu Akademi (Vaddeshwaram, Mangalagiri, Andhra Pradesh (2025).

(v) Intermediate I Year (as reviewer) - Text Book E/M, Telugu Akademi (Vaddeshwaram, Mangalagiri, Andhra Pradesh (2025).

(vi) M.Sc. Botany (12201): First Year, Semester-I, Course-I: Biology, Diversity of Microbes and Fungi (Dr B.R. Ambedkar Open University, Hyderabad) (Editor: Prof. C. Manohara Chary; Program Co-ordinator: Dr N. Ramakrishna; Authors: Dr B. Kiran Kumar, Dr D. Nagaraju, Dr **S. Suthari**, Prof. K. Shailaja, Dr Y. Kumar).

(vii) NEET QUESTION BANK – Volume II: Text Book T/M, Telugu Akademi (Vaddeshwaram, Mangalagiri, Andhra Pradesh (2025).

(viii) Intermediate II Year - Text Book T/M, Telugu Akademi (Vaddeshwaram, Mangalagiri, Andhra Pradesh (2025).

(ix) Wild Edible Plants of Telangana, India: A Pictorial Guide to 100 Natural Foods. Vedashree Publishers, Hyderabad, Telangana. [Dr **S. Suthari**, Dr P. Harikrishna].

Books Edited:

1. **Suthari, S.** (ed.) 2024. *Exploring Emerging Techniques in Plant Sciences*. Published by Vaagdevi Degree & PG College (A), Hanumakonda, Warangal. Printed at Vasavi Printers, Telangana. ISBN: 978-93-5406-563-7. pp. 298.

2. **Teacher Recruitment Test (DSC) – Biological Sciences-Content:** Text Book **E/M & T/M**, Telugu Akademi, Hyderabad (2025). (Editor: Dr **S. Suthari**; Authors: Dr **S. Suthari**, Dr K. Omkar, Dr D. Parvathi, J. Swamy and Dr M. Mallesh].