



Learning Outcomes based Curriculum Framework

(LOCF)

For

F.Y.B.Sc. Botany (Autonomous)

Undergraduate Programme

Under NEP Guidelines

From

Academic year

2023 - 24





Vision & Mission

Mission:

Equip the student with knowledge and skills of their chosen vocation,

Inculcate values.

Provide them opportunities for all, round growth and prepare them for life.

Vision:

- To equip the students with advanced knowledge and skills in their chosen vocation.
- To provide value-based education and opportunities to students.
- To help them to face challenges in life.
- To nurture a scientific attitude, temperament and culture among the students.
- To continually review, develop and renew the approach to build India of the

Founder dream.

Goals and Objectives:

- To build a strong Academia-Industry bridge.
- To provide flexibility in the courses offered and proactively adapt to the changing needs of students and the society.
- To establish a centre for multidisciplinary activities.
- To mould individuals who would nurture the cultural heritage of our country and contribute to the betterment of the society.





Board of studies in Botany

Undergraduate

	Name	Designation	Institute/Industr
	11		У
	Head	d of the Department	
1	Mrs. Supriya Janbandhu	Chairman	K. J. Somaiya
			College of
			Science and
	Carle in a Francisco		Commerce
	Subject Expert	nominated by vice-Chane	cellor
1	Dr. Nisha Muni	Associate Professor	R. J. College
			Ghatkopar
		Subject experts	
1	Dr.Ajit Kengar	Professor	Kelkar –Vaze
			College
2	Dr.Smita Jadhav	Associate Professor	Kirti College
3	Dr.Satnam Sing Sohal	Associate Professor	M.D College
	Representative from I	ndustry/corporate sector,	/allied area
1	Dr. Kshitij Satardekar	Scientist	Colgate India Ltd
	Stu	dent representative	
1.	Mr.Abhijit Singh	student	K.J.Somaiya
	,		college of science
			and commerce
	Facult	y of the specialisation	
1	Dr. Ajit katdare	Associate Professor	K.J.Somaiya
			college of science
			and commerce
2	Dr. Meena Patankar	Assistant Professor	K.J.Somaiya
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			and commerce
3	Dr. Ketan Thatte	Assistant Professor	K.J.Somaiya
			College of
			Science and
			Commerce





Foreword

Autonomy reflects efforts for excellence in academic performances, capability of self-governance and enhancement in the quality of education. In the year 2012, the UGC and University of Mumbai conferred the Autonomous Status to K. J. Somaiya College of Science and Commerce. Post this recognition and having several accolades to our credit, we made significant changes to our existing syllabi to reflect the changing business, industrial and social needs. A holistic education that provides opportunities to gain and share knowledge, experiment and develop beyond curriculum, is offered at our College.

Autonomous college carries a prestigious image for the students and the teachers and we have made a collaborative attempt to maintain a high level of quality in the standard of education that we impart.

Structured feedback obtained from the students, alumni and the experts from the industry and the changes suggested by them were duly incorporated in the syllabi. The Board of Studies constituted for each department meets to carry out in depth discussions about different aspects of the curriculum taking into cognizance the recent trends in the discipline

The IQAC team has facilitated the conduct of a number of workshops and seminars to equip the faculty with the necessary skill set to frame the syllabi and competencies to deliver the same. Training was also provided to employ innovative evaluation methods pertaining to higher cognitive levels of revised Bloom's taxonomy. This ensured the attainment of the learning outcomes enlisted in the syllabus. Audits are conducted to critically review the practices undertaken in teaching, learning and evaluation. Innovative learning methodologies such as project-based learning, experiential learning and flip- class learning practiced by a committed fleet of faculty, supported by several hands have been our unique outstanding propositions. All efforts have been made to nurture the academic ambitions as well as the skills in co-curricular activities of the most important stakeholder i. e. student.

With sincere gratitude, I acknowledge the constant support and guidance extended by Shri Samir Somaiya, President- Somaiya Vidyavihar, and all the esteemed members of the Governing board and Academic council of the College. I also would like to acknowledge the Heads of the





Departments and all the faculty members for their meticulous approach, commitment and significant contribution towards this endeavour for academic excellence

Dr. Pradnya Prabhu

Principal

Acknowledgement

At the outset, I would like to thank our Principal Dr. Pradnya Prabhu for her support and encouragement throughout the process of curriculum restructuring. I am also grateful to all the esteemed members of the Board of Studies, for their valuable inputs.

Above all, I am deeply indebted to all the vibrant colleagues in the Department of Botany for the long and arduous work they have put in during the compiling of the improved syllabus.

Mrs. Supriya Janbandhu Chairperson Board of Studies in Botany





Preamble

The revised syllabus will be effective from the academic year 2O23-24. Autonomy has given us the flexibility to frame the syllabus with a blend of Classical and Applied Botany which will open an array of opportunities in Higher Studies. Skill based courses have been incorporated which will benefit the learners to develop entrepreneurial skills. Successful completion of these courses will provide employability to the learners. It has been prepared according to the unique requirements of Botany students in focus.

The content caters to the current changing needs of the stakeholders, specifically pertaining statistics and computation skills. In this revision, the student will be introduced to the Interdisciplinary approach of learning. The syllabus has been made more relevant by addition of latest topics pertaining to Botany, so as to encourage core competencies and discovery-based learning. Learners will be taught topics through experiential learning also. Choice has been given for a skill-based core course in both semesters to engage them in the learning process. Elective courses will have more of a practical component over theory. Skill based course will ignite the conscience about global issues amongst the learner to become a sensitive citizen.

As the term suggests, LOCF works with curriculum aim and framework, learning goals and objectives at its focal point. It uses foundations of already existing examples of effective learning, teaching and assessments. Also, it allows the liberty of constant updating with reference to the current needs of the hour. This syllabus has been drafted to enable the learners to prepare them for future employment in various fields including academics and competitive examinations.





F Y B.Sc. Botany

Semeste	Course	Course title	Credits		
r	numbe		Theory	Practica	Total
	r			I	
I	CC I	Plant Diversity – I	2	1	3
	CC II	Plant Diversity – II	2	1	3
II	CC I	Forms and Function	2	1	3
	CC II	Ecology and Plant resource	2	1	3





Detailed B.Sc. Botany Syllabus

F. Y. B.Sc. Syllabus with effect from the Academic year 2023–2024

Syllabus -	F.	Y.	B.Sc.	Botany
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Cours	Course	Cours	Credit	Hr.	Periods	Module	Lectures	Ex	aminatio	n
e No.	Title	e Code	S		(60 min)		per module (60	Internal Marks	External Marks	Total Marks
							min)			
SEMES	TER I									
Core c	ourses THEC	ORY								
I	Plant	23US1B	2	30	30	2	15	40	60	100
	Diversity	OCCIP								
	- I	DI								
II	Plant	23US1B	2	30	30	2	15	40	60	100
	Diversity	OCC2								
	-11	PDII								
Core c	ourses PRAC	TICAL								
		23US1B	1		60			50	50	100
		OCCP								
SEMES	TER II									
Core c	ourses THEC	ORY								
I	Forms	23US2	2	30	30	2	15	40	60	100
	and	BOCC1								
	Function	FAF								





II	Ecology	23US2	2	30	30	2	15	40	60	100
	and Plant	BOCC								
	resource	2EPR								
Core c	Core courses PRACTICAL									
		23US2	1		60			50	50	100
		BOCC								
		Р								

F.Y. B. Sc. (BOTANY) SEMESTER I

Core Course-I

COURSE TITLE: Plant Diversity - I

COURSE CODE: 23USIBOCCIPDI [CREDITS - O2]

Course Learning Outcome

After the successful completion of the Course, the learner will be able to:

- 1. Differentiate various life forms based on external morphology.
- 2. Classify the organisms to respective groups.
- 3. Interpret the evolutionary features of organisms.
- 4. Illustrate the internal structure of various life forms using microscopy.
- 5. Correlate significance of bacteria, algae and fungi with human welfare.
- 6. Connect the impact of environmental change on the existence of biodiversity.
- 7. Narrate the transitory stages of non-vascular plants to vascular plants with reference to terrestrial habitat.

Module 1	Microbiology and Phycology	[15L]				
Learning C	Learning Objectives:					
The modu	le is intended to					
1. To (1. To overview general and reproductive features of bacteria and algae.					





2. To e	2. To explore the economic importance of bacteria.				
Learning C	Dutcome:				
After the s	uccessful completion of the module, the learner will be able to):			
1. Dit	fferentiate features of bacterial and algal cells and categor	rize the			
orga	anism based on phylogeny.				
1.1	Pactoria	[9L]			
	111 Shapes size and arrangement of bacteria				
	1.1.2 Ultrastructure of bacteria				
	1.1.3 Reproduction in bacteria				
	1.1.4 Bacterial diversity in different habitats				
	1.1.5 Economic importance of bacteria				
1.2	Algae –	[6L]			
	1.2.1 General characteristics of algae				
	1.2.2 Range of thallus in algae				
	1.2.3 Structure, reproduction in Zygnema				
	1.2.4 Economic importance of algae				
	1.2.5 Single Cell Protein - Introduction and applications				
References	S:				
• Pelc	zar and Reid. General Microbiology				
• Kale	e and Bhusari.General Microbiology				
• Ana	nthanarayan.Basics of Microbiology				
• Vas	ishta,B. R.Botany for Degree Students				
• Smit	th,G. M. Cryptogamic Botany Vol. I				
• Shai	• Sharma, O. P. Textbook of Algae				
• Gan	Gangulee and Kar.College Botany				
Module 2	Mycology and Lichens	[15L]			
Learning C	Dbjectives:				





This module is intended to:

- 1. To review general and reproductive features of fungi and lichens
- 2. To explore the interrelation with the environment and lichens.

Learning Outcome:

After the successful completion of the module, the learner will be able to:

1. Develop an understanding of fungi and lichens and compare their adaptive strategies.

2.1	- ·	[10L]				
	Fungi					
	2.1.1 General characters of lungi					
	2.1.2 Structure and reproduction in Kinzopas. 2.1.3 Economic importance of Fungi-Positive and					
	Negative aspects					
	2.1.4 Mycorrhiza- Ectomycorrhiza, Endomycorrhiza					
	and their significance.					
	2.1.5 General symptoms of plant diseases					
2.2	Lichens	[5L]				
	221 Occurrence Thallus structure and					
	Reproduction					
	2.2.2 Types of lichens based on Fungal partner,					
	substratum , internal and external structure.					
	2.2.3 Ecological and economic significance					
	of lichens					
References:						
• Sha	rma,O. P. Textbook of Fungi					
Dubey,H. C.An Introduction of Fungi						
Vasishta, B. R. Botany for Degree Students						
• Sart	phoy ,A.K. Textbook of Mycology					
• Gar	ngulee and Kar.College Botany					





F.Y. B. Sc. (BOTANY) SEMESTER I

Core Course- II

COURSE TITLE: Plant Diversity-II

COURSE CODE: 23USIBOCC2PDII [CREDITS - O2]

Course Learning Outcome After the successful completion of the Course, the learner will be able to: 1. . Module [15L] Bryophyta and Pteridophyta 1 Learning Objectives: The module is intended to To configure general and reproductive features of Bryophyta and Pteridophyta. Learning Outcome: After the successful completion of the module, the learner will be able to: 1. Develop critical understanding on morphology, anatomy and reproduction of Bryophytes and Pteridophytes. 2. Interpret the evolutionary journey of Bryophytes and Pteridophytes and their transition to the terrestrial habitat. [7 L] 1.1 Bryophyta 1.1.1 General characters of Bryophytes. 1.1.2 Structure and Reproduction in Riccia. 1.1.3 Ecological and economic importance of





	Bryophyte				
1.2	Pteridophyte	[8 L]			
	1.2.1 General characters of Pteridophytes. 1.2.2 Structure, and Reproduction of <i>Nephrolepis</i> .				
	1.2.3 Economic importance of pteridophyte.				
Reference	S:	L			
Vasisl	nta,B. R.Botany for Degree Students				
• Smi	th,G. M. Cryptogamic Botany Vol. I				
• Saxe	ena and Sarabhai.Textbook of Botany.Vol.II				
• Gar	gulee and Kar.College Botany				
Module 2	Gymnosperms and Paleobotany	[15L]			
This modu	le is intended to:				
 To compare the features of gymnosperms and angiosperms with reference to morphological and reproductive features of Cycas. To consolidate the process of fossilization and principle types of fossils. To prove the evolutionary relationship with prehistoric evidences 					
Learning Outcome:					
After the successful completion of the module, the learner will be able to:					





	scale.				
	2. Recognise different Gymnosperms with industrial potential				
2.1	Gymnosperm				
	1.1.1 General characters of Gymnosperms.				
	1.1.2 Similarity and differences between				
	gymnosperms and angiosperms.				
	1.1.3 Structure and Reproduction of Cycas.				
	1.1.4 Economic importance of Gymnosperms				
2.2	Paleobotany				
	1.2.1 Types of fossils: Petrification, Cast,				
	Impression, Compression, Amber.				
	1.2.2 Application of Fossil fuels, C14 dating.				
Reference	S:				
• Das Datta Gangulee. College Botany. Vol II					
Cheshter Arnold. Paleobotany					
• Vashishtha. Gymnosperm.					
● Sharma,0	O. P. Gymnosperm.				





F. Y. B. Sc. (BOTANY)

SEMESTER I - Practical

COURSE CODE: 23USIBOCCP Credit- O1

Learn	ing Objec	ctives:				
The P	ractical is	intended to				
1.	To overv	view general and reproductive features of crypt	cogams.			
2.	To distir	guish bacteria based on staining characteristics				
Learn	ing Outco	ome:				
After	the succe	essful completion of the practical, the learner w	ill be able to:			
1.	Differen	tiate various types of bacteria.				
2.	Identify	morphological, anatomicals, and reproducti	ve features of			
	cryptog	ams.				
Core	Course	Plant Diversity -I				
	1					
	1					
		Study of morphology of bacteria by Positive				
		taining.				
	2					
		Motility studies in bacteria by hanging drop				
		technique				
	3	Screening of halophiles, alkalophiles and				
		acidophiles from suitable samples				
	4	Study of Range of thallus in algae using				
	5	Study of Life cycle of Zygnema and Nostoc				
	J	using specimens/ photomicrograph				
	6	Economic importance of algae using				
		specimen/ photomicrograph				





7	Study of production of single cell protein	
8	Study of life cycle of Rhizopus using specimen/ photomicrograph	
9	Isolation of fungi using suitable material on PDA.	
10	Economic importance of fungi using specimen/ photomicrograph	
11	Identification of types of lichens using specimen/ photomicrograph	
12	Study of V S of thallus of lichen using permanent slide.	
13	Screening and identification of of VAM fungi from suitable roots	
14	With the help photomicrograph study of symptoms of plant diseases	
Core Course	Plant Diversity II	
II		

I	Study of life cycle of <i>Riccia</i> using specimen/ photomicrograph	
2	Economic importance of bryophytes using specimen/ Photomicrograph	
3	Study of life cycle of <i>Nephrolepis</i> using specimen/ photomicrograph	
4	Economic importance of pteridophytes using specimen/ Photomicrograph	
5	Study of life cycle of <i>Cycas</i> using specimen/ photomicrograph	





6	Economic importance of gymnosperms using specimen/ Photomicrograph	
7	Identification of types of fossils using specimen/ photomicrograph	





F.Y. B. Sc. (BOTANY) SEMESTER II

Core Course- I

COURSE TITLE: Forms and Function

COURSE CODE: 23US2BOCCIFAF [CREDITS - O2]

~	-	<u> </u>
	earning	()utcome
Course	Learning	Cuttome

After the successful completion of the Course, the learner will be able to:

1. Classify the plants to their respective family based on morphological characteristics.

2. Illustrate the internal morphology of plants.

Module 1

Angiosperms

[15L]

Learning Objectives:

The module is intended to

1. Describe the various morphological characteristics of flowers and its variations.

2. Classify the plants to respective families

Learning Outcome:

After the successful completion of the module, the learner will be able to:

1. Classify plants as per Bentham and Hooker system and identify their economic importance.

2. Describe the various morphological characteristics of flowers.

1.1	1.1.1 Flower-thalamus , forms of thalamus , androphore ,	[9L]
	gynophore ,androgynophore	





	1.1.2 Complete and incomplete flower, Bisexual , unisexual	
	staminate and pistillate	
	1.1.3 Actinomorphic and zygomorphic	
	1.1.4 Non Essential whorls - calyx - Functions , Variations -	
	petaloid, pappus and spurred	
	Corolla - Functions , Forms -Cruciform , tubular , salver	
	shaped , Infundibuliform , Papilionaceous , ligulate and	
	bilabiate	
	1.1.5 Aestivation	
	1.1.6 Essential whorls - androecium - Parts of a stamen , T.S	
	anther, Attachment - Basifixed , dorsifixed and versatile	
	,adnate Union of stamens-Cohesion , adhesion ,variation	
	of stamens	
	Gynoecium - Parts of a carpel, functions and types of	
	carpels	
	117 Placentation - Types	
1.2	Study of the following families according to Bentham and	[6L]
	Hooker system of classification with special emphasis on	
	morphological peculiarities and economic importance.	
	1.2.1 Malvaceae	
	1.2.2 Rubiaceae	
	1.2.3 Amaryllidaceae	
Keterences	S:	
• R. K. Sinł	na. Taxonomy of Angiosperms	
• Ganqule	e. Das. Dutta. College Botany volume I	





A. V. S. S. Sambamurthy. Taxonomy of Angiosperms			
• Sutaria. Textbook of Systematic Botany			
		Frei 7	
Module 2	Anatomy	[I5L]	
Learning C)bjectives:		
This modu	le is intended to:		
I.To comp	are structure and function of plant tissues with reference to specific	organs.	
Learning C	Dutcome:		
After the s	uccessful completion of the module, the learner will be able to	:	
1.Explain i	nternal organization and functioning of various plant tissue		
systems.			
2.1	Tissue system in plants:	[9L]	
	2.1.1 Introduction to various tissue systems in		
	plants		
	2.1.2 Types of vascular bundles		
	2.1.3 Stomata (Dicot and Monocot –		
	Graminaceous)		
2.2	Study of primary structure of –	[6L]	
	2.2.1 Dicot and Monocot root		
	2.2.2 Dicot and Monocot stem		
Keterences	S:		
 Pijush Roy. Plant Anatomy. 			
• Sinh	 Sinha, S K. The Textbook of Plant Anatomy 		





• Pande, B. P. Plant Anatomy

F.Y. B. Sc. (BOTANY) SEMESTER II

Core Course- II

COURSE TITLE: Ecology and Plant Resource

COURSE CODE: 23US2BOCCEPR [CREDITS - O2]

Course Learning Outcome		
After the successful completion of the Course, the learner will be able to:		
1. Comment on adaptive features of plants with respect to specific ecological conditions.		
2. Identify specific phytogeographical region of India.		
3. Enlist various plants as a source of compounds used in day to day life.		
Module Ecology and Plant Geography [15L] 1]	
Learning Objectives:		
The module is intended to		
1. Describe morphological and anatomical characteristics of plants with respect to ecological adaptations.		
Learning Outcome:		
After the successful completion of the module, the learner will be able to:		
1. Illustrate ecological adaptations with respect to specific ecological conditions.		





1.1	Study of ecological adaptations based on	[IOL]
	morphology and anatomical features -	
	1.1.1 Hydrophytes	
	1.1.2 Mesophytes	
	1.1.3 Halophytes	
	1.1.4 Xerophytes	
	1.1.5 Epiphytes	
1.2	Phytogeographical regions of India	[5L]
Reference	S:	
• Odum E	.P. (1978) Ecology. Oxford and IBS Publishing Co., New Delhi.	
• Sharma	P.D. (2010) Ecology and Environment. Rastogi Publications, Mee	erut
Module	Plant resource and utilisation	[15L]
2		
Learning (Objectives:	
This modu	Ile is intended to:	
I. Disc	cuss plants as a source of compounds used in day to day life.	
2. Des	cribe the source and importance of major and minor forest	
pro	ducts	
Learning (Dutcome:	
After the	successful completion of the module, the learner will be able to):
1. Enlist the plants as a source of various compounds.		
2. lo	dentify major and minor forest products.	
	1	
2.1	Fiber industry- Jute, Cotton, Coir: Source, Processing and Uses	(4L)
	I	





2.2	Major and Minor Forest products	(5L)
2.3	Plant pigments- as a source of food colour, Dye	(4L)
2.4	Conventional and Non-conventional sources, extraction and uses of Starch	(2L)
References:		
 <u>ttps://www1.gujaratuniversity.ac.in/data/pdfs/syllabus/B.Sc%2O%2OBota</u> <u>ny%2OSem%2O1%2Oto%2O6%2O%2O2O17.pdf</u> 		
 <u>http://telanganauniversity.ac.in/UG_CBCS_Bot_Syll.PDF</u> 		

F. Y. B. Sc. (BOTANY)

SEMESTER II - Practical

COURSE CODE: 23US2BOCCP

Credit- Ol

Learning Objectives:

- 1. Classify the plants to their respective family.
- 2. Interpret the internal structure of the dicot and monocot root and stem.
- 3. Describe plants as a source of various industrially important

compounds.

4. Identify major and minor forest forest products. Learning Outcome:

After the successful completion of the practical, the learner will be able to:





1. Assign the plants to their respective family based on morphological characteristics.

2. Illustrate internal morphology of dicot and monocot root and stem.

3. Enlist and identify plants as a source of pigments, fibers, etc. 4.

perform extraction of fibers, pigments from plants.

5. Describe source and significance of major and minor forest produc

Core Course I	Practical	
1	Study of flower morphology	
2	Study of the following families with the help of fresh material Malvaceae Rubiaceae	
	Amaryllidaceae	
3	Types of vascular bundles using specimen/ photomicrograph	
4	Study of Monocot and Dicot stomata using specimen/ photomicrograph	
5	Study of primary structure of Monocot root and Dicot root	
6	Study of primary structure of Monocot and Dicot stem	
Core Course II	Practical	





1	Study of morphological and anatomical characteristics of plants with respect to ecological adaptations -Hydrophytes: Mesophytes, Halophytes, Xerophytes,	
	Epiphytes	
2	Identification of plants as source of fibers using specimen/ photomicrograph	
3	Extraction of fibers from suitable plant material	
4	Extraction of food colour from the suitable plant material	
5	Extraction of starch from suitable plant material	
6	Identification of major and minor forest products using specimen/ photomicrograph	



