



Sir P. T. Sarvajani College of Science

(Autonomous, Affiliated with VNSGU, Surat)

Re-Accredited 'A+' with CGPA 3.35

PROPOSED

SYLLABUS

FOR

SEM II

Program: B.Sc.

Course: Botany

From

Academic year

2024-25

(NEP-2020)

(To be effective from June, 2024)



B.Sc. (BOTANY) SEMESTER- II

CORE COURSE- I

MAJOR COURSE (THEORY)

COURSE TITLE: Higher cryptogams and phanerogams

COURSE CODE: BOTMJ-S2P3-3CR24

[CREDITS - 03]

Course learning outcome		
<p>After the successful completion of the course, the learner will be able to:</p> <ol style="list-style-type: none"> Gain Knowledge of diversity among the bryophytes, pteridophytes and gymnosperms Understand about the habit, habitats and diversity of higher cryptogamic plants, their classification, structure, growth and life cycle. Acquaint with differentiation and structure of different plant organs. 		
Module 1	Bryophytes	[15L]
<p>Learning objectives: This module is intended to introduce:</p> <ul style="list-style-type: none"> Awareness of structure, development and life cycle of bryophytes. Skill to identify different bryophytes. 		
<p>Learning outcome: After the successful completion of the module, the learner will be able to</p> <ol style="list-style-type: none"> Illustrate diversity among the bryophyte and general characters of bryophytes. Classify bryophytes based on their structure, reproduction and life cycles. Aware of ecological, ethnic and economic importance of bryophytes. 		
1.1	<ul style="list-style-type: none"> General Characters of Bryophytes. Classification of Bryophytes. Economic and Ecological importance of Bryophytes. 	[7L]
1.2	<ul style="list-style-type: none"> Occurrence, Morphology, Anatomy and Life cycles of <i>Riccia</i> and <i>Marchantia</i>. 	[8L]
Module 2	Pteridophytes	[15L]
<p>Learning objectives: This module is intended to:</p> <ul style="list-style-type: none"> Create awareness in morphology, anatomy, development and life cycle of Pteridophytes. Identify different Pteridophytes and classify them. 		
<p>Learning outcome: After the successful completion of the module, the learner will be able to:</p>		



<ol style="list-style-type: none"> 1. Grasp the overall diversity among the Pteridophytes. Illustrate general characters of Pteridophytes. 2. Classify pterophytes based on their structure, reproduction, and life cycles. 3. Understand the ecological, ethnic, and economic importance of pteridophytes. 		
2.1	<ul style="list-style-type: none"> • General Characters of Pteridophytes • Classification of Pteridophytes. • Economic and ecological importance of Pteridophytes. 	[7L]
2.2	<ul style="list-style-type: none"> • Occurrence, morphology, anatomy and life cycle of <i>Nephrolepis</i>. 	[8L]
Module 3	Gymnosperms	[15]
<p>Learning objectives: This module is intended to make students</p> <ul style="list-style-type: none"> • Aware of gymnosperms, their morphology, anatomy, development and life cycle. • Identify different gymnosperms and classify them. 		
<p>Learning outcome: After the successful completion of the module, the learner will be able to</p> <ol style="list-style-type: none"> 1. Illustrate diversity among the gymnosperms. General characters of gymnosperms. 2. Classify gymnosperms based on their structure, reproduction, and life cycles. 3. Understand the ecological, ethnic, and economic importance of gymnosperms. 		
3.1	<ul style="list-style-type: none"> • General Characters of Gymnosperms. • Classification of Gymnosperms. • Economic and Ecological importance of Gymnosperms. 	[8L]
3.2	<ul style="list-style-type: none"> • Occurrence, morphology, anatomy and life cycle of the genera: <i>Cycas</i> 	[7L]
<p>References:</p> <ul style="list-style-type: none"> • Pandey B. P. (2011). College Botany (Vol. 3). S. Chand & Co. Ltd, New Delhi, India • Pandey S.N. and Trivedi P.S(2015). A text book of Botany vol. I (Algae, Fungi, Bacteria, Viruses, Lichen & Plant pathology)12th Edition, Vikash publishing House Pvt. Ltd., New Delhi • Biswas C. and Johri, B.M. (1977). The Gymnosperms. Narosa publishing House, NewDelhi. • Sharma O. P. (2012). Pteridophyta. Tata McGraw-Hill Education, Delhi. • Vashishta, P.C. (1991). Gymnosperms. S. Chand & Company Ltd., Ram Nagar, NewDelhi. • Vashishta, P.C. (1991). Vascular Cryptogams. S. Chand & Company Ltd., RamNagar, New Delhi. 		



- Chopra, R. N. (2005). Biology of bryophytes. New Age International (P) Ltd. New Delhi, India.

Question Paper

B. Sc. (BOTANY) SEMESTER II

Core Course- II

COURSE TITLE: HIGHER CRYPTOGAMS AND PHENEROGAMS

COURSE CODE: BOTMJ-S2P3-3CR24

[CREDITS - 03]

Module	Remembering / Knowledge	Understanding	Applying	Analysing	Evaluating	Creating	Total marks
I	28%	36%	36%	-	-	-	100%
II	25%	42%	33%	-	-	-	100%
III	25%	42%	33%	-	-	-	100%

Mapping of CLOs and PSOs

Course Learning Outcomes	Programme Outcomes					
	1	2	3	4	5	6
1. Understand the diversity among the higher cryptogams and Gymnosperm.	X	X				
1. Explain the systematic structure of Bryophytes, Pteridophytes and Gymnosperm.		X	X			
2. Students will be able to classify the Bryophytes, Pteridophytes and Gymnosperms.	X	X		X		
3. Students will be able to identify the different types of Bryophytes, Pteridophytes and Gymnosperms.	X	X		X		



B.Sc. (BOTANY) SEMESTER- II

CORE COURSE- I1

MAJOR COURSE (THEORY)

COURSE TITLE: Flowering Plants and Systematics

COURSE CODE: BOTMJ-S2P4-3CR24

[CREDITS - 03]

Course learning outcome

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

1. Enlightened on the process of gradual evolution in plants.
2. Equipped to understand the increasing complexity in plant body with introduction to flowers and their parts, arrangement of flowers, arrangement of calyx, corolla, stamens and carpels.
3. Understand principles of taxonomy and importance of characters in taxonomy.
4. Appraise the characters obtained from different sources over and above morphological characters.
5. Study the morphology of some common Angiosperm plants found around with their identification and classification.

Module 1

Structure of flower

[15L]

Learning objectives:

The module is intended to

- Provide an overview of morphological features of the flowers.
- Be acquainted with the fundamental mechanisms associated with the development, differentiation and structure of different plant organs.

Learning outcomes:

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

1. Describe the morphological characteristics of a flower.
2. Use morphology for the identification of flowering plants.



1.1	<ul style="list-style-type: none"> ➤ Types of Inflorescences. ➤ Introduction, types, and parts of a flower. • Aestivation • Placentation • Androecium • Gynoecium 	[15L]
Module 2	Introductory Plant Systematics	[15L]
<p>Learning objectives:</p> <p>This module is intended to</p> <ul style="list-style-type: none"> • Discuss naming of plants and the binomial nomenclature. 		
<p>Learning outcome:</p> <p>After the successful completion of the module, the learner will be able to</p> <ul style="list-style-type: none"> • Compare different methods of classification. • Gain Knowledge on the botanical survey of India, importance and functions of gardens and herbaria. <p>Prepare Herbarium specimens.</p>		
2.1	<ul style="list-style-type: none"> ➤ Binomial Nomenclature, Types of Classification (Artificial, Natural and Phylogenetic), APG. ➤ Bentham and Hooker's System of classification (up to series). <p>Herbarium technique, Botanical Garden and Botanical Survey of India (BSI).</p>	[15L]
Module 3	Angiosperm Families	[15L]
<p>Learning objectives:</p> <p>This module is intended to</p> <ul style="list-style-type: none"> • Describe the morphological characteristics of flowers and their variations. <p>Understand characters good and bad characters</p>		
<p>Learning outcome:</p> <p>After the successful completion of the module, the learner will be able to</p> <p>Classify plants as per Bentham and Hooker's system of classification and know their economic importance.</p>		



3.1	<p>➤ Classification (as per Bentham and Hooker's), general and distinguishing characters and economic importance of following angiosperm families:</p> <ul style="list-style-type: none">• Malvaceae• Fabaceae• Nyctaginaceae• Amaryllidaceae	[15L]
<p>References:</p> <ul style="list-style-type: none">• College Botany Vol. I - III Gangulee, et al. 5th Edi. 1990 New central book agency Calcutta.• Taxonomy of Angiosperms V. Singh 1st Edi. 1981 Rastogi pub.• V. Singh (1981). 1st Edi Taxonomy of Angiosperms: Rastogi pub.• B.P. Panday (2001). Taxonomy of Angiosperm: S. Chand.• A. C. Datta (1964). Botany for Degree Student. Oxford University press• Das Datta and Gangulee, (1990). College Botany Volume-I. 5th Edition New central book agency Calcutta• Gangulee and Kar (1990). College Botany Volume-II. New central book agency Calcutta• Mukharjee (1990). College Botany Volume-III. New central book agency Calcutta• A. C. Datta (1989). College Botany 3rd Edi Oxford Bombay.		



Question Paper Template

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

Core Course- II

COURSE TITLE: Flowering Plants and Systematics

COURSE CODE: **BOTMJ-S2P2-3CR24**

[CREDITS - 03]

Module	Remembering / Knowledge	Understanding	Applying	Analysing	Evaluating	Creating	Total marks
I	28%	36%	36%	-	-	-	100%
II	25%	42%	33%	-	-	-	100%
III	25%	42%	33%	-	-	-	100%



Mapping of CLOs and PSOs

Course Learning Outcomes	Programme Outcomes					
	1	2	3	4	5	6
1. Understand about flower parts arrangements.	X	X				
2. Explain the types of classification of plants.		X	X			
3. Students will be able to identify and classify the plants species according their characters.		X	X	X		
4. Students will be able to prepare an herbarium of different plants			X		X	X



B.Sc. (BOTANY) SEMESTER II

COURSE TITLE: PRACTICAL MJ-I

COURSE CODE: **BOTMJ-S2PR3-1CR24**

[Credit- 01]

Course Learning Outcome

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

1. Identify and classify the plants to their respective family based on morphological characteristics.
2. Describe the plants morphology with live specimens.

PRACTICAL – I

1	<p>A. study the external features of Gametophyte and sporophyte, Anatomy of <i>Riccia</i> using fresh or preserved specimens.</p> <p>B. To study the permanent slide of <i>Riccia</i>.</p>
2	<p>A. Study external features of Gametophyte and sporophyte, Anatomy of <i>Marchantia</i> using fresh or preserved specimens.</p> <p>B. Study permanent slides of <i>Marchantia</i>.</p>
3	<p>A. Study of the morphology of Sporophyte of Nephrolepis using fresh or preserved material.</p> <p>B. Preparation of slides from the fresh/preserved material of Stolon (T.S.) of Nephrolepis.</p> <p>C. Preparation of slides from the fresh/preserved material of leaflet passing through the sori of Nephrolepis.</p> <p>D. Preparation of slides from the fresh/preserved material Rachis (T.S.) of Nephrolepis.</p>
4	<p>A. Study fresh/preserved specimens of Cycas coralloid roots</p> <p>B. Study fresh/preserved specimens of Cycas Megasporophyll.</p> <p>C. Study fresh/preserved specimens of Cycas Microsporophyll.</p> <p>D. Study fresh/preserved specimens of Cycas Rachis.</p> <p>E. Preparation of slides from fresh or preserved specimen material of Cycas leaflet.</p>



B.Sc. (BOTANY) SEMESTER II

COURSE TITLE: PRACTICAL MJ-II

COURSE CODE: **BOTMJ-S2PR4-1CR24**

[Credit- 01]

Course Learning Outcome

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

3. Assign the plants to their respective family based on morphological characteristics.
4. Describe plant morphology with live specimens.

PRACTICAL – II

1	Study Flower: (any of the type as per availability) <ul style="list-style-type: none">• Regular Flower- <i>Ipomoea</i>• Irregular Flower- <i>Clitoria and Caesalpinia</i>• Unisexual Flower- <i>Coccinea/ Papaya</i>• Bisexual Flower- <i>Hibiscus</i>
2	Study of inflorescence of the following: <p>A. Racemose:</p> <ol style="list-style-type: none">a. Raceme: <i>Caesalpinia pulcherrima, Brassica juncea.</i>b. Spike: <i>Achyranthes aspera, Polianthes tuberosa.</i>c. Spadix: <i>Colocasia</i>d. Catkin: <i>Acalypha hispida</i>e. Corymb: <i>Cassia, Ixora</i>f. Umbel: <i>Coriander</i>g. Capitulate: <i>Acacia, Albizia</i>h. Capitulum: <i>Helianthus and Tridax</i> <p>B. Cymose:</p> <ul style="list-style-type: none">• Unbrancheda. Solitary Terminal: <i>Datura</i>b. Solitary Axillary: <i>Hibiscus</i>• Brancheda. MonochasialHelicoid: <i>Hamellia patens</i>b. Scorpid: <i>Heliotropium</i>



	Dichasial or Biparous: <i>Clerodendrum</i> , <i>Nyctanthes</i> and <i>Jasminum</i> c. Polychasial or Multiparous: <i>Nerium</i> and <i>Calotropis</i>	
3	Study the following placentation types: Marginal, Axile, Free central, Parietal, Basal and Superficial.	
4	Study types of Aestivations .	
5	Study types of Bracts .	
6	Study types of Stamen .	
7	Study of morphological characters, floral dissection, T.S of ovary and floral formula of Malvaceae .	
8	Study of morphological characters, floral dissection, T.S of ovary and floral formula of Fabaceae .	
9	Study of morphological characters, floral dissection, T.S of ovary and floral formula of Nyctaginaceae .	
10	Study of morphological characters, floral dissection, T.S of ovary and floral formula of Amaryllidaceae .	
<ul style="list-style-type: none">• Every candidate shall complete a laboratory course by the regulations issued from time to time by the Academic Council on the recommendation of the Board of Studies.• Every candidate shall record observations directly in the laboratory journal. Every journal shall be signed periodically.• At the end of the semester candidate shall produce a certified journal during the practical examination.		



B.Sc. (BOTANY) SEMESTER II

MINOR COURSE THEORY

COURSE TITLE: Higher Cryptogams and Phenerogams

COURSE CODE: BOTMN-S2P2-2CR24

[CREDITS - 02]

Course learning outcome		
<p>After the successful completion of the Botany Minor Course, the learner will be able to:</p> <ul style="list-style-type: none"> • Familiarize and identify viruses, bacteria, algae, and fungi. • Describe morphology of angiosperms like root, stem, leaf, flower and inflorescence. 		
Module 1	Bryophytes and Pteridophytes	[15L]
<p>Learning objectives:</p> <p>The module is intended to</p> <ul style="list-style-type: none"> • Provide a thorough knowledge of general characters and classification of Bryophytes. • Describe Vegetative structure and Life cycle of <i>Marchantia</i>. • Acquire knowledge about general characters and classification of pteridophytes. • Describe the Vegetative structure and Life cycle of <i>Nephrolepis</i>. 		
<p>Learning outcomes:</p> <p>After the successful completion of the module, the learner will be able to</p> <ol style="list-style-type: none"> 1. Gain knowledge about diversity among the bryophytes and pteridophytes with their general characters. 2. Understand the Classification of bryophytes and pteridophytes based on their structure, reproduction and life cycles. 3. Evaluate the ecological, ethnic, and economic value of bryophytes and pteridophytes 		
1.1	<p>BRYOPHYTES-1</p> <ul style="list-style-type: none"> • General Characters of Bryophytes. • Classification of Bryophytes. 	[3L]
1.2	<p>BRYOPHYTES-2</p> <ul style="list-style-type: none"> • Morphology, anatomy, occurrence and life cycle of Riccia and <i>Marchantia</i>. • Economic and Ecological importance of Bryophytes 	[4L]



1.3	PTERIDOPHYTES-1 <ul style="list-style-type: none"> • General Characters of Pteridophytes. • Classification of Pteridophytes. 	[4L]
1.4	PTERIDOPHYTES-2 <ul style="list-style-type: none"> • Morphology, anatomy, occurrence, and life cycle of the genera: <i>Nephrolepis</i> • Economic and ecological importance of Pteridophytes. 	[4L]
Module 2	Gymnosperm and Angiosperm	[15L]
<p>Learning objectives:</p> <p>This module is intended to</p> <ul style="list-style-type: none"> • Acquire knowledge about the morphology, internal structure and importance of gymnosperms and Angiosperm. • Discuss the importance of characters obtained from some modern disciplines as an aid to plant taxonomy. • Realize the values of diversity and its importance in human welfare. • To understand the basis of plant nomenclature and classification. 		
<p>Learning outcome:</p> <p>After the successful completion of the module, the learner will be able to</p> <ol style="list-style-type: none"> 1. Identify flowers and their parts, arrangement of flowers, arrangement of calyx and corolla, and arrangement of the placenta. 2. Study basic principles of taxonomy and use of rules of nomenclature. 3. Identify the local angiosperms to the families prescribed and prepare herbarium specimen. 		
2.1	GYMNOSPERM-1 <ul style="list-style-type: none"> • General Characters of Gymnosperms. • Classification of Gymnosperms. 	[3L]
2.2	GYMNOSPERM-2 <ul style="list-style-type: none"> • Occurrence, morphology, anatomy and life cycle of the genera: <i>Cycas</i>. • Economic and Ecological importance of gymnosperm. 	[4L]



2.3	ANGIOSPERM-1 <ul style="list-style-type: none">• Introduction, types and parts of flower.• Inflorescence• Aestivation• Placentation	[4L]
2.4	ANGIOSPERM-2 <ul style="list-style-type: none">• Introduction to code and some rules of nomenclature.• Binomial nomenclature, Types of Classification (Artificial, Natural and Phylogenetic)• Bentham and Hooker's System of classification (up to series)	[4L]

REFERENCES:

- A.C. Datta (1964). Botany for Degree Student. Oxford University press
- Das Datta and Gangulee (1990). College Botany Volume-I. 5th Edition New central book agency Calcutta
- Gangulee and Kar (1990). College Botany Volume-II. New central book agency Calcutta
- Mukharjee. (1990). College Botany Volume-III. New central book agency Calcutta.
- A. C. Datta(1989). College Botany 3rd Edi Oxford Bombay.
- V. Singh (1981).1st Edi Taxonomy of Angiosperms: Rastogi pub.
- B.P. Pandey (2001). Taxonomy of Angiosperm: S. Chand
- Pandey B. P. (2011). College Botany (Vol. 3). S. Chand & Co. Ltd, New Delhi, India.
- Pandey S.N. and Trivedi P.S(2015). A text book of Botany vol. I (Algae, Fungi, Bacteria, Viruses, Lichen & Plant pathology)12th Edition, Vikash publishing House Pvt. Ltd., New Delhi
- Biswas, C. and Johri B.M. (1977). The Gymnosperms. Narosa publishing House, NewDelhi.
- Sharma, O.P. (2012). Pteridophyta. Tata McGraw-Hill Education, Delhi



- Vashishta, P.C. (1991). Gymnosperms. S. Chand & Company Ltd., Ram Nagar, NewDelhi.
- Vashishta, P.C. (1991). Vascular Cryptogams. S. Chand & Company Ltd., Ram Nagar, New Delhi.
- Chopra, R. N. (2005). Biology of bryophytes. New Age International (P) Ltd. New Delhi, India.

Mapping of CLOs and PSOs

Course Learning Outcomes	Programme Outcomes					
	1	2	3	4	5	6
1. Understand the diversity among the Higher Cryptogams and Phanerogams.	X	X				
2. Explain the systematic structure of Bryophytes, Pteridophytes and Phanerogams.		X	X			
3. Students will be able to classify the Bryophytes, Pteridophytes, and Phanerogams.		X	X	X		
4. Students will be able to identify the different types of Bryophytes, Pteridophytes and Phanerogams according there morphological character.		X	X	X		

Question Paper Template

B. Sc. (BOTANY) SEMESTER II

MINOR BOTANY (THEORY)

COURSE TITLE: Higher Cryptogams and Phenerogams

COURSE CODE: BOTMN-S2P2-2CR24

[CREDITS - 02]

Module	Remembering/ Knowledge	Understanding	Applying	Analysing	Evaluating	Creating	Total marks
I	25%	50%	25%	--	--	--	100%
II	23%	46%	--	31%	--	--	100%



B.Sc. (BOTANY) SEMESTER II

COURSE TITLE: PRACTICAL(MN)-II

COURSE CODE: **BOTMN-S2PR2-2CR24**

[CREDIT- 02]

Course Learning Outcome

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

1. Understand the anatomical structure of *Marchantia*.
2. Differentiate the sporophytic and gametophytic structure.
3. Study the morphological characters of Angiosperms.

PRACTICAL Module – I (Course – II)

1	A. Study external features of gametophyte & sporophyte, anatomy of <i>Marchantia</i> using fresh or preserved specimens. B. Study permanent slides of <i>Marchantia</i> .
2	A. Study of the morphology of Sporophyte of <i>Nephrolepis</i> using fresh or preserved specimens. B. Preparation of slides from the fresh/preserved material of Stolon (T.S.) of <i>Nephrolepis</i> C. Preparation of slides from the fresh/preserved material of leaflet passing through the sori of <i>Nephrolepis</i> . D. Preparation of slides from the fresh/preserved material Rachis (T.S.) of <i>Nephrolepis</i>

PRACTICAL Module – I (Course – II)

3.	A. Study fresh/preserved specimens of <i>Cycas</i> coralloid roots, B. Study fresh/preserved specimens of <i>Cycas</i> Megasporophyll C. Study fresh/preserved specimens of <i>Cycas</i> Microsporophyll. D. Study fresh/preserved specimens of <i>Cycas</i> Rachis E. Study T.S. of fresh/preserved specimens of <i>Cycas</i> Leaflet
4.	Study of inflorescence of the following: A. Racemose: a. Raceme: <i>Caesalpinia pulcherrima</i> , <i>Brassica juncea</i> . b. Spike: <i>Achyranthes aspera</i> , <i>Polianthes tuberosa</i> .



4.	<p>c. Spadix: <i>Colocasia</i></p> <p>d. Catkin: <i>Acalypha hispida</i></p> <p>e. Corymb: <i>Cassia, Ixora</i></p> <p>f. Umbel: <i>Coriander</i></p> <p>g. Capitate: <i>Acacia, Albizia</i></p> <p>h. Capitulum: <i>Helianthus and Tridax</i></p> <p>B. Cymose:</p> <ul style="list-style-type: none">• Unbrancheda. Solitary Terminal: <i>Datura</i>b. Solitary Axillary: <i>Hibiscus</i>• Branchedc. Monochasiala. Helicoid: <i>Hamellia patens</i>b. Scorpoid: <i>Heliotropium</i><ul style="list-style-type: none">f. Dichasial or Biparous: <i>Clerodendrum, Nyctanthes and Jasminum</i>g. Polychasial or Multiparous: <i>Nerium and Calotropis</i>
5	<p>Study the following placentation types:</p> <p>Marginal, Axile, Free central, Parietal, Basal and Superficial.</p>
6	<p>Study types of Aestivations.</p>
<ul style="list-style-type: none">• Every candidate shall complete a laboratory course by the regulations issued from time to time by the Academic Council on the recommendation of the Board of Studies.• Every candidate shall record observations directly in the laboratory journal. Every journal shall be signed periodically.• At the end of the semester candidate shall produce a certified journal during the practical examination.	



B.Sc. (BOTANY) SEMESTER II

Multidisciplinary

COURSE TITLE: Ethnobotany, Pharmacognosy and Economic botany

COURSE CODE: BOTMDC-S2P1-4CR24

[CREDITS - 04]

Course learning outcome		
<p>After the successful completion of the Course, the learner will be able to:</p> <ol style="list-style-type: none"> 1. Understand delimits and scopes of ethnobotany, pharmacognosy & economic botany. 2. Learn to identify the useful medicinal plants and crop plants found around you. 3. Effectively communicate scientific ideas both orally and in writing. 4. Collect crude drugs from field/market and test their genuineness and quality. 		
Module 1	Introduction to Ethnobotany	[15L]
<p>Learning objectives:</p> <p>The module is intended to</p> <ul style="list-style-type: none"> ● Provide comprehensive knowledge on different aspects related to medicinal plants. ● Acquire knowledge on the status and the developments in ethnobotany with a practical approach. ● To produce a student who thinks independently, and critically and discusses various aspects of medicinal plants and crop plant. ● Prepare drugs of natural origin and test their quality. 		
<p>Learning outcomes:</p> <p>After the successful completion of the module, the learner will be able to</p> <ol style="list-style-type: none"> 1. Be able to discuss patterns of cultural evolution with plants. 2. Understand and interrelate the different systems of medicine. 3. Discuss the role, importance and contribution of ethnomedicine, and active compounds of pharmacological importance. 		
1.1	➤ Introduction, aim, scope and importance of Ethnobotany.	[5L]
1.2	<ul style="list-style-type: none"> ➤ Classification of ethnobotany. ➤ International, national and regional contribution of ethnobotany ➤ Ethnobotany and its importance in medicine. Common and rare medicinal plants of South Gujarat. 	[10L]
Module 2	Introduction to Pharmacognosy	[15L]
<p>Learning objectives:</p> <p>The module is intended to</p> <ul style="list-style-type: none"> ● Provide comprehensive knowledge on different aspects related to medicinal plants. 		



<ul style="list-style-type: none"> ● Acquire knowledge on the status and the developments in pharmacognosy with a practical approach. ● To produce a student who thinks independently, and critically and discusses various aspects of medicinal plants and crop plant. ● Prepare drugs of natural origin and test their quality. 		
<p>Learning outcomes:</p> <p>After the successful completion of the module, the learner will be able to</p> <ol style="list-style-type: none"> 1. Be able to discuss patterns of cultural evolution with plants. 2. Understand and interrelate the different systems of medicine. 3. Discuss the role, importance and contribution of ethnomedicine, and active compounds of pharmacological importance. 		
2.1	➤ Introduction, aim, scope and importance of pharmacognosy.	[5L]
2.2	<ul style="list-style-type: none"> ➤ Introduction to different systems of medicine AUSH (Ayurvedic, Unani, Siddha and Homeopathy) ➤ Principal active compounds and pharmacological uses. 	[10L]
Module 3	Economic Botany – I	[15L]
<p>Learning objectives:</p> <p>The module is intended to</p> <ul style="list-style-type: none"> ● Capacitate students to stand and face national and international examinations related to ethnobotany, pharmacognosy & economic botany. ● Empower the student to become an employee or an entrepreneur in Botany, Pharma companies, NGOs, BSI, ZSI and forest department. 		
<p>Learning outcomes:</p> <p>After the successful completion of the module, the learner will be able to:</p> <ol style="list-style-type: none"> 1. Understand the importance of botanical resources around them. 2. Appreciate economic and ecological importance of plants and strive to cultivate and conserve them. 		
3.1	<ul style="list-style-type: none"> ➤ Be aware the following plants: botanical name, family, parts used, external morphology, cultivation and economic uses. <p>A. Cereals – Rice (<i>Oryza sativa</i>), wheat (<i>Triticum aestivum</i>), Maize (<i>Zea mays</i>).</p>	[15L]



	<p>B. Pulses – Pigeon pea (<i>Toor- Cajanus cajan</i>), Chick Pea (<i>Chana- Cicer arietinum</i>), Green gram (Moong- <i>Vigna radiata</i>).</p> <p>C. Spices – Cardamom (<i>Elettaria cardamomum</i>), Black pepper (<i>Piper nigrum</i>), Turmeric (<i>Curcuma longa</i>).</p> <p>D. Oils – Groundnut (<i>Arachis hypogaea</i>), Castor (<i>Ricinus communis</i>), Sesame (<i>Sesamum indicum</i>).</p>	
Module 4	Economic Botany – II	[15L]
<p>Learning objectives:</p> <p>The module is intended to</p> <ul style="list-style-type: none"> • Capacitate students to stand and face national and international examinations related to ethnobotany, pharmacognosy & economic botany. • Empower the student to become an employee or an entrepreneur in Botany, Pharma companies, NGOs, BSI, ZSI and forest department. 		
<p>Learning outcomes:</p> <p>After the successful completion of the module, the learner will be able to:</p> <ol style="list-style-type: none"> 1. Understand the importance of botanical resources around them. 2. Appreciate economic and ecological importance of plants and strive to cultivate and conserve them. 		
4.1	<p>➤ Be aware the following plants: botanical name, family, parts used, external morphology, cultivation and economic uses.</p> <p>A. Fibres – Cotton (<i>Gossypium herbaceum</i>), Jute (<i>Corchorus</i>) and coir (<i>cocos nucifera</i>).</p> <p>B. Timbers– Teak (<i>Tectona grandis</i>), Shisham (<i>Dalbergia latifolia</i> and <i>D. Sissoo</i>) and Sevan (<i>Gmelina arborea</i>)</p> <p>C. Dyes-Sinduri (<i>Bixa orellana</i>), Mehendi (<i>Lawsonia inermis</i>)</p> <p>D. Beverages – Tea (<i>Camelia sinensis</i>), Coffee (<i>Coffea arabica</i>), Cocoa (<i>Theobroma cacao</i>).</p>	
<p>References:</p> <ul style="list-style-type: none"> • Vinod D Rangari(2017). Pharmacognosy & Phytochemistry Vol.1and 2. Career publication 		



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Question Paper Template

B. Sc. (BOTANY) SEMESTER II

Multidisciplinary

COURSE TITLE: Ethnobotany, Pharmacognosy and Economic Botany

COURSE CODE: BOTMDC-S2P1-4CR24

[CREDITS - 04]

Module	Remembering/ Knowledge	Understanding	Applying	Analysing	Evaluating	Creating	Total marks
I	20%	40%	40%	-	-	-	100%
II	20%	40%	40%	-	-	-	100%
III	20%	40%	40%	-	-	-	100%
IV	20%	40%	40%	-	-	-	100%



Mapping of CLOs and PSOs

Course Learning Outcomes	Programme Outcomes					
	1	2	3	4	5	6
1. Understand the different systems of Medicine.	X	X				
2. Explain the different types of plants' traditional uses and pharmacognosy.		X	X			
3. Students will be able to cultivate crop plants and medicinal plants and make an ethno medicine.		X	X	X		
4. Students will be able to use minor and major products of plants.	X	X	X	X		



F.Y. BSc. (BOTANY) SEMESTER II

Skill Enhanced Course (Practical)

COURSE TITLE: Basics of crude herbal drugs

COURSE CODE: **BOTSEC-S2PR1-2CR24**

[CREDIT- 02]

Course Learning Outcome

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

1. Students develop their practical skills for knowledge of crude herbal drugs.
2. Students will be able to collect medicinal plants and make crud drugs.
3. Students will be able to use different types of methods for crud drugs and herbal cosmetics preparation.

PRACTICAL Module – I

1	Collection of different plant parts for their medicinal use.
2	Drying, Grading and Storage of collected plant parts.
3	Perform the maceration method on <i>Clerodendrum inerme</i> .
4	Study of extractive value of plant sample.
5	Study stomatal index in <i>Calotropis porcera</i> .
6	Biochemical test of Protein and Amino acid from plant sample.
7	Biochemical test of Carbohydrates and Steroids from plant sample.

PRACTICAL Module – II

1	Preparation of Herbal lotion.
2	Preparation of Churan mixture.
3	Preparation of Herbal face pack.
4	Preparation of Hair oil.
5	Preparation of Herbal shampoo.
6	To prepare Herbarium of Medicinal plant. [Minimum 5 Plants]
7	Submit the field visit report of Herbal plants.

- Every candidate shall complete laboratory courses by the regulations issued from time to time by the Academic Council on the recommendation of the Board of Studies.
- Every candidate shall record observations directly in the laboratory journal. Every journal shall be signed periodically.
- At the end of the semester candidate shall produce a certified journal during the practical examination.



Mapping of CLOs and PSOs

Course Learning Outcomes	Programme Outcomes					
	1	2	3	4	5	6
5. Understand about pharmacognosy and crud drugs.	X	X	X			
6. Explain the different types of plants' traditional uses and pharmacognosy.		X	X			
7. Students will be able to cultivate medicinal plants and make crud drugs.		X	X	X		
8. Students will be able to use different types of extraction methods for crud drug preparation.		X	X	X		