TEACHING PLAN: Plant Taxonomy (Dr. Santosh Joshi)

<table>
<tr><td colspan="2">SCHOOL: (SOBAS)
SCHOOL OF BASIC & APPLIED SCIENCES</td><td>ACADEMIC SESSION: 2024</td><td colspan="2">FOR STUDENTS' BATCH: B.Sc. Bio Semester II</td></tr>
<tr><td>1</td><td>Course code</td><td colspan="3">BOT-104</td></tr>
<tr><td>2</td><td>Course Title</td><td colspan="3">Plant Taxonomy</td></tr>
<tr><td>3</td><td>Credits</td><td colspan="3">3</td></tr>
<tr><td>4</td><td>Learning Hours</td><td colspan="3"><table><tr><td>Contact Hours</td><td>38</td></tr><tr><td>Practical Teaching</td><td>30</td></tr><tr><td>Project, Tutorial and Assessment</td><td>22</td></tr><tr><td>Total hours</td><td>90</td></tr></table></td></tr>
<tr><td>5</td><td>Course Objective</td><td colspan="3">1. The major objective of this course is to provide a general overview of Fundamental components of Taxonomy and Diversity of Flowering Plants.
2. To know about the principles, rules and keys to the identification of plants.
3. To understand the salient features of the different systems of classification i.e., artificial, natural and phylogenetic.
4. To get an insight of position of Dicotyledons and Monocotyledonous families in classification.
5. To get an information on diagnostic features and economic importance of some Angiosperm families.
6. To understand basic concepts and terminology in plant description/flowering plants.</td></tr>
<tr><td>6</td><td>Course Outcomes</td><td colspan="3">After completing the course, the students will be able to:
1.Employ various taxonomic resources for plant identification and herbarium collections.
2.Design, carry out, and present a laboratory-based study in flowering plants.
3.Identify, and describe the morphological characteristics of Dicotyledons and Monocotyledonous families.
4.Draw and describe floral formulas and diagrams of Angiosperms.
5.Recognize the economic importance (Medicinal as well as Industrial uses) of important members of Angiosperms.
6.Outline and describe the different parameters of classification</td></tr>
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THEORY

Unit	Title & Contents	Number of Hours	Learning outcome	Course Outcome
Unit 1:	Fundamental components of taxonomy (identification, classification, description, nomenclature and phylogeny). Role of chemotaxonomy, cytotaxonomy and taximetrics in relation to taxonomy. Botanical Nomenclature, principles and rules, principle of priority, Keys to identification of plants.	10	Know about thebasics Taxonomy of plants	CO1 & CO 2
Unit 2:	Floral Terms and Types of Inflorescences Type concept, taxonomic ranks; Salient features of the systems of classification of angiosperms proposed by Bentham & Hooker and Engler & Prantl.	10	Study the important characters of classification in plants	CO2 & CO3
Unit 3:	Diagnostic features and economic importance of the families: Ranunculaceae, Brassicaceae, Malvaceae,Diagnostic features and economic importance of the families: Euphorbiaceae, Rutaceae, Fabaceae and Cucurbitaceae.	10	Identify plants according to their usefulness	CO4 & CO 5
Unit 4:	Diagnostic features and economic importance of the families: Apiaceae, Asclepiadaceae and Lamiaceae. Diagnostic features and economic importance of the families: Solanaceae, Asteraceae, Liliaceae and Poaceae	10	Identify plants according to their usefulness	CO4, CO5 & CO6
	Augmentation done	NA		

Portions for Sessional examination

I - Sessional Exam	II- Sessional Exam	III- Sessional Exam	Re-Sessional Exam
Unit 1,2	NA	NA	Unit 1 2 3,4

Chapter No.	Title & Contents of the chapter	After completion of the chapter the student shall be able to	Skills and Competency Developed	Course Outcome
	Augmentation done	NA		

Portions for sessional examination

I- Sessional Exam	II- Sessional Exam	III- Sessional Exam	Re-Sessional Exam
Unit 1,2	NA	NA	Unit 1,2,3,4

Assessment of course outcomes:

Assessment method	Course outcomes in Percentage				
	CO1	CO2	CO3	CO4	CO5
Unit Test	√	√	√	√	√
Sessional Examination					
Pre-final Exam			√	√	√
Assignment	√	√	√	√	√
Others Specify					

Course Outcomes-Program Outcomes mapping

COs	Program Outcomes										
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**Total**
CO1	√	√			√			√	√		**5**
CO2	√	√			√			√	√		**5**
CO3	√		√		√	√		√	√		**6**
CO4	√		√		√	√		√	√	√	**7**
CO5	√	√	√		√	√		√	√	√	**8**
CO6								√	√	√	**3**
Total	**5**	**3**	**3**		**5**	**3**		**5**	**5**	**2**	

Modes of delivery of courses

Methodology	**Code**
Lecturing	a
Discussion	b
Group discussion	c
Demonstration	d
Power point presentation	e
Tutorial class	f
Assignment	g
Remedial class	i
Industrial visit	k
Quiz	m
Others specify	o

Assessment Method	**Code**
Viva	A
Continuous assessment	C
Unit test	D
Sessional exam	E
Assignments	G
Others specify	H

Teaching Aids used	Code
Marker & board	I
Power point	II
Videos	III
Posters	IV
Charts	V
Others specify	VIII

List of prescribed text books from University Syllabus

Sl No	Title of the book	Author/s	Edition, Year of Publication	Publisher	No. of copies available in the library
1	Plant Taxonomy	O. P. Sharma.	2009	Tata McGraw-Hill Education (India) Private limited Chennai.	
2	Taxonomy of the angiosperms	V.N. Nair	1995	TMH Publishing Company New Delhi.	

List of text books for Augmented Syllabus

Sl No	Title of the book	Author/s	Edition, Year of Publication	Publisher	No. of copies available in the library
1					
2					

List of Reference text books from University Syllabus

Sl No	Title of the book	Author/s	Edition, Year of Publication	Publisher	No. of copies available in the library
1	Introduction to the principles of plants Taxonomy.	V.V. Sivrajan	1984	Oxford & IBH Publishing Co. Pvt. Ltd. New Delhi	
2	Plant Taxonomy	Sushell	2003	Dominant Publisher and Distributers. New Delhi.	
3	Plant Systematics	Gurcharan Singh	2001	Oxford and IBH Publishing Co. Pvt.	

List of Journals / Articles / Dissertations

Sl No	Title of the book	Author/s	Edition, Year of Publication	Publisher	No. of copies available in the library
1					
2					
3					
4					

List of URLs / Blogs / Other e-Sources

Sl No	Title of the book	Author/s	Edition, Year of Publication	Publisher	Web-address
1	https://www.sciencedirect.com/science/article/pii/S2667031322000410#				
2	https://www.sciencedirect.com/science/article/pii/B978012373972800005X				
3	https://www.sciencedirect.com/science/article/pii/B9780444427557500225				
4	https://www.sciencedirect.com/science/article/pii/B9780080219486500467				
5	https://www.sciencedirect.com/science/article/abs/pii/S0378874117302891				
6	https://www.sciencedirect.com/science/article/pii/B9780444427557500237				

7	https://www.sciencedirect.com/science/article/abs/pii/S0367253021001900				
8	https://www.sciencedirect.com/science/article/pii/B978008102908400068				
9	https://www.sciencedirect.com/science/article/pii/S2667031322000410#				

Questions

Unit-1

Sl No	Question	Max Marks	Related course outcome
1	What do you mean by virtual herbarium?	10	CO 1 & CO2
2	What is tautonym?		CO 1 & CO2
3	What is para-tautonym?		CO 1 & CO2
4	What do you mean by holotype and neotype?		CO 1 & CO2
5	Define the term “Primitive character”.		CO 1 & CO2
6.	What do you understand by the term- Homology?		CO 1 & CO2
7.	Enumerate various types of homology.		CO 1 & CO2
8.	What is cluster analysis?		CO 1 & CO2
9.	How can you define numerical taxonomy?		CO 1 & CO2
10.	Who wrote the book “Principles of Numerical Taxonomy”?		CO 1 & CO2
11.	What is chemotaxonomy?		CO 1 & CO2
12.	What is molecular systematics?		CO 1 & CO2
13.	What is phytochemistry?		CO 1 & CO2
14.	Define herbarium. What is the standard size of herbarium sheet?		CO 1 & CO2
15.	Write names of two national herbaria of India.		CO 1 & CO2
16.	What is Botanical Garden?		CO 1 & CO2
17.	What is the difference between plant press and vasculum?		CO 1 & CO2
18.	Name any two important botanical gardens of India.		CO 1 & CO2

19.	Name the first botanical garden established in India.		CO 1 & CO2
20.	What do you mean by monograph?		CO 1 & CO2
21.	Define taxonomic key.		CO 1 & CO2
22.	What type of taxonomic keys is conventional and most acceptable at present?		CO 1 & CO2
23.	When a lectotype is designated?		CO 1 & CO2
24.	Name the International code of nomenclature exclusively meant for viruses.		CO 1 & CO2
25.	Define syntype and topotype.		CO 1 & CO2
26.	Who is known as “Grand Father of Numerical Taxonomy”?		CO 1 & CO2
27.	Name one orthographically conserved family name.		CO 1 & CO2
28.	Give the full form of ICNCP.		CO 1 & CO2
29.	Name any two important botanical gardens in world.		CO 1 & CO2
30	What is autonym?		CO 1 & CO2
31.	What is type specimen?		CO 1 & CO2
32.	Who is known as Father of Indian Botany?		CO 1 & CO2
33.	Give the full form of (a) DC. (b) A.DC. (c) Rox b. (d) D.Don. (e) Buch.Ham. (f) Wall. (g) Hook. and (h) Hook.f.		CO 1 & CO2
34.	Write notes on- (a) Typification and (b) Herbarium techniques.		CO 1 & CO2
35.	Write short notes on- (a) Role of Botanical Gardens and (b) Role of secondary metabolites in plants.		CO 1 & CO2
36.	Write notes on- Cytology in relation to taxonomy.		CO 1 & CO2
37.	Explain holotype and lectotype.		CO 1 & CO2
38.	Why do taxonomists sometimes have to change a plant’s name?		CO 1 & CO2
39.	What is the role of national gardens in conserving biodiversity – discuss.		CO 1 & CO2

Unit 2

Sl No	Question	Max Marks	Related course outcome
1	What do you mean by artificial, natural and phylogenetic system of plant classification?	10	CO 2 &CO3
2	Give the outline of Bentham and Hooker plant classification. Mention its merit and demerits.		CO 2 &CO3
3	What is chemotaxonomy? Illustrate the role of different secondary metabolites in solving the systematic disputes of different taxa in angiosperms.		CO 2 &CO3
4	What do you mean by palynology? How the pollen keys are used to categories plants of a family at various taxonomic levels?		CO 2 &CO3
5	What is phytochemistry? Discuss some important sources of taxonomic evidence derived from phytochemistry.		CO 2 &CO3
6.	What is the significance of cytological studies in taxonomy? Give suitable examples.		CO 2 &CO3
7.	Give an outline classification of angiosperms as proposed by Engler and Prantl. State the merits and demerits of the classification. How does Bentham and Hooker plant classification differ from Takhtajan's system of plant classification?		CO 2 &CO3
8.	Define numerical taxonomy. State its principle. Discuss the methods of this study. Justify the need of this study.		CO 2 &CO3
9.	Compare the classifications of Bentham & Hooker, Engler & Prantl and Hutchinson's system of classification in details.		CO 2 &CO3
10.	Write short notes on the contribution of - (a) C.E.Bessey, (b) Carolus Linnaeus as taxonomist, (c) Theophrastus, (d) Bauhin, (e) Adanson and (f) De Candolle.		CO 2 &CO3
11.	What is virtual herbarium? Discuss in details about the goals and data contents of virtual herbarium. What are the herbarium based databases? Mention the importance of virtual herbarium.		CO 2 &CO3
12.	What is numerical taxonomy? Write in brief its various aspects.		CO 2 &CO3
13.	Explain the following author citation: (a) Ceropegia longifolia Walllich ex Hook.f. (b) Castanopsis indica (Rox b.) D.Don (c) Gastrochillus sikkimensis Yamazaki in Hara (d) Rubia cordifolia L. (not found in India) 1753 Rubia wallichi D.Don 1825 Galium monjith		CO 2 &CO3
14.	State the basic principle of ICBN related to principle of priority.		CO 2 &CO3

Unit 3

Sl No	Questions	Max Marks	Related course outcome
1	Where will you place the plants which contain two cotyledons with cup shaped thalamus?	10	CO 4 &CO5
2	Give the floral characters of Brassica campestris.		CO 4 &CO5
3	Give the botanical description of Ranunculaceae.		CO 4 &CO5
4.	Give the floral characters of Iberis.		CO 4 &CO5
5.	Discuss the inflorescence and floret details of Brassicaceae.		CO 4 &CO5
6.	Give the floral characters of Euphorbia.		CO 4 &CO5
7.	Give the botanical description of Malvaceae.		CO 4 &CO5
8.	Discuss the inflorescence and floret details of Hibiscus rosa-sinensis.		CO 4 &CO5
9.	Give the botanical description of Euphorbiaceae.		CO 4 &CO5
10.	Give the floral characters of Citrus.		CO 4 &CO5
11.	Discuss the inflorescence and floret details of Rutaceae.		CO 4 &CO5
12.	Give the botanical description of Fabaceae.		CO 4 &CO5
13.	Discuss the inflorescence and floret details of Cucurbitaceae.		CO 4 &CO5

Unit 4

Sl No	Questions	Max Marks	Related course outcome
1	How will you distinguish Solanaceae members from Liliaceae members?	10	CO4,CO 5 & CO6
2	Discuss the inflorescence and floret details of Poaceae.		CO4,CO 5 & CO6
3	“Poaceae are of greater economic importance than any other family of flowering plants”. Comment.		CO4,CO 5 & CO6
4.	Discuss the inflorescence and floret details of Apiaceae.		CO4,CO 5 & CO6
5.	Give the botanical description of Asclepiadaceae.		CO4,CO 5 & CO6
6.	Discuss the inflorescence and floret details of Asteraceae		CO4,CO 5 & CO6
7.	Give the botanical description of Lamiaceae.		CO4,CO 5 & CO6

8.	Discuss the inflorescence and floret details of Solanaceae.		CO4,CO 5 & CO6

S.No	Classification	Name of the students
	Slow learners (less than 50 %)	None
	Actions taken	
1	Remedial teaching	
2	Questions for practice	
3	Special guidance beyond college hour	
4	Trace out physical and mental problems if any	
5	Encourage even for small achievement	
6	Giving memory tip	
7	Review time to time	

S.No	Classification	Name of the students
	Average learners (51-75 %)	Aman, Raksha, Lalit, Mohit, Monu Yadav, Ridhi
	Actions taken	
1	Motivate students	**yes**
2	Audio-visual aids	
3	Create confidence level in their interest areas	**yes**
4	Mind map	

Feedback on Curriculum

Formats have been developed for the following stakeholders

1. Present / Current students
2. Students just passing out (Exit Interview)
3. Alumni
4. Parents
5. Industry based supervisors
6. Placement (campus recruiters)
7. Departmental Advisory Board