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| **B.Sc.** | **Semester - II** | **Credits: 4** |
| **Course: 2** | **Basics of Vascular plants and Phytogeography** | **Hrs/Wk: 4** |

**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.
* Justify evolutionary 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 Angiosperm plants of their localities and 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 I: Pteridophytes 12 Hrs.

1. General characteristics of Pteridophyta; classification of Smith (1955) up to divisions.
2. Occurrence, morphology, anatomy, reproduction (developmental details are not needed) and life historyof (a) *Lycopodium* (Lycopsida) and (b) *Marsilea* (Filicopsida).
3. Stelar evolution in Pteridophytes.
4. Heterospory and seed habit.

## UNIT II: Gymnosperms 14 Hrs.

1. General characteristics of Gymnosperms; Sporne classification up to classes.
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 III: 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:
	1. Annonaceae (b) Curcurbitaceae

## UNIT IV: Systematic Taxonomy 13 Hrs.

1. Systematic description and economic importance of the following families:
	1. Asteraceae (b) Asclepiadaceae (c)Amaranthaceae (d) Euphorbiaceae

(e) Arecaceae and (f) Poaceae

1. Outlines of Angiosperm Phylogeny Group (APG IV).

## UNIT V: 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 :**

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

**REFERENCE BOOKS:**

1. Smith, G.M. (1971)*CryptogamicBotanyVol. II*., Tata McGraw Hill, New Delhi
2. Sharma,O.P.(2012)Pteridophyta. Tata McGraw-Hill, New Delhi
3. 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
4. Bhatnagar, S.P. &AlokMoitra (1996)*Gymnosperms*. New Age International, New Delhi
5. Coulter, J.M. &C.J.Chamberlain(1910) *Morphology of Gymnosperms,*The University of Chicago Press, Chicago, Illinois
6. Govil, C.M. (2007)*Gymnosperms : Extinct and Extant*. KRISHNA Prakashan Media (P) Ltd.Meerut& Delhi
7. Sporne, K.R.(1971)*The Morphology of Gymnosperms.*Hutchinsons Co. Ltd., London
8. Arnold, C.A., (1947) *An introduction to Paleobotany*McGraw –Hill Book Company,INC, New York
9. Stewart,W.N., and G.W.Rothwell (2005) *Paleobotany and the evolution of plants*Cambridge University Press, New York
10. Lawrence, George H.M. (1951) *Taxonomy of Vascular Plants.* The McMillan Co., New York
11. Heywood, V. H. and D. M. Moore (1984)*Current Concepts in Plant Taxonomy.* Academic Press, London.
12. Jeffrey, C. (1982)*An Introduction to Plant Taxonomy.* Cambridge University Press, Cambridge. London.
13. Sambamurty, A.V.S.S. (2005)*Taxonomy of Angiosperms* I. K .International Pvt. Ltd., New Delhi
14. Singh, G. (2012*). Plant Systematics: Theory and Practice.*Oxford & IBH Pvt. Ltd., NewDelhi.
15. Simpson, M.G. (2006). *Plant Systematics.* Elsevier Academic Press, San Diego, CA,U.S.A.
16. Cain, S.A . (1944)*Foundations of Plant Geography*Harper & Brothers, N.Y.
17. Good, R. (1997)*The Geography of flowering Plants (2nd Edn.)*Longmans, Green & Co., Inc., London & Allied Science Publishers, New Delhi
18. Mani, M.S (1974)*Ecology & Biogeography of India*Dr. W. Junk Publishers, The Haque

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| **B.Sc.** | **Semester - II** | **Credits: 1** |
| **Course: 2(L)** | **Basics of Vascular plants and Phytogeography Lab** | **Hrs/Wk: 2** |

**Course Outcomes :**On successful completion ofthiscourse students shall be able to :

* Demonstrate the techniques of section cutting, preparing slides, identifying of the materialand drawing exact figures.
* Compare and contrast the morphological, anatomical and reproductive features of vascular plants.
* Identify the local angiosperms of the families prescribed to their genus and species level and prepare herbarium.
* 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.
* 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 :
	1. Pteridophyta : *Lycopodium* and *Marselia*
	2. 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 / taxonomicstudy of locally available plants belonging to the families prescribed in theory syllabus. (Submission of 30 number of Herbarium sheets of wild plants with the standard system is mandatory).
5. Mapping of phytogeographical regions of the globe and India.

## Model Question Paper for Practical Examination

Semester – II/ Botany Core Course – 2

## Basics of Vascular plants and Phytogeography

(Pteridophytes, Gymnosperms,Taxonomy of Angiosperms and Phytogeography)

## Time : 3 Hrs. Max. Marks : 50

1. Take T.S. of the material ‘A’ (Pteridophyta), make a temporary slide and justify the identification with apt points. 10 M
2. Take T.S. of the material ‘B’ (Gymnosperms), make a temporary slide and justify the identification with apt points. 10 M
3. Describe the vegetative and floral characters of the material ‘C’ (Taxonomy of Angiosperms) and derive its systematic position. 10 M
4. Identify the specimen ‘D’ (Fossil Gymnosperm) and give specific reasons. 5 M
5. Locate the specified phytogeographical regions (2x2M) in the world / India (E) map supplied to you. 4 M
6. Record + Herbarium & Field note book + Viva-voce 5 +4+3 = 12 M

**Suggested co-curricular activities for Botany Core Course-2 in Semester-II :**

1. **Measurable :**
	1. **Student seminars :**
		1. Fossil Pteridophytes.
		2. Aquatic ferns and tree ferns
		3. Ecological and economic importance of Pteridophytes
		4. Evolution of male and female gametophytes in Gymnosperms.
		5. Endemic and endangered Gymnosperms.
		6. Ecological and economic importance of Gymnosperms.
		7. Floras and their importance :Flora of British India and Flora of Madras Presidency.
		8. Botanical gardens and their importance :National Botanic garden and Royal Botanic garden.
		9. Artificial, Natural and Phylogenetic classification systems.
		10. Molecular markers used in APG system of classification.
		11. Vessel less angiosperms.
		12. Insectivorous plants.
		13. Parasitic angiosperms.
		14. Continental drift theory and species isolation.
	2. **Student Study Projects :**
		1. Collection and identification of Pteridophytes from their native locality/ making an album by collecting photographs of Pteridophytes.
		2. Collection and identification of Gymnospermsfrom their native locality/ making an album by collecting photographs of Gymnosperms.
		3. Collection of information on famous herbaria in the world and preparation of a report.
		4. Collection of information on famous botanic gardens in the world and preparation of a report.
		5. Collection of data on vegetables (leafy and fruity) plants in the market and and preparation of a report on their taxonomy.
		6. Collection and identification of fresh and dry fruits plants in the market and and preparation of a report on their taxonomy.
		7. Collection of data on plants of ethnic and ethnobotanical importance from theirnative locality.
		8. Preparation of a local flora by enlisting the plants of their native place.
	3. **Assignments**: Written assignment at home / during ‘0’ hour at college; preparation of charts with drawings, making models etc., on topics included in syllabus.
2. **General :**
3. Visit to Botanic garden in a Research institute/University to see the live plants.
4. Virtual tour in websites for digital herbaria and botanic gardens.
5. Acquaint with standard floras like – Flora of Madras Presidency, Flora of their respective district in Andhra Pradesh.
6. Looking into vegetation of different phytogeographical regions using web resources.

Group Discussion (GD)/ Quiz/ Just A Minute (JAM) on different modules in syllabus of the course

## MODEL QUESTION COURSE (Sem - End)

**B. Sc DEGREE EXAMINATION**

**SEMESTER: II**

Semester – II/ Botany Core Course – 2

## Course 2 : Basics of Vascular plants and Phytogeography

(Pteridophytes, Gymnosperms,Taxonomy of Angiosperms and Phytogeography)

**Time: 3Hrs. Max. Marks: 75**

## SECTION - A

**Answer any FIVE questions. Each question carries 5 marks 5 x 5 =25M**

1. a) Eusporangium (b) Leptosporangium
2. Geological time scale.
3. Binomial system
4. (a) Synandrous condition (b) Syngenesious condition
5. Essential organs in flower of Acepiadaceae family
6. Economic importance of Arecaceae family
7. (a) Wides (b) Discontinuous species
8. Vegetation types in Andhra Pradesh

## SECTION - B

**Answer ALL the questions. Each question carries 10 marks 5X10 =50M**

9.a) Describe the sexual reproduction in Lycopodium with neat labeled diagrams.

(OR)

b)Explain the stellar evolution in Pteridophytes with neat labeled diagrams and suitable examples.

1. a)Write an essay on general characteristics of Gymnosperms.

(OR)

b)Discuss the structure of ovule in *Gnetum* with a neat labeled diagram.

1. a) What is a herbarium? Explain the techniques of herbarium.

(OR)

b)Discuss the vegetative and floral characters of Annonaceae family. Add a note on economic importance of that family.

1. a) Discuss the vegetative and floral characters of Asteraceae family.

(OR)

b) Discuss the vegetative and floral characters of Poaceae family. Add a note on economic importance of that family.

1. a)Explain different types Endemism and causes for it.

(OR)

b) Describe different phytogeographic regions of India with examples of flora.