



PARVATHANENI BRAHMAYYA
SIDDHARTHA COLLEGE OF ARTS & SCIENCE
Autonomous
Siddhartha Nagar, Vijayawada-520010
Re-accredited at 'A+' by the NAAC

Course Code				23BOMAL231							
Title of the Course				VASCULAR PLANTS (Pteridophytes, Gymnosperms and Taxonomy of Angiosperms)							
Offered to: (Programme/s)				B.Sc Hons Botany							
L	4	T	0	P	0	C	3				
Year of Introduction:		2024-25		Semester:		3					
Course Category:		MAJOR		Course Relates to:		GLOBAL					
Year of Revision:		NA		Percentage:		NA					
Type of the Course:				SKILL DEVELOPMENT							
Crosscutting Issues of the Course :				NA							
Pre-requisites, if any				KNOWLEDGE OF VASCULAR PLANTS AT +2 LEVEL							

Course Description:

A comparative study of pteridophytes, gymnosperms and angiosperms, integrating from function and ecology. This course is designed to introduce students to the major lineages of vascular plants, including the ferns, gymnosperms and flowering plants. Students will be introduced to basic plant structure (anatomy and morphology) and diversity, as well as topics in plant evolution. An understanding of vascular plants is essential for global citizens with interests in biodiversity, ecology, agriculture, forestry, medicine and biochemistry. This course will provide one with a basic and comprehensive understanding of Vascular Plants (Pteridophytes, Gymnosperms and Taxonomy of Angiosperms). Enable the student with depth of topics and helps them to gain an appreciation in the special groups of Pteridophytes and Gymnosperms. On the other hand, importance of understanding Taxonomy of the flowering plant provides an extensive knowledge to the student.

Course Aims and Objectives:

S.NO	COURSE OBJECTIVES
1	To recognize the morphology, anatomy and reproduction in two groups of archegoniates.
2	To acquire knowledge of the taxonomic aids and classification systems.
3	To read the vegetative and floral characteristics of some forms of angiosperm families along with their economic value.
4	To study the significance of other branches of botany in relation to Plant taxonomy.

5	To evaluate the economic value of Plant species from the families under the study.

Course Outcomes

At the end of the course, the student will be able to...

CO NO	COURSE OUTCOME	BTL	PO	PSO
CO1	Infer the evolution of vasculature, heterospory and seed habit in Pteridophytes.	K2	2	1
CO2	Illustrate the general characteristics of Gymnosperms along with their uses.	K2	2	1
CO3	Discuss about some Taxonomic aids and their applications in Plant systematics.	K2	2	1
CO4	Compare and contrast the vegetative and floral characteristics of some Angiospermic families.	K4	2	1
CO5	Defend the utility of evidence from different branches of botany in solving the taxonomic lineages of some species.	K5	2	1

CO-PO MATRIX									
CO NO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1		2						2	
CO2		2						2	
CO3		2						2	
CO4		3						3	
CO5		3						3	

Course Structure:

Unit – 1: [Pteridophytes] (12Hrs)

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

Examples/Applications/Case Studies:

Case Study 1- True Alternation of Generations.

Case Study 2- Pteridophytes as Primary Colonizers.

Exercises/Projects:

Project 1- Poster Making of Life Cycle of Pteridophytes

Project 2- Model of Types of Steles in Pteridophytes

Specific Resources:

<https://www.youtube.com/watch?v=FTZQIeL80hc&pp=ygUNcHRlcmlkb3BoeXRlcw%3D%3D>

Unit – 2: [Gymnosperms] (12Hrs)

1. General characteristics of Gymnosperms; Sporne (1965) classification.
2. Occurrence, morphology, anatomy, reproduction (developmental details are not needed) and life history of: (a) Cycadopsida: *Cycas* and (b) Gnetopsida: *Gnetum*.
3. Ecological and economic importance of Gymnosperms.

Examples/Applications/Case Studies:

Case Study 1- Analyzing the distribution of seed size

Case Study 2- Functionally pleiotropic with defense

Exercises/Projects:

Project 1- Collection of photographs of gymnosperm plants

Project 2- Wood elements in locally available gymnosperms

Specific Resources:

<https://www.youtube.com/watch?v=zZ6XPDDeVwk&pp=ygULZ3ltbm9zcGVybXM%3D>

Unit – 3: [Principles of Plant Taxonomy] (12Hrs)

1. Aim and scope of taxonomy, species concept, taxonomic hierarchy-major and minor categories.
2. Plant nomenclature: Binomial system, ICBN- rules for nomenclature.
3. Herbarium and its techniques, BSI herbarium and Kew herbarium; concept of digitalherbaria.
4. Bentham and Hooker system of classification.
5. Phylogenetic systematics: primitive and advanced, homology and analogy, parallelism and convergence, monophyly, paraphyly, polyphyly, clades. synapomorphy, symplesiomorphy, apomorphy. APG-IV classification.

Examples/Applications/Case Studies:

Case Study 1- Identification, Classification and Description of Plants

Case Study 2- Interrelationship between plants

Exercises/Projects:

Project 1- A brief report on present status of plant taxonomy

Project 2- List of systems of plant taxonomy

Specific Resources:

<https://www.youtube.com/watch?v=5kuuNHCGkTo&pp=ygUccHJpbmNpcGxlcyBvZiBwbGFudCB0YXhvbm9teQ%3D%3D>

Unit – 4: [Descriptive Plant Taxonomy] (12Hrs)

Systematic description and economic importance of the following families:

1. Polypetalae: (a) Annonaceae (b) Curcurbitaceae
2. Gamopetalae: (a) Asteraceae (b) Asclepiadaceae
3. Monochlamydae: (a) Amaranthaceae (b) Euphorbiaceae
4. Monocotyledonae: (a) Arecaceae (b) Poaceae

Examples/Applications/Case Studies:

Case Study 1- Poster making of comparative study of above said families

Case Study 2- Identification of 10 members of different families by each student

Exercises/Projects:

Project 1- Collection of inflorescence of above said families

Project 2- Preparation of herbarium of above said families

Specific Resources:

<https://www.youtube.com/watch?v=CVaPfKr101c&pp=ygUOcGxhbnQgZmFtaWxpZXMX%3D>

Unit – 5: [Evidences for Plant Systematics] (12Hrs)

1. Anatomy and embryology in relation to plant systematics.
2. Cytology and cytogenetics in relation to plant systematics.
3. Phytochemistry in relation to plant systematics.
4. Numerical taxonomy.
5. Origin and evolution of angiosperms.

Examples/Applications/Case Studies:

Case Study 1- Assignment on evolution of angiosperms

Case Study 2- Assignment on plant taxonomy and its contribution

Exercises/Projects:

Project 1- Identifying the diversity among different plant species

Project 2- Understanding the numerical taxonomy by applying numerical units to the available plants

Specific Resources:

<https://www.youtube.com/watch?v=z5STVo2jRrI&pp=ygUfZXZpZGVuY2VzIGZvcIBwbGFudCBzeXN0ZW1hdGljew%3D%3D>

Text Books:

1. Acharya, B.C., (2019) Archegoniates, Kalyani Publishers, New Delhi
2. Pandey, B.P. (2013) College Botany, Volumes-I&II, S. Chand Publishing, New Delhi

References:

1. Sharma,O.P.(2012) Pteridophyta. Tata McGraw-Hill, New Delhi
2. Bhatnagar, S.P. &AlokMoitra (1996) Gymnosperms. New Age International, NewDelhi



SEMESTER -END QUESTION PAPER STRUCTURE

Course Code & Title of the Course:	23BOMAL231 VASCULAR PLANTS (Pteridophytes, Gymnosperms and Taxonomy of Angiosperms)
Offered to:	B.Sc. Hons Botany
Category:	SEMESTER: 3
Max. Marks	70
Max.Time	3 Hrs

Section A: Short Answer Questions (20 Marks)

Answer All questions. Each question carries 4 Marks.

Q1 (a) Describe the Lycopodium cone. K1
OR
(b) Describe the Marselia petiole. K1

Q2 (a) Explain Cycas coralloid roots. K2
OR
(b) Explain economic importance of gymnosperms. K2

Q3 (a) Explain herbarium technique. K2
OR
(b) Explain APG-IV classification. K2

Q4 (a) Discuss the economic uses of annonaceae. K2
OR
(b) Explain the head inflorescence. K2

Q5 (a) Describe the numerical taxonomy. K1
OR
(b) Define and describe alkaloids & flavonoids. K1

Section B: Long Answer Questions (50 Marks)

Answer All questions. Each question carries 10 Marks.

Q6 (a) Explain the general characters of pteridophyte and mention smith classification. K2
OR
(b) Explain the heterospory seed habit. K2

Q7 (a) Discuss the general characters of gymnosperms and add a note on alternation of generations. K2
OR
(b) Extend a note on life history of gnetum. K2

Q8 (a) Define and describe ICBN and its rules. K2
OR
(b) Describe the Bentham and Hooker system of classification. K2

Q9 (a) Describe the characters of Family Cucurbitaceae in detail. K1
OR
(b) Describe the Vegetative and Floral Characters of Family euphorbiaceae. K1

Q10 (a) Describe an account on cytogenetics. K2
OR
(b) Describe the embryology in relation to systematics K2