

SRI VENKATESWARA UNIVERSITY
B.Sc. DEGREE COURSE IN BOTANY
FIRST YEAR - SECOND SEMESTER
(Revised Syllabus under CBCS w.e.f. 2020-21)

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.
 - 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.
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Unit – 1: Pteridophytes 12 Hrs.

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

Unit – 2: Gymnosperms 14 Hrs.

1. General characteristics of Gymnosperms; Sporne classification upto 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 – 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) Curcubitaceae

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) Areaceae and (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) *Cryptogamic Botany Vol. 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) Springer-Verlag, New York
- Bhatnagar, S.P. & Alok Moitra (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., New Delhi.
- 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 Hague

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PRACTICAL PAPER: BASICS 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 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.

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MODEL QUESTION PAPER FOR PRACTICAL EXAMINATION

Max. 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:

A. Measurable :

a. 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.

b. 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 Gymnosperms from their native locality/ making an album by collecting photographs of Gymnosperms.
 2. Collection of information on famous herbaria in the world and preparation of a report.
 3. Collection of information on famous botanic gardens in the world and preparation of a report.
 4. Collection of data on vegetables (leafy and fruity) plants in the market and and preparation of a report on their taxonomy.
 5. Collection and identification of fresh and dry fruits plants in the market and and preparation of a report on their taxonomy.
 6. Collection of data on plants of ethnic and ethnobotanical importance from their native locality.
 7. Preparation of a local flora by enlisting the plants of their native place.
- c. Assignments:** Written assignment at home / during '0' hour at college; preparation of charts with drawings, making models etc., on topics included in syllabus.

B. General :

1. Visit to Botanic garden in a Research institute/University to see the live plants.
2. Virtual tour in websites for digital herbaria and botanic gardens.
3. Acquaint with standard floras like – Flora of Madras Presidency, Flora of their respective district in Andhra Pradesh.
4. Looking into vegetation of different phytogeographical regions using web resources.
5. Group Discussion (GD)/ Quiz/ Just A Minute (JAM) on different modules in syllabus of the course.

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MODEL QUESTION PAPER

Time: 3 hours

Marks: 75 marks

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer any five of the following questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks

PART – A

Answer any Five of the following question.

(5X5=25M)

1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	

PART – B

Answer All The Questions. Each question carries 10 marks (5X10= 50M)

9.	(A)	
		OR
	(B)	
10.	(A)	
		OR
	(B)	
11.	(A)	
		OR
	(B)	
12.	(A)	
		OR
	(B)	
13.	(A)	
		OR
	(B)	