KRANTIGURU SHYAMJI KRISHNA VERMA KACHCHH UNIVERSITY,
BHUJ.

Year: 2025-2026

B. Sc. (Honours) BOTANY

(With Research /Without Research)

Semesters: V and VI

FACULTY OF SCIENCE

SYLLABUS

Curriculum as per UGC Guideline
Framed according to National Education Policy (NEP) - 2020
With effect from June – 2025 (and thereafter)

NATURE AND EXTENT OF BACHELOR'S DEGREE PROGRAMME IN BOTANY HONOURS)

A bachelor's degree in Botany with Research or without Research is a 4-year degree course which is divided into 8 semesters.

Sr. No.	Type of Award	Stage of Exit	Mandatory Credits to be secured for the Award
1	Certificate in the Discipline	After successful completion of 1st Year	**Certificate with Exit 4 Credit course (44+4)**
2	Diploma in the Discipline	After successful completion of 1st and 2nd Years	**Diploma with Exit 4 Credit course (88+4)**
3	B.Sc. in Botany	After successful completion of 1st, 2nd, and 3rd Years	**Bachelor's degree (132)**
4	B.Sc. (Honors with Research/ without Research) in Botany	After successful completion of 1st, 2nd, 3rd, and 4th Years	**Bachelor + Honours degree (176)** **Bachelor + Research degree (176)**

A student pursuing 4 years undergraduate Programme with research in a specific discipline shall be awarded an appropriate Degree in that discipline on completion of 8th Semester if he/she secures 176 Credits. Similarly, for certificate, diploma and degree, a student needs to fulfill the associated credits.

AIMS:

1. To develop the curriculum for fostering discovery-learning.
2. To provide the latest subject matter, both theoretical as well as practical, such a way to foster their core competency and discovery learning. A Botany graduate as envisioned in this framework would be sufficiently competent in the field to undertake further discipline-specific studies, as well as to begin domain-related employment.
3. To mould a responsible citizen who is aware of most basic domain-independent knowledge, including critical thinking and communication.
4. To enable the graduate, prepare for national as well as international competitive examinations, especially UGC - CSIR NET, IIT - JAM and UPSC Civil Services Examination.

COURSE INTRODUCTION

B.Sc. Botany Programme covers academic activities within the classroom sessions along with practical concepts at laboratory sessions. Infield, outstation activities and projects would also be organized for real-life experience and learning. Candidates who have curiosity in plants kingdom, ecosystem, love exploring exotic places and wish to work as researchers or professions like Botanist, Conservationist, Ecologist, Environmentalist etc. can choose B.Sc. Botany course.

Programme outcomes (POs)

Transformed curriculum shall develop educated outcome-oriented candidature, to develop into responsible citizen for nation-building and transforming the country towards the future with their knowledge gained in the field of plant science.

Programme specific objectives (PSOs): B.Sc. III Year Degree Course in Basic Botany

- This course will provide knowledge on various fields of basic Botany.
- The syllabus is prepared to enable students for competitive exams in frontier areas of plant sciences.
- Students will be able to know about habit, habitat, morphology, anatomy, and reproduction of various plant groups.
- Student shall produce competent plant biologists who can employ and implement their gained knowledge in basic and applied aspects that will profoundly influence the prevailing paradigm of agriculture, industry, healthcare, and environment to provide sustainable development.
- Certificate and diploma courses are framed to generate self- entrepreneurship and self-employability, if multi exit option is opted. Lifelong learning is achieved by drawing attention to the vast world of knowledge of plants and their domestication.
- Students will increase the ability of critical thinking, development of scientific attitude, handling of problems and generating solutions, improve practical skills, social interaction, and increase awareness in judicious use of plant resources by recognizing the ethical value system.
- The training provided to the students will make them competent enough for doing jobs in Govt. and private sectors of academia, research, and industry along with graduate preparation for national as well as international competitive examinations, especially UGC-CSIR NET, UPSC Civil Services Examination, IFS, NSC, FCI, BSI, FRI etc.,

EVALUATION METHODS:

Academic performance in various courses *i.e.,* **Major, Minor** and **SEC** are to be considered as parameters for assessing the achievement of students in the Botany subject. Several appropriate assessment methods of Botany will be used to determine the extent to which students demonstrate desired learning outcomes.

A student shall be evaluated through Comprehensive Continuous Assessment (**CCA**)/ (***Internal Evaluation***) as well as the **End of Semester examination** (***External Evaluation***). The weightage of CCA shall be 50%, whereas the weightage of the Semester end examination shall be 50%. CCA will include tests/online –offline exams/seminars/assignments/ submissions/student attendance and active participation (oral/poster), field work, report etc....

The End of Semester Examination will be conducted by the University. A certified journal of the respective practical course must be produced at the time of practical examination by the student. The Botanical Excursion is highly essential for to studying vegetation in its natural state, Botanical Industrial visit, Plant tissue culture lab visit, plant nursery visit, organic farm visit etc..... There shall be at least one Botanical Excursion.

This is compulsory to record laboratory work in the Journal. Certified journals must produce while appearing at the time of Practical examination.

Credit Framework and course code for SECOND YEAR BOTANY Programme (B.Sc.)

Year	Semester	Course Code	Paper Title	Credits	Marks		Total
					CA	UA	
Third Year	V	MJ BOT 501	Environmental Botany	3	35	40	75
		MJ BOT 502-P	Environmental Botany	1	15	10	25
		MJ BOT 503	Genetics, Biotechnology & Molecular biology	3	35	40	75
		MJ BOT 504-P	Genetics, Biotechnology & Molecular biology	1	15	10	25
		MJ BOT 505	Phytopathology Structural botany And Plant Taxonomy	3	35	40	75
		MJ BOT 506-P	Phytopathology Structural botany And Plant Taxonomy	1	15	10	25
		MN BOT 507	Environmental Botany	3	35	40	75
		MN BOT 508-P	Environmental Botany	1	15	10	25
		MN BOT 509	Genetics, Biotechnology & Molecular biology	3	35	40	75
		MN BOT 510-P	Genetics, Biotechnology & Molecular biology	1	15	10	25
			Total Credits	**20**			
		SEC Bot 501-P	Organic farming & Botanical Origami /Introductory Floral Design	2	25	25	50
			Total Credits	**22**			
	VI	MJ BOT 601	Conservation, Forest and forestry	3	35	40	75
		MJ BOT 602-P	Conservation, Forest and forestry	1	15	10	25
		MJ BOT 603	Analytical Techniques & Research Methodology	3	35	40	75
		MJ BOT 604-P	Analytical Techniques & Research Methodology	1	15	10	25
		MJ BOT 605	Paleobotany, Phanerogams, structural Botany& phytochemistry	3	35	40	75
		MJ BOT 606-P	Paleobotany, Phanerogams, structural Botany& phytochemistry	1	15	10	25
		MN BOT 607	Forest, forestry and Conservation	3	35	40	75
		MN BOT 608-P	Forest, forestry and Conservation	1	15	10	25
			Total Credits	**16**			
		INT BOT 612	Internship In Major Specific Course	4			
			Total Credits	**20**			
		AEC		2			

The Structure of the Question Paper for the University Exam

KSKV Kachchh University: BHUJ

THIRD YEAR B.Sc. Semester: 5 & 6

SUBJECT: BOTANY

Total Marks: 40, Duration: 2 hours

PATTERN OF QUESTION PAPER FOR SEMESTER-END EXAMS

- The structure for FIRST THREE question is as under: 30 Marks (10 X 3)
- **Descriptive type 10 Marks**

  (1) Two questions of 10 Marks each. Out of which one must be answered, the type of questions is varied, like: Flow chart/ labeled diagram with explanation/ writes in detail etc.

  (2) Three questions of 05 Marks each out of which two must be answered.

* **The structure for Fourth question is as under: 10 Marks**

Twelve questions from all three units out of which ten questions shall be answered. Each of 01 mark makes total 10 Marks.

- The types of questions are varied, like: one-line answers / two-line answers / definitions / reasoning / drawing small figures/ label the figure / fill in the blanks / multiple choice question/ one-word answer / match the pairs etc.

Question No	Question type	Marks	Remarks
Que-1 Unit-1	Descriptive Questions with Internal Option.	10	Question may be of 10 marks/ 5 + 5 marks
Que-2 Unit-2	Descriptive Questions with Internal Option.	10	Question may be of 10 marks/ 5 + 5 marks
Que-3 Unit-3	Descriptive Questions with Internal Option.	10	Question may be of 10 marks/ 5 + 5 marks
Que-4	Do as directed.	10	Total 12 questions from all units will be ask; students have to attempt any 10

PATTERN OF PRACTICAL FOR SEMESTER-END EXAMS

There will be FOUR Exercises in each Practical, as under, total of 10 Marks.

Instructions: Strictly follow the instructions given by examiner(s).	
Ex: 1. specimen A. (Do as Directed)	03
Ex: 2. specimen B (Do as Directed)	02
Ex: 3. specimen C. (Do as Directed)	03
Ex: 4. Journal	02

- The End of Semester Examination will be conducted by the University. The Botanical Excursion is highly essential for to studying vegetation in its natural state. There shall be at least one Botanical Excursion.
- This is compulsory to record laboratory work in the Journal. Certified journal has to produce while appearing at the time of Practical examination.

- For the botanical practical fresh material of plants must be need. In absence of fresh material preserved material or specimen can be used.

DETAILED SYLLABUS OF B.Sc. III YEAR FOR DEGREE COURSE IN BASIC BOTANY

KSKV Kachchh University, Bhuj - Kachchh

(Effective from June 2025-26 UNDER NEP-2020)

SEMESTER 5

(Course code: MJ BOT- 501)

Course Title: Environmental Botany

Credit: 3

Course Objectives

1. In a plant ecology course within a botany curriculum, students should be able to understand plant interactions with their environment, including abiotic and biotic factors, and apply this knowledge to conservation and restoration efforts, as well as understanding plant diversity and distribution.
2. students should be able to understand the dynamics of plant communities, including the processes of colonization, competition, and succession, as well as the factors influencing these processes.
3. Students should be able to understand ecosystem concepts, types, development, and functions, including their communication with environmental factors and the role of biogeochemical cycles and environmental pollution
4. students should be able to understand plant diversity, ecological principles, and conservation strategies, ultimately contributing to sustainable resource management and biodiversity protection.
5. "Plant Adaptation" botany course, students should be able to understand how plants adapt to their environment, including identifying adaptations, relating them to ecological factors, and applying knowledge to real-world scenarios. understanding involves recognizing their morphological and anatomical adaptations.

DISCIPLINE SPECIFIC CORE COURSES (MAJOR)							
COURSE	**SEMESTER**	**COURSE CODE**	**COURSE TITLE**	**THEORY**			
				Credits	**Lectures**	**External**	**Internal**
Degree Course	**B.Sc.**	**MJ BOT-501**	**Environmental Botany**	**3**	**45**	**40 Marks**	**35 Marks**
UNIT	**TOPIC**						
Unit 1	**Plant Succession:** Definitions, Causes of succession, Succession and climax concept, Monoclimax and polyclimax theories, **Kinds of succession,** Hydrosere, Xerosere (a succession on bare rock surface), Some examples of secondary succession or subseres. **Ecosystem**: Definition, Classification, Components, Structure of an Ecosystem, Functions (Trophic Structure, Ecological Pyramids, Energy Flow in an Ecosystem), Types.						
Unit 2	**Environmental Pollution:** Water pollution, Air pollution, Agriculture pollution, Control of environmental pollution, Air Quality and Air Quality Index. **Global Warming** (Green House Effect) Introduction, causes, (manmade and Natural) Impact of Global Warming on Climate and Living Organisms, Acid Rain **Physical properties of Soils:** Soil texture; **Soil Erosion and Soil Conservation**: Introduction and factors affecting fertility of soil. Soil erosion-Definition and types of erosion. Agencies causing soil erosion: (a) Climatic-Water and wind. (b) Biotic agencies. **Soil conservation**-Aims of soil conservation, Practical methods of soil conservation (I) Biological: (i) Agronomic practices, (ii) Agrostological, (iii) Dry farming practices.						

Unit 3	**Plant Adaptation**: Introduction and ecological classification of plants. **Hydrophytes:** Definition, classification of hydrophytes, Factors affecting the plants in the aquatic environment, Hydrophytic adaptations-(a) Morphological, (b) Anatomical modifications, Comparison of sub-merged, floating and amphibious plants. **Xerophytes:** Definition of Xerophytes, Classification of Xerophytes-Drought escaping plants, Drought enduring plants and Drought resistant plants, Xerophytic adaptations - Morphological, Anatomical and Physiological adaptations. **Epiphytes:** Definition, Distribution, Important features -Morphological and Anatomical features, Types of Epiphytes. **Halophytes and Mangrove Vegetation**: Definition, Examples, Distribution, or Plant Geography, Distribution, Theories of discontinuous distribution, Important characters Habit, External morphology and anatomical features, succession of mangrove vegetation in sea coast.

Suggested readings.

- Ecology and Environment by P.D. SHARMA (Author)
- A Textbook of Plant Ecology by R.S. SHUKLA AND P.S. CHANDE
- Environment and Ecology by SUNAKAR PANDA
- Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha
- Objective Environmental Sciences by B. B. Singh
- Environmental Studies by Benny Joseph
- Environment and Ecology – Biodiversity, Climate Change and Disaster Management by Majid Husain
- Environmental Ecology Biodiversity & Climate Change – Pratiyogita Darpan
- Environment and Ecology – Arihant
- Environmental Studies: From Crisis to Cure – R. Rajagopalan

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(Effective from June 2025-26 UNDER NEP-2020)

SEMESTER 5

Course Title: Environmental Botany

Practical/ Lab course (Course code: MJ BOT-502-P)

Credit: 1

Course Outcome & Objectives

1. After the completion of the course in a practical Plant Ecology, Environment, and Adaptive Biology course, students should gain hands-on experience in field and laboratory techniques to understand plant communities, ecological adaptations, environmental factors, as well as develop skills in data collection, analysis, and presentation.
2. students with practical skills and knowledge to understand, analyze, and address environmental issues related to plants, ecosystems, and conservation, fostering a scientific approach to environmental challenges.
3. Practical activities help students understand the interactions between plants, other organisms, and the environment, including nutrient cycling, energy flow, and ecological processes.

DISCIPLINE SPECIFIC CORE COURSE(MAJOR)						
COURSE	**SEMESTER**	**COURSE CODE**	**COURSE TITLE**	**PRACTICAL**		
				Credits	**Lectures**	**Internal/External**
Degree Course	**B.Sc.**	**MJ BOT-502-P**	Environmental Botany	**1**	**30**	**25Marks (15+10)**
UNIT	***TOPIC***					
1	Exercise :1 To estimate dust holding capacity of different plant species. Exercise:2 To classify hydrophytes. Exercise: 3 To study the hydrophytic characters in T. S. petiole of *Nymphaea.* Exercise: 4 To classify Xerophytes. Exercise:5 To study the morphological characters of xerophytes. Exercise:6 To study the xerophytic characters seen in T.S. stem of *Casuarina.* Exercise:7: To study the Morphological and Anatomical features of Epiphytes. Exercise:8: To study the Epiphytes characters in T.S. of Orchid root. Exercise:9 To study the Morphological and Anatomical features of mangrove. Exercise:10: To study the Halophytes characters in T.S. of Avicennia leaf.					

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SEMESTER 5
B. Sc.: BOTANY INTERNAL PRACTICAL
Course Code: MJBOT-502-P
Course Title: Environmental Botany
Total Marks: 15

Instructions: Strictly follow the instructions given by examiner(s).	
Ex: 1. Specimen A. (Do as Directed)	04
Ex: 2. Specimen B (Do as Directed)	04
Ex: 3. Specimen C. (Do as Directed)	04
Ex: 4. Viva-voice, submission	03

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SEMESTER 5
B. Sc.: BOTANY UNIVERSITY PRACTICAL
Course Code: MJ BOT-502-P
Course Title: Environmental Botany
Total Marks: 10

Instructions: Strictly follow the instructions given by examiner(s).	
Ex: 1. Specimen A. (Do as Directed)	03
Ex: 2. Specimen B (Do as Directed)	02
Ex: 3. Specimen C. (Do as Directed)	03
Ex: 4. Journal	02

Note: Excursion/ Project work/ Visit/ Study Tour report and submission of specimens / Charts/ Model/ Fresh Material/ Herbarium (Given by teacher or as a part of Syllabus) will be mandatory for all the students.

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(Effective from June 2025-26 UNDER NEP-2020)

SEMESTER 5

(Course code: MJ BOT- 503)

Course Title: Genetics, Biotechnology & Molecular biology

Credit: 3

Course Objectives

1. In a Botany course focusing on Genetics, Biotechnology, and Molecular Biology, students should gain a comprehensive understanding of plant genetics, molecular mechanisms, biotechnological techniques, and their applications in areas like plant improvement and environmental sustainability
2. Understand fundamental principles of inheritance, genetic variation, and gene expression in plants.
3. Learn about different types of mutations and their effects on plant traits.
4. students will be able to understand and apply techniques to identify genotypes, analyze genetic variability, and understand applications in plant breeding, taxonomy, and forensics, among other areas.
5. students should be able to understand plant breeding principles, identify desirable traits, and apply various breeding techniques to improve crop varieties, ultimately enhancing yield, quality, and resilience.

DISCIPLINE SPECIFIC CORE COURSES (MAJOR)							
COURSE	**SEMESTER**	**COURSE CODE**	**COURSE TITLE**	**THEORY**			
				Credits	**Lectures**	**External**	**Internal**
Degree Course	**B.Sc.**	**MJ BOT-503**	Genetics, Biotechnology & Molecular biology	**3**	**45**	**40 Marks**	**35 Marks**
UNIT	**TOPIC**						
Unit 1	**Pre-Mendelian and Post-Mendelian Concepts of Heredity** **Gene Interactions:** Introduction to Gene Interaction, Allelic Gene Interactions (Incomplete Dominance, Co-dominance, over dominance), Non-Allelic Gene Interactions (Simple Interaction, Complementary Factor (9:7), epistasis) **Cytoplasmic Inheritance** (Characteristics, Plastid Inheritance in Mirabilis, Mitochondrial Inheritance -Male sterility, Significance)						
Unit 2	**Linkage of Genes:** Meaning, Features, Phases, Types, Linkage Groups, Detection, Linkage and Pleiotropy, Linkage Significance in Plant Breeding. **Crossing-Over:** Meaning, Mechanism and Significance. **Genetic Code:** Meaning, Types and Properties. **Biotechnology:** Introduction, Scope, types and Applications (in Crop Improvement, Applications in Medicines and Industrial Applications);						
Unit 3	**Gene Expression:** Transcription & Translation: **Genetic Variation & Cytogenetics** o Chromosomal mutation: Types o Gene Mutation: Types, Spontaneous and Induced o Regulation of Gene Expression: Prokaryotes: - Lac & Tryptophan operon. **DNA Fingerprinting**- Principle, Methods, Applications **DNA damage & repair**						

Suggested readings.

- Molecular biology of the cell, 1994: By Bruce Alberts et al; Garland publishing New York.
- Cell and molecular biology, 1999: By Gerald Karp, John Wiley, London.
- Cell and molecular biology, 1987: By DeRobertis and DeRobertis, Lee and Febiger, Washington.
- Molecular cell biology, 2000: By Lodish et al; W. H. Freeman & Company, Newyork.
- Strickberger M. W. Genetics. Third Edition. Macmillan Publishing co. New York.
- Robert Weaber & Philip W. Hedrick. Basic Genetics, Second Edition. W. M. C.
- Brown Publishers Dubuque lowq.
- Anna C. Pal & Helen M. Roberts. Genetics – its concepts & implications, Prentic – Hall Inc. Engle clifts, New Jersey. USA
- Edmund W. Sinnot, L. C. Dunn & T. Dobzhansky, Principles of Genetics. McGraw Hill Book company Inc. New York, USA.
- M. Sr & R. W. Owen. General Genetics, W. H. Freeman & Company, Sanfrancisco.
- P. K. Gupta, Genetics. Rastogi Publications. Shivaji Road Meerut, India.
- Stebbins G. L. Variation & Evolution in plant.
- G. Ledyard Stebbins. Process of organic Evolution.
- Jay M. Savage. Evolution
- Edward O. Dodson. Evolution: Process & Product.
- Paul Amos Moody. Introduction to Evolution.

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SEMESTER 5

Course Title: Genetics, Biotechnology & Molecular biology

Practical/ Lab course (Course code: MJ BOT-504-P)

Credit: 1

Course Outcome & Objectives

After the completion of the course the students will be able to:

1. objectives of a genetics practical course are to provide hands-on experience with experimental techniques, reinforce theoretical knowledge, and develop skills in data analysis and interpretation, ultimately preparing students for careers in genetics and related fields.
2. Understand its application in various field like crop improvement, gene therapy.
3. Understand the concept about Genes and Inheritance.

DISCIPLINE SPECIFIC CORE COURSE(MAJOR)						
COURSE	**SEMESTER**	**COURSE CODE**	**COURSE TITLE**	**PRACTICAL**		
				Credits	**Lectures**	**Internal/External**
Degree Course	**B.Sc.**	**MJ BOT-504-P**	Genetics, Biotechnology & Molecular biology	**1**	**30**	**25Marks (15+10)**
UNIT	***TOPIC***					
	Exercise :1 Study through Chart/ Photograph: Plastid Inheritance in *Mirabilis jalpa.* Exercise :2 Study through Chart/ Photograph: Cytoplasmic male sterility. Exercise :3 Study through Chart/ Photograph: Chromosomal Mutation. Exercise :4 Study through Chart/ Photograph: Gene Mutation. Exercise :5 Study lac operon through chart/photograph. Exercise:6 Study Tryptophan operon through Chart/ Photograph. Exercise:7 Study recombinant DNA technology through chart/ photograph. Exercise:8 Study Development of Transgenic Plant: Bt Cotton through Chart/ Photograph					

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(Effective from June 2025-26 UNDER NEP-2020)
SEMESTER 5
B. Sc.: BOTANY INTERNAL PRACTICAL
Course Code: MJ BOT-504-P
Course Title: Genetics, Biotechnology & Molecular biology
Total Marks: 15

Instructions: Strictly follow the instructions given by examiner(s).	
Ex: 1. Specimen A. (Do as Directed)	04
Ex: 2. Specimen B (Do as Directed)	04
Ex: 3. Specimen C. (Do as Directed)	04
Ex: 4. Viva-voice, submission	03

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SEMESTER 5
B. Sc.: BOTANY UNIVERSITY PRACTICAL
Course Code: MJ BOT-504-P
Course Title: Genetics, Biotechnology & Molecular biology
Total Marks: 10

Instructions: Strictly follow the instructions given by examiner(s).	
Ex: 1. Specimen A. (Do as Directed)	03
Ex: 2. Specimen B (Do as Directed)	02
Ex: 3. Specimen C. (Do as Directed)	03
Ex: 4. Journal	02

Note: Excursion/ Project work/ Visit/ Tour/ report and submission of specimens / Charts/ Model/ Fresh Material/ Herbarium (Given by teacher or as a part of Syllabus) will be mandatory for all the students.

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(Effective from June 2025-26 UNDER NEP-2020)

SEMESTER 5

(Course code: MJ BOT- 505**)**

Course Title: Phytopathology Structural botany And Plant Taxonomy

Credit: 3

Course Objectives

1. Identify plant diseases and find out control measures.
2. Realize the significance of plant diseases as far as crop production is concerned.
3. To make acquainted with the basic characteristic features of lower group of plants such as Algae and Fungi with suitable examples of each sub categories.
4. Realize the importance of fossil study.
5. Understand the climatic conditions of the past and realize the changes happened To give exposure for applied role and importance of such lower groups of plants.
6. students gain knowledge of ancient plants, their fossilization, evolution, and past environments, enabling them to understand the history of plant life and its role in Earth's ecosystems.

DISCIPLINE SPECIFIC CORE COURSES (MAJOR)							
COURSE	**SEMESTER**	**COURSE CODE**	**COURSE TITLE**	**THEORY**			
				Credits	**Lectures**	**External**	**Internal**
Degree Course	**B.Sc.**	**MJ BOT-505**	Phytopathology Structural botany And Plant Taxonomy	**3**	**45**	**40 Marks**	**35 Marks**
UNIT	**TOPIC**						
Unit 1	**Phytopathology:** Introduction, Classification of plant diseases, Symptoms of plant diseases, Differentiation between bacterial, viral and fungal diseases using morphological symptoms. **Study of the following diseases** (symptoms, causal organism, disease cycle and disease control). Bacterial diseases –Citrus Canker Viral diseases -Leaf curl of papaya. Fungal diseases- White rust of crucifers, Red rot of sugarcane, Tikka disease of groundnut, Phytoplasma diseases: Little leaf of brinjal. Significant contributions of Prof. Karam Chand Mehta.						
Unit 2	**Structural botany** **Root:** Storage root; Propagative Roots; breathing roots; Stilt roots; Prop roots; buttress roots; climbing roots; assimilatory roots; aerophytic roots; parasitic roots; Symbiotic Roots. **Buds**: Types & modifications. **Branching:** Meaning and Types. **Stem:** Underground Modifications; Sub Aerial Modifications; Aerial Modifications. **Leaves:** Kinds of Leaves; Modifications of leaves. **Flower:** Types Bracts and Bracteoles; Adhesion & Cohesion in flower. **Fruits:** Definition, structure of fruit, Biological Significance of Fruit Formation, Functions of Fruits. **Seed:** Definition and Structure, Dispersal of Seeds and Fruits.						

Unit 3	**Floral Diagram:** Meaning and Indication, How to Draw Floral Diagram. **Floral Formula:** Meaning, signs and letters are used, how to write Floral formula. Study of the following families with special reference to their geographical distribution, characters, Bentham and Hooker's system of classification; economic and medicinal importance and common examples for members of the families. **Polypetalae:** Leguminosae (Subfamily: Caesalpinioideae, Faboideae, Mimosoideae) , Zygophyllaceae, **Gamopetalae:** Meliaceae, Cucurbitaceae, Oleaceae **Monoclamydae:** Amaranthaceae, Amaryllidaceae **Monocotyledonae**: Cannaceae.

Suggested readings.

- College Botany Vol 2: Gangulee and Kar
- Algae by B. R. Vashistha Fungi by B. R. Vashistha
- Plant Pathology by Singh R. S.
- Botany by A. C. Dutta
- Agrios, G.N. (1997) Plant Pathology, 4th edition, Academic Press, U.K.
- R.S.Mehrotra,Plant Pathology
- Gangulee and Kar, College Botany Vol 2
- John Wiley & Sons, Introductory Mycology, (Asia) Singapore. 4th edition.
- Sharma, P.D. (2011). Plant Pathology, Rastogi Publication, Meerut, India. Kumar, H.D. (1999).
- Singh R. S. Plant Pathology
- Kumar, H.D. (1999). Introductory Phycology. Affiliated East-West Press, Delhi.
- Campbell, N.A., Reece J.B., Urry L.A., Cain M.L., Wasserman S.A. Minorsky P.V.,
- Willey, Sherwood and Christopher. Laboratory exercises in Microbiology. McGraw-Hill, India. 9th edition.
- P. R. Vasista (2017) Botany for Degree student, Algae, S. Chand Publication, New Delhi.
- B. K. Mishra (2018) Microbiology and Phycology, Kalynai Publishers, New Delhi.
- Rangaswamy, G. and Mahadevan, A. 1999. Diseases of Crop Plants in India. Prentice Hall of India Pvt. Ltd., New Delhi.
- Singh R S. Plant diseases. 6th edition. Oxford and IBH, New Delhi
- Singh R.S. Principles of plant pathology. 3rd edition. Oxford and IBH, New Delhi

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(Effective from June 2025-26 UNDER NEP-2020)

SEMESTER 5

Course Title: Phytopathology Structural botany And Plant Taxonomy

Practical/ Lab course (Course code: MJ BOT-506-P)

Credit: 1

Course Outcome & Objectives

After the completion of the course the students will be able to:

DISCIPLINE SPECIFIC CORE COURSE(MAJOR)						
COURSE	**SEMESTER**	**COURSE CODE**	**COURSE TITLE**	**PRACTICAL**		
				Credits	**Lectures**	**Internal/External**
Degree Course	**B.Sc.**	**MJ BOT-506-P**	Phytopathology Structural botany And Plant Taxonomy	**1**	**30**	**25Marks (15+10)**
UNIT	***TOPIC***					
	Exercise 1: Study of White rust of crucifers. Exercise 2: Study of Red rot of sugarcane. Exercise: 3. Study of Tikka disease of ground nut. Exercise: 4 To study Root modifications. Exercise: 5 To study Types of buds. Exercise: 6 To study stem modifications. Exercise: 7 To study leaf modifications. Exercise:8 To study Types Bracts and Bracteoles. Exercise:9 To study General structure of fruit. Description of an angiospermic plant, To study of vegetative and floral characters (description, V.S. flower, section of ovary, floral diagram, floral formula) and systematic position of the following families according to Bentham and Hooker's system of classification: Exercise :10 Caesalpinioideae, Exercise :11 Faboideae, Ecercise:12 Mimosoideae, Exercise 13: Zygophyllaceae, Exercise 14: Meliaceae, Exercise 15: Cucurbitaceae, Exercise 16: Oleaceae, Exercise 17: Amaranthaceae, Exercise 18: Amaryllidaceae, Exercise 19: Cannaceae,					

- Fresh material /Preserve Specimen/ Chart/ Photograph....

KSKV Kachchh University, Bhuj - Kachchh

(Effective from June 2025-26 UNDER NEP-2020)

SEMESTER 5

B. Sc.: BOTANY INTERNAL PRACTICAL

Course Code: MJBOT-506-P

Course Title: Phytopathology Structural botany And Plant Taxonomy

Total Marks: 15

Instructions: Strictly follow the instructions given by examiner(s).	
Ex: 1. Specimen A. (Do as Directed)	04
Ex: 2. Specimen B (Do as Directed)	04
Ex: 3. Specimen C. (Do as Directed)	04
Ex: 4. Viva-voice, submission	03

KSKV Kachchh University, Bhuj - Kachchh

(Effective from June 2025-26 UNDER NEP-2020)

SEMESTER 5

B. Sc.: BOTANY UNIVERSITY PRACTICAL

Course Code: MAJBOT-506-P

Course Title: Phytopathology Structural botany And Plant Taxonomy

Total Marks: 10

Instructions: Strictly follow the instructions given by examiner(s).	
Ex: 1. Specimen A. (Do as Directed)	03
Ex: 2. Specimen B (Do as Directed)	02
Ex: 3. Specimen C. (Do as Directed)	03
Ex: 4. Journal	02

Note: Excursion/ Project work/ Visit/ Tour/ report and submission of specimens / Charts/ Model/ Fresh Material/ Herbarium (Given by teacher or as a part of Syllabus) will be mandatory for all the students.

KSKV Kachchh University, Bhuj - Kachchh

(Effective from June 2025-26 UNDER NEP-2020)

SEMESTER 5

(Course code: MN BOT- 507)

Course Title: Environmental Botany

Credit: 3

Course Objectives

1. In a plant ecology course within a botany curriculum, students should be able to understand plant interactions with their environment, including abiotic and biotic factors, and apply this knowledge to conservation and restoration efforts, as well as understanding plant diversity and distribution.
2. students should be able to understand the dynamics of plant communities, including the processes of colonization, competition, and succession, as well as the factors influencing these processes.
3. Students should be able to understand ecosystem concepts, types, development, and functions, including their communication with environmental factors and the role of biogeochemical cycles and environmental pollution
4. students should be able to understand plant diversity, ecological principles, and conservation strategies, ultimately contributing to sustainable resource management and biodiversity protection.
5. "Plant Adaptation" botany course, students should be able to understand how plants adapt to their environment, including identifying adaptations, relating them to ecological factors, and applying knowledge to real-world scenarios. understanding involves recognizing their morphological and anatomical adaptations.

DISCIPLINE SPECIFIC CORE COURSES (MINOR)							
COURSE	**SEMESTER**	**COURSE CODE**	**COURSE TITLE**	**THEORY**			
				Credits	**Lectures**	**External**	**Internal**
Degree Course	**B.Sc.**	**MNBOT-507**	Environmental Botany	**3**	**45**	**40 Marks**	**35 Marks**
UNIT	**TOPIC**						
Unit 1	**Plant Succession:** Definitions, Causes of succession, Succession and climax concept, Monoclimax and polyclimax theories, **Kinds of succession,** Hydrosere, Xerosere (a succession on bare rock surface), Some examples of secondary succession or subseres. **Ecosystem**: Definition, Classification, Components, Structure of an Ecosystem, Functions (Trophic Structure, Ecological Pyramids, Energy Flow in an Ecosystem), Types.						
Unit 2	**Environmental Pollution:** Water pollution, Air pollution, Agriculture pollution, Control of environmental pollution, Air Quality and Air Quality Index. **Global Warming** (Green House Effect) Introduction, causes, (manmade and Natural) Impact of Global Warming on Climate and Living Organisms, Acid Rain **Physical properties of Soils:** Soil texture; **Soil Erosion and Soil Conservation**: Introduction and factors affecting fertility of soil. Soil erosion-Definition and types of erosion. (In brief) **Soil conservation**-Aims of soil conservation, Practical methods of soil conservation (In brief)						
Unit 3	**Plant Adaptation**: Introduction and ecological classification of plants. **Hydrophytes:** Definition, classification of hydrophytes, Factors affecting the f plants in the aquatic environment, Hydrophytic adaptations-(a) Morphological, (b) Anatomical modifications, Comparison of sub-merged, floating and amphibious plants. **Xerophytes:** Definition of Xerophytes, Classification of Xerophytes-Drought escaping plants, Drought enduring plants and Drought resistant plants, Xerophytic adaptations -Morphological, Anatomical and Physiological adaptations. **Epiphytes:** Definition, Distribution, Important features -Morphological and Anatomical features, Types of Epiphytes. **Halophytes and Mangrove Vegetation**: Definition, Examples, Distribution, or Plant						

	Geography, Distribution, Theories of discontinuous distribution, Important characters Habit, External morphology and anatomical features, succession of mangrove vegetation in sea coast.

KSKV Kachchh University, Bhuj - Kachchh

(Effective from June 2025-26 UNDER NEP-2020)

SEMESTER 5

Course Title: Environmental Botany

Practical/ Lab course (Course code: MN BOT-508-P)

Credit: 1

Course Outcome & Objectives

After the completion of the course the students will be able to:

1. students with practical skills and knowledge to understand, analyze, and address environmental issues related to plants, ecosystems, and conservation, fostering a scientific approach to environmental challenges.
2. Practical activities help students understand the interactions between plants, other organisms, and the environment, including nutrient cycling, energy flow, and ecological processes.

DISCIPLINE SPECIFIC CORE COURSE(MINOR)						
COURSE	**SEMESTER**	**COURSE CODE**	**COURSE TITLE**	**PRACTICAL**		
				Credits	**Lectures**	**Internal/External**
Degree Course	**B.Sc.**	**MN BOT-508-P**	Environmental Botany	**1**	**30**	**25Marks (15+10)**
UNIT	***TOPIC***					
	Exercise :1 To estimate dust holding capacity of different plant species. Exercise:2 To classify hydrophytes. Exercise: 3 To study the hydrophytic characters in T.S. petiole of *Nymphaea*. Exercise: 4 To classify Xerophytes. Exercise:5 To study the morphological characters of xerophytes. Exercise:6 To study the xerophytic characters seen in T.S. stem of *Casuarina*. Exercise:7: To study the Morphological and Anatomical features of Epiphytes. Exercise:8: To study the Epiphytes characters in T.S. of Orchid root. Exercise:9 To study the Morphological and Anatomical features of mangrove. Exercise:10: To study the Halophytes characters in T.S. of Avicennia leaf.					

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(Effective from June 2025-26 UNDER NEP-2020)
SEMESTER 5
B. Sc.: BOTANY INTERNAL PRACTICAL
Course Code: MN BOT-508-P
Course Title: Environmental Botany
Total Marks: 15

Instructions: Strictly follow the instructions given by examiner(s).	
Ex: 1. Specimen A. (Do as Directed)	04
Ex: 2. Specimen B (Do as Directed)	04
Ex: 3. Specimen C. (Do as Directed)	04
Ex: 4. Viva-voice, submission	03

KSKV Kachchh University, Bhuj - Kachchh
(Effective from June 2025-26 UNDER NEP-2020)
SEMESTER 5
B. Sc.: BOTANY UNIVERSITY PRACTICAL
Course Code: MN BOT-508-P
Course Title: Environmental Botany
Total Marks: 10

Instructions: Strictly follow the instructions given by examiner(s).	
Ex: 1. Specimen A. (Do as Directed)	03
Ex: 2. Specimen B (Do as Directed)	02
Ex: 3. Specimen C. (Do as Directed)	03
Ex: 4. Journal	02

Note: Excursion/ Project work/ Visit/ Tour/ report and submission of specimens / Charts/ Model/ Fresh Material/ Herbarium (Given by teacher or as a part of Syllabus) will be mandatory for all the students.

KSKV Kachchh University, Bhuj - Kachchh

(Effective from June 2025-26 UNDER NEP-2020)

SEMESTER 5

(Course code: MN BOT- 509)

Course Title: Genetics, Biotechnology & Molecular biology

Credit: 3

Course Objectives

1. In a Botany course focusing on Genetics, Biotechnology, and Molecular Biology, students should gain a comprehensive understanding of plant genetics, molecular mechanisms, biotechnological techniques, and their applications in areas like plant improvement and environmental sustainability
2. Understand fundamental principles of inheritance, genetic variation, and gene expression in plants.
3. Learn about different types of mutations and their effects on plant traits.
4. students will be able to understand and apply techniques to identify genotypes, analyze genetic variability, and understand applications in plant breeding, taxonomy, and forensics, among other areas.
5. students should be able to understand plant breeding principles, identify desirable traits, and apply various breeding techniques to improve crop varieties, ultimately enhancing yield, quality, and resilience.

DISCIPLINE SPECIFIC CORE COURSES (MINOR)							
COURSE	**SEMESTER**	**COURSE CODE**	**COURSE TITLE**	**THEORY**			
				Credits	**Lectures**	**External**	**Internal**
Degree Course	**B.Sc.**	**MN BOT-509**	Genetics, Biotechnology & Molecular biology	**3**	**45**	**40 Marks**	**35 Marks**
UNIT	**TOPIC**						
Unit 1	**Pre-Mendelian and Post-Mendelian Concepts of Heredity** **Gene Interactions:** Introduction to Gene Interaction, Allelic Gene Interactions (Incomplete Dominance, Co-dominance, over dominance), Non-Allelic Gene Interactions (Simple Interaction, Complementary Factor (9:7), epistasis) **Cytoplasmic Inheritance** (Characteristics, Plastid Inheritance in Mirabilis, Mitochondrial Inheritance -Male sterility, Significance.)						
Unit 2	**Linkage of Genes:** Meaning, Features, Phases, Types, Linkage Groups, Detection, Linkage and Pleiotropy, Linkage Significance in Plant Breeding. **Crossing-Over:** Meaning, Mechanism and Significance. **Genetic Code:** Meaning, Types and Properties. **Biotechnology:** Introduction, Scope, types and Applications (in Crop Improvement, Applications in Medicines and Industrial Applications).						
Unit 3	**Gene Expression:** Transcription & Translation: **Genetic Variation & Cytogenetics** o Chromosomal mutation: Types o Gene Mutation: Types, Spontaneous and Induced o Regulation of Gene Expression: Prokaryotes: - Lac & Tryptophan operon **DNA Fingerprinting**- Principle, Methods, Applications **DNA damage & repair**						

KSKV Kachchh University, Bhuj - Kachchh

(Effective from June 2025-26 UNDER NEP-2020)

SEMESTER 5

Course Title: Genetics, Biotechnology & Molecular biology

Practical/ Lab course (Course code: MN BOT-510-P)

Credit: 1

Course Outcome & Objectives

After the completion of the course the students will be able to:

1. objectives of a genetics practical course are to provide hands-on experience with experimental techniques, reinforce theoretical knowledge, and develop skills in data analysis and interpretation, ultimately preparing students for careers in genetics and related fields.
2. Understand its application in various field like crop improvement, gene therapy.
3. Understand the concept about Genes and Inheritance.

DISCIPLINE SPECIFIC CORE COURSE(MINOR)						
COURSE	**SEMESTER**	**COURSE CODE**	**COURSE TITLE**	**PRACTICAL**		
				Credits	**Lectures**	**Internal/External**
Degree Course	**B.Sc.**	**MN BOT-510-P**	Genetics, Biotechnology & Molecular biology	**1**	**30**	**25Marks (15+10)**
UNIT	***TOPIC***					
	Exercise :1 Study through Chart/ Photograph: Plastid Inheritance in *Mirabilis jalpa.* Exercise :2 Study through Chart/ Photograph: Cytoplasmic male sterility. Exercise :3 Study through Chart/ Photograph: Chromosomal Mutation. Exercise :4 Study through Chart/ Photograph: Gene Mutation. Exercise :5 Study lac operon through chart/photograph. Exercise:6 Study Tryptophan operon through Chart/ Photograph. Exercise:7 Study recombinant DNA technology through chart/ photograph. Exercise:8 Study Development of Transgenic Plant: Bt Cotton through Chart/ Photograph.					

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SEMESTER 5
B. Sc.: BOTANY INTERNAL PRACTICAL
Course Code: MN BOT-510-P
Course Title: Genetics, Biotechnology & Molecular biology
Total Marks: 15

Instructions: Strictly follow the instructions given by examiner(s).	
Ex: 1. Specimen A. (Do as Directed)	04
Ex: 2. Specimen B (Do as Directed)	04
Ex: 3. Specimen C. (Do as Directed)	04
Ex: 4. Viva-voice, submission	03

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(Effective from June 2025-26 UNDER NEP-2020)
SEMESTER 5
B. Sc.: BOTANY UNIVERSITY PRACTICAL
Course Code: MN BOT-510-P
Course Title: Genetics, Biotechnology & Molecular biology
Total Marks: 10

Instructions: Strictly follow the instructions given by examiner(s).	
Ex: 1. Specimen A. (Do as Directed)	03
Ex: 2. Specimen B (Do as Directed)	02
Ex: 3. Specimen C. (Do as Directed)	03
Ex: 4. Journal	02

Note: Excursion/ Project work/ Visit/ Tour/ report and submission of specimens / Charts/ Model/ Fresh Material/ Herbarium (Given by teacher or as a part of Syllabus) will be mandatory for all the students.

KSKV Kachchh University, Bhuj – Kachchh

(Effective from June 2025-26 UNDER NEP-2020)

SEMESTER V

Course Title: Organic farming &Botanical Origami/Introductory Floral Design

(Course code: SEC BOT 501-P)

Credit: 2

Course Outcome &Objectives:

1. Plant crafts offer a unique blend of creativity and learning. Here, we explore their key aspects, from educational value to environmental awareness, which make them a hit with young learners.
2. **Educational Value**: They teach children about different types of plants, their parts, growth processes, and the ecological significance of plants in our world.
3. **Sensory Experience:** Working with plant materials like leaves, seeds, flowers, and stems provides a tactile experience, helping children engage with textures, scents, and colours.
4. The student will understand the basic principles and elements of floral design.
5. The student will have a working knowledge of the materials and accessories used in basic floral design.
6. The student will be proficient in the techniques of producing basic floral designs.
7. **Practical Skills:** These crafts often involve skills like cutting, glueing, painting, and arranging, aiding in the development of fine motor skills.
8. Understanding organic principles, developing practical skills in organic production, and learning about related topics like soil health, pest management, and crop rotation.

DISCIPLINE-SPECIFIC CORE COURSE(MAJOR)						
COURSE	**SEMESTER**	**COURSE CODE**	**COURSE TITLE**	**PRACTICAL**		
				Credits	**Lectures**	**Internal/External**
Certificate Course	**B.SC. V**	**SEC BOT 501 P**	Organic farming &Botanical Origami/Introductory Floral Design	**2**	**30**	**Marks 50 (25+25)**
UNIT	**TOPIC**					
Unit 1	**Organic farming** – Green manuring and organic fertilizers, Recycling of biodegradable municipal, agricultural and Industrial wastes – bio compost (Definition of Compost; Process of Composting; Factors affecting aerobic composting; Roles) Types and method of vermicomposting – field Application.					
Unit 2	**Introductory Floral Design**: An introduction to the principles of design applied to floral arrangements, including color, forms and lines, balance, types of floral arrangements, floral materials and accessories, and production techniques. **Dehydration Techniques for Flowers:** Introduction, Methodology, uses of dried flower.					

Suggested readings.

- Teacher's Guide to Flower Arrangement. Fox.
- Extension Publications from Michigan, Ohio and Pennsylvania.
- Educational Material. John Henry Company (cut flower ID cards).
- Wire Service Visual Aids.
- Basic Floral Design. TELEFLORA .
- Florist Review Resources & Source Book Floral Design Overlay Series.
- University of Illinois VAS #28.
- Floriculture Bionda & Noland. Pearson Floral Design & Interior
- Landscape Management, Noland. Pearson
- The Cut Flower Companion. Mckinley

DETAILED SYLLABUS OF B.Sc. III YEAR FOR DEGREE COURSE IN BASIC BOTANY

KSKV Kachchh University, Bhuj - Kachchh

(Effective from June 2025-26 UNDER NEP-2020)

SEMESTER 6

(Course code: MJ BOT- 601)

Course Title: Conservation, Forest and forestry

Credit: 3

Course Objectives

1. After completing a course in Conservation, Forest, and Forestry, students should be able to understand forest ecosystems, biodiversity, sustainable management, wildlife ecology, and conservation principles, along with skills in monitoring, and habitat restoration.
2. Understand how forests and watersheds respond to natural disturbances or management activities.
3. Understand the importance of biodiversity and the threats to forest ecosystems, as well as conservation strategies
4. Understand the social and political context of forestry and relevant policies, laws, and regulations.
5. Understand principles and practices for managing forests in a sustainable way, balancing resource use with ecological integrity.
6. Students should be able to design and conduct scientific research projects in wildlife ecology and conservation.

DISCIPLINE SPECIFIC CORE COURSES (MAJOR)							
COURSE	**SEMESTER**	**COURSE CODE**	**COURSE TITLE**	**THEORY**			
				Credits	**Lectures**	**External**	**Internal**
Degree Course	**B.Sc.**	**MJ BOT-601**	Conservation, Forest and forestry	**3**	**45**	**40 Marks**	**35 Marks**
UNIT	**TOPIC**						
Unit 1	**Conservation of Natural Resources** Types of natural resources; Objectives, Methods, and Importance, Chipko Movement. **Forests and Forest Management**: Forest (Definition, classification, ecological significance), Deforestation, its causes, Forest Management (Aspects, Conservation, commercial forestry, Social Forestry, Forest management programme activities), Agroforestry. **Forest products** – Major and minor with reference to Gujarat Major Forest products: **Timber**: Azadirachta indica, Bamboo **Fire wood:** Acacia nilotica, Prosopis cineraria **lac**: Selichera oleosa, Prosopis juliflora Minor forest products: **Seed Oil**: Madhuca indica, Pongamia pinnata **Dye:** Butea monosperma, Wrightia tinctoria **Gum**: Sterculia urens, Commiphora wightii						
Unit 2	**Phytoresource Conservation.** Principles of conservation; (Objectives; introduction; plant biodiversity; species diversity; genetic diversity; extincitons; environmental status of plants based on International Union for Conservation of Nature; IUCN Categories of Threatened Species; Red data book; **Strategies for conservation** –Objective; in *situ* conservation: International efforts and Indian initiatives; Steps Taken by Government for Biodiversity Protection; **protected areas in India** – wildlife sanctuaries, national parks, biosphere reserves, Sacred groves; wetlands; Ramsar Convention; mangroves and coral reefs for conservation of wild biodiversity.						
Unit 3	***Ex situ* conservation:** Objectives; Principles and practices;conventional methods of ex-situ conservation (gene banks; field gene banks; Seed Banks; botanical gardens) *Biotechnology Method of Ex-Situ Conservation (*in *vitro* Conservation; cryobanks; other method) **Institutions/ Agencies Working for Protection\ Conservation:** General account of the						

	activities of Botanical Survey of India (BSI); Department of Biotechnology (DBT); International Collaboration. **Autonomous Institutions:** Indian Agricultural Research Institute (IARI); The National Bureau of Plant Genetic Resources (NBPGR), Council of Scientific & Industrial Research (CSIR).

Suggested readings.

- Text book of plant ecology S. Chand publication
- Textbook of Introduction to Forestry (As per 5th Dean's Committee Syllabi, ICAR)
- "Silviculture" by H.S. Gupta - This book covers various silvicultural practices and principles.
- "Forest Management" by K. S. G. S. R. Rao - It offers insights into sustainable forest management practices.
- "Forestry in India" by D. N. Tiwari - A good reference for understanding the context of forestry in India.
- "Forest Ecology" by Paul M. F. and others.
- Indian Forestry: K. Manikandan and S. Prabhu (Primary Book)
- Forestry notes by *Rishab Gupta Sir*
- Hand book of forestry..... L.S Khanna
- Principles and practice of Silviculture..... LS Khanna
- Silvilcultural systems..... LS Khanna
- Text book of agroforestry..... Chundawat
- Forest Management.....Ram Prakash
- Forest Mensuration.....A N Chaturvedi
- Forest Utilisation..... Mehta, FRI Publication
- ."An Introduction to Agroforestry" by P K Ramachandran Nair
- "Forest Botany and Ethnobotany" by Patel Suresh and Desai Prashantkumar

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(Effective from June 2025-26 UNDER NEP-2020)

SEMESTER 6

Course Title: Conservation, Forest and forestry

Practical/ Lab course (Course code: MJ BOT-602-P)

Credit: 1

Course Outcome & Objectives

After the completion of the course the students will be able to:

1. In practical forestry courses, students gain hands-on skills in identifying forest resources, conducting soil analysis, understanding forest ecosystems, and applying forestry techniques for sustainable management and conservation.
2. Students will learn to differentiate between different tree species, forest types, and forest products (timber, non-timber forest products, etc.).
3. Students will learn how to measure and inventory forest vegetation, including tree diameters, heights, and species composition.
4. Students should understand the benefits and challenges of tourism in protected areas and how it can be managed sustainably.

DISCIPLINE SPECIFIC CORE COURSE(MAJOR)						
COURSE	**SEMESTER**	**COURSE CODE**	**COURSE TITLE**	**PRACTICAL**		
				Credits	**Lectures**	**Internal/External**
Degree Course	**B.Sc.**	**MJ BOT-602-P**	Conservation, Forest and forestry	**1**	**30**	**25Marks (15+10)**
UNIT	***TOPIC***					
	Exercise 1: Study of biodiversity composition of different types of forest in India. Exercise2: Measurement of tree height using non instrumental methods. **Identification of forest products and their sources** Exercise 3: **Timber**: Azadirachta indica, Bamboo Exercise 4: **Fire wood:** Acacia nilotica, Prosopis cineraria Exercise 5: **lac**: Selichera oleosa, Prosopis juliflora Exercise 6**: Seed Oil**: Madhuca indica, Pongamia pinnata Exercise 7**: Dye:** Butea monosperma, Wrightia tinctoria Exercise 8: **Gum**: Sterculia urens, Commiphora wightii Exercise 9: Mapping of National Parks and Sanctuary on India map. Exercise 10: Submission of field report.					

1. Visit to National Parks and/ or Sanctuary and/or Nursery to study its management. Report to be submitted during practical exam.
2. Visit to Seed Banks and /or botanical gardens Report to be submitted during practical exam.

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SEMESTER 6
B. Sc.: BOTANY INTERNAL PRACTICAL
Course Code: MJ BOT-602-P
Course Title: Conservation, Forest and forestry
Total Marks: 15

Instructions: Strictly follow the instructions given by examiner(s).	
Ex: 1. Specimen A. (Do as Directed)	04
Ex: 2. Specimen B (Do as Directed)	04
Ex: 3. Specimen C. (Do as Directed)	04
Ex: 4. Viva-voice, submission	03

KSKV Kachchh University, Bhuj - Kachchh
(Effective from June 2025-26 UNDER NEP-2020)
SEMESTER 6
B. Sc.: BOTANY UNIVERSITY PRACTICAL
Course Code: MJ BOT-602-P
Course Title: Conservation, Forest and forestry
Total Marks: 10

Instructions: Strictly follow the instructions given by examiner(s).	
Ex: 1. Specimen A. (Do as Directed)	03
Ex: 2. Specimen B (Do as Directed)	02
Ex: 3. Specimen C. (Do as Directed)	03
Ex: 4. Journal	02

Note: Excursion/ Project work/ Visit/ Tour/ report and submission of specimens / Charts/ Model/ Fresh Material/ Herbarium (Given by teacher or as a part of Syllabus) will be mandatory for all the students.

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(Effective from June 2025-26 UNDER NEP-2020)

SEMESTER 6

(Course code: MJ BOT- 603)

Course Title: Analytical Techniques & Research Methodology.

Credit: 3

Course Objectives

- A course on Analytical Techniques in Botany, students will be able to understand and apply various analytical methods, including microscopy, chromatography, pH meter; Colori meter; Spectrophotometer; Water bath; Hot plate; Centrifuge; Hot air Oven; Magnetic Stirrer; Micro pipette.
- Students will learn about light microscopy, fluorescence microscopy, confocal microscopy, transmission electron microscopy (TEM), and scanning electron microscopy (SEM).
- Understand and apply statistical concepts to analyze and interpret data.
- Explain the processes that determine population growth, namely fertility, mortality and migration
- Students should be able to apply ecological principles to address conservation challenges and management issues.
- Students should be able to critically assess different conservation approaches and policies.

DISCIPLINE SPECIFIC CORE COURSES (MAJOR)							
COURSE	**SEMESTER**	**COURSE CODE**	**COURSE TITLE**	**THEORY**			
				Credits	**Lectures**	**External**	**Internal**
Degree Course	**B.Sc.**	**MJ BOT-603**	**Analytical Techniques & Research Methodology**	**3**	**45**	**40 Marks**	**35 Marks**
UNIT	**TOPIC**						
Unit 1	**Tools & Techniques:** Principle, Structure and Uses of (pH meter; Colori meter; Spectrophotometer; Water bath; Hot plate; Centrifuge; Hot air Oven; Magnetic Stirrer; Micro pipette) **Imaging Related Techniques:** Component, principle, and uses of (Phase Contrast Microscopy; Fluorescence Microscopy; Confocal Microscopy; Electron Microscopy: SEM, TEM) **Chromatography:** Principle of Chromatography (how does chromatography work); Types of Chromatography; Commonly employed chromatography techniques include; Applications of Chromatography.						
Unit 2	**Biostatistics** Definition, Scope, and Applications of Biostatistics in Botany **Types of Data**: Qualitative and Quantitative **Levels of Measurement:** Nominal, Ordinal, Interval, and Ratio **Population and Sample**: Concept, Sampling Methods, Sources and methods of collecting primary and secondary data Classification & Tabulation of Data Diagrammatic & Graphic presentation of Data: Histogram, Bar Graph, Pie Chart, Line Graph Mean, Median, Mode. Range, Variance, Standard Deviation, Coefficient of Variation Skewness and Kurtosis. **Correlation:** Definition, types, and methods of studying correlation						
Unit 3	**CAMPUS/URBAN ECOLOGY** 1. **Understanding the campus**: origin and history; departments, building designs, architecture,						

	various facilities, organizational set up, origin and history, beneficiaries. 2. **Biodiversity**: Flora and fauna, seasonal variations, exotic plants and weeds, horticultural species, arboretum, significance of campus species from ecological and conservation perspective. 3. **Ecoclimate:** Serenity of the campus; ecological factors – rainfall, temperature, impact of plants; campus as an ecosystem; rain water harvesting, water crisis and conservation. 4. **Waste regulation:** Waste disposal; litter vs solid waste, basics of solid waste management, Orbin bins; Aerobiology- aerosols (physical, chemical, optical properties), particulate matter, Black Carbon, atmospheric cleanliness. 5. **Eco-watching:** Tree cover – qualitative and quantitative analysis: belt transect (density, abundance and frequency); basics of bird watching, unique trees and animals.

Suggested readings.

- College Botany, by A.C. Datta
- College Botany, by B.P. Pandey
- A Text Book of Systematic Botany, by R.N. Sutariya
- Practical Botany, Vol I & II, Bendre & Kumar
- V. Kumaresan; Plant Ecology and Phytogeography, Saras Publication. S.A.Shah; Forestry for People; Indian Council of Agriculture Research;
- Ecology on Campus by Robert Kingsolver (Author)
- Environmental Biology Matthew R. Fisher
- Campus Ecology: A Guide to Assessing Environmental Quality and Creating Strategies for Change by April A. Smith (Author), Thorina Rose (Illustrator)
- Biostatistics (ebook) by P.N. Arora
- BIOSTISTICS 1/ED. (Paperback) by K.S. Negi
- Biostatistics: A Foundation for Analysis in the Health Sciences—Student Solutions Manual (Paperback) by Chad L. Cross
- Biostatistics by Rastogi V. B
- Biostatistics by P Ramakrishnan
- Intuitive Biostatistics by Harvey Motulsky
- Introductory Statistics with R (Statistics and Computing) by Peter Dalgaard
- Methods in Biostatistics by BK Mahajan
- Text book of Biostatistics by A.K.Vashisth

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(Effective from June 2025-26 UNDER NEP-2020)

SEMESTER 6

Course Title: Analytical Techniques & Research Methodology

Practical/ Lab course (Course code: MJ BOT-604-P**)**

Credit: 1

Course Outcome & Objectives

After the completion of the course the students will be able to:

- Students should understand how biostatistics is used in botanical studies.
- Students should be able to analyze different types of data (continuous and categorical) using appropriate statistical software.
- Students should be able to describe and summarize data using measures like mean, median, standard deviation.
- Students should be able to acquire proficiency in forest /urban plant survey methods.
- Know the types of samples and sampling techniques.

DISCIPLINE SPECIFIC CORE COURSE(MAJOR)						
COURSE	**SEMESTER**	**COURSE CODE**	**COURSE TITLE**	**PRACTICAL**		
				Credits	**Lectures**	**Internal/External**
Degree Course	**B.Sc.**	**MJ BOT-604-P**	**Analytical Techniques & Research Methodology**	**1**	**30**	**25Marks (15+10)**
UNIT	***TOPIC***					
	Exercise 1: Calculation of central tendencies mean, median and mode. (From given data) Exercise 2: Calculation of Inter Quartile Range. (From given data) Exercise 3: Calculation of Standard Deviation. (From given data) Exercise 3: study of type of co-relation. (From given data) Exercise 4: To Determination of soil/ water pH from given sample. Exercise 5: To measure the soil temperature. Exercise 6: Separation of chloroplast pigments by solvent method. Exercise 7: Separation of plant pigments by chromatographic technique (paper and thin-layer chromatography).					

- Understand campus ecology and submit report during practical exam.

KSKV Kachchh University, Bhuj - Kachchh
(Effective from June 2025-26 UNDER NEP-2020)
SEMESTER 6
B. Sc.: BOTANY INTERNAL PRACTICAL
Course Code: MJ BOT-604-P
Course Title: Analytical Techniques & Research Methodology
Total Marks: 15

Instructions: Strictly follow the instructions given by examiner(s).	
Ex: 1. Specimen A. (Do as Directed)	04
Ex: 2. Specimen B (Do as Directed)	04
Ex: 3. Specimen C. (Do as Directed)	04
Ex: 4. Viva-voice, submission	03

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SEMESTER 6
B. Sc.: BOTANY UNIVERSITY PRACTICAL
Course Code: MAJBOT-604-P
Course Title: Analytical Techniques & Research Methodology.
Total Marks: 10

Instructions: Strictly follow the instructions given by examiner(s).	
Ex: 1. Specimen A. (Do as Directed)	03
Ex: 2. Specimen B (Do as Directed)	02
Ex: 3. Specimen C. (Do as Directed)	03
Ex: 4. Journal	02

Note: Excursion/ Project work/ Visit/ Tour/ report and submission of specimens / Charts/ Model/ Fresh Material/ Herbarium (Given by teacher or as a part of Syllabus) will be mandatory for all the students.

KSKV Kachchh University, Bhuj - Kachchh

(Effective from June 2025-26 UNDER NEP-2020)

SEMESTER 6

(Course code: MJ BOT- 605)

Course Title: Paleobotany, Phanerogams, Phytoremediation & phytochemistry

Credit: 3

Course Objectives

1. A paleobotany course, students should be able to understand plant evolution, fossil record interpretation, and the role of paleobotany in understanding past environments and ecosystems, including reconstructing past climates and understanding plant adaptations.
2. A phytochemistry course, students should be able to identify, isolate, and characterize active constituents from plants, understand the principles of herbal medicine, and apply knowledge of phytochemistry in quality control and analysis of phytomedicines.
3. Students will understand the basics of primary and secondary metabolites in plants, their biosynthesis, and their therapeutic efficacy.
4. Students will be able to discuss the pharmacological effects of plant-derived compounds.
5. This course introduces concept of bioaccumulation of metals and remediation of metal pollution

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DISCIPLINE SPECIFIC CORE COURSES (MAJOR)							
COURSE	**SEMESTER**	**COURSE CODE**	**COURSE TITLE**	**THEORY**			
				Credits	**Lectures**	**External**	**Internal**
Degree Course	**B.Sc.**	**MJ BOT-605**	Paleobotany, Phanerogams, Phytoremediation & phytochemistry	**3**	**45**	**40 Marks**	**35 Marks**

UNIT	**TOPIC**
Unit 1	**Geological Time Scale** **Fossil:** Definition, Types and Formation, Techniques for studying fossil, Significance of Paleobotany, **Study fossil plant:** Habit and structure of Lepidodendron; Lygenopteris; Bennettitales (Spore bearing organ); Cordaites. **Habitat, Habit and life histories of following (Development of organs are excluded)** **Pteridophytes**: *Isoetes; Marselia.* **Gymnosperm**: *Cycas, Ginkgo.*
Unit 2	**Phytoremediation** Phytoremediation: Definition of Phytoremediation; Transgenic Plants for Phytoremediation; Transgenic Approach. Use of Plants in Bioremediation Classification, Mechanisms (1. Phytoextraction 2. Phytostabilization 3. Rhizofiltration 4. Phytovolatization 5. Phytodegradation.), Applications and limitations Heavy-Metal Stress in Plants (1. Subject-Matter of Heavy Metal Stress 2. Metal Toxicity in Plants 3. Tolerance of Metal Phytotoxicity.)
Unit 3	**Phytochemistry:** Primary & secondary Metabolites, Factors controlling of metabolites in plants citing sitable examples, Ergastic substances:(Reserve food; Inorganic Materials (Mineral matter); Secretory products; Excretory products.) Introduction to Alkaloids, Terpenoids and Phenolics. **Nitrogen metabolism** Biological nitrogen fixation; Nitrate and ammonia assimilation.

Suggested readings.

- Text book of Phytochemistry by J.K. SHSH
- Practical Botany, Vol I & II, Bendre & Kumar
- "Textbook of Systematic Botany" by R.P. Gupta
- A Text Book of Botany Vol I & II, by Ganguli, Das & Dutta
- A Text Book of Botany, by Ganguli & Kar
- Gangulee, S. C., Das, K.S, Dutta, C.D. and Kar, A.K. (1968) College Botany Vol. I and Vol. II
- "Systematic Botany" by Subhash Chandra Datta
- College Botany, by B.P. Pandey
- "The Cambridge Illustrated Glossary of Botanical Terms" by Michael Hickey and Clive King:
- Taiz, L., Zeiger, E., (2010). Plant Physiology. Sinauer Associates Inc., U.S.A. 5th Edition.
- Hopkins, W.G., Huner, N.P., (2009). Introduction to Plant Physiology. John Wiley & Sons, U.S.A. 4th Edition.
- Bajracharya, D., (1999). Experiments in Plant Physiology- A Laboratory Manual. Narosa Publishing House, New Delhi.
- "Mabberley's Plant-Book : A Portable Dictionary of Plants, Their Classification and Uses" by David J. Mabberley:
- "The Concise Oxford Dictionary of Botany"
- "Paleobotany: The Biology and Evolution of Fossil Plants" by Taylor, Taylor, and Krings,
- "Text Book of Palaeobotany" by Mishra S R,
- Birbal Sahni: A Pioneer in the Field of Palaeobotany by Anil Kumar
- Paleobotany and the Evolution of Plants by Stewart and Wilson
- Fundamentals of Palaeobotany by Sergei Meyen

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SEMESTER 6

Course Title: Paleobotany, Phanerogams, Phytoremediation & phytochemistry

Practical/ Lab course (Course code: MJ BOT-606-P)

Credit: 1

Course Outcome & Objectives

After the completion of the course the students will be able to:

1. students will gain the ability to identify and classify plants, understand plant diversity, and appreciate their economic and ecological importance, including skills in herbarium preparation and field identification
2. Students will learn to identify plants based on their morphological characteristics, including vegetative and reproductive structures.
3. Students will gain knowledge about the diversity of plant life, including different plant groups (e.g., angiosperms, gymnosperms, pteridophytes) and their evolutionary relationships.
4. Students will develop practical skills in identifying plants in their natural habitats, including understanding ecological factors that influence plant distribution.

DISCIPLINE SPECIFIC CORE COURSE(MAJOR)						
COURSE	**SEMESTER**	**COURSE CODE**	**COURSE TITLE**	**PRACTICAL**		
				Credits	**Lectures**	**Internal/External**
Degree Course	**B.Sc.**	**MJ BOT-606-P**	Paleobotany, Phanerogams, Phytoremediation & phytochemistry	**1**	**30**	**25Marks (15+10)**
UNIT	***TOPIC***					
	Exercise :1 Study the external features and strobilus of the Liriodendron (Specimen/ Chart/ Photograph) Exercise:2 Study of external morphology of the stem Lyginopteris (Specimen / Chart/ Photograph) Exercise:3 To Characteristic features of Bennetitales (Specimen/ Chart/ Photograph) Exercise:4 Distinguishing Features of Cordaitales: (Specimen/ Chart/ Photograph) Exercise :5 Identification and Classification of *Cycas* & external features of Cycas Exercise :6 Identification and Classification of *Ginkgo* & external features of Ginkgo Exercise :7 Study the External feature and structure of thallus *Isoetes,* Identification and Classification of *Isoetes,* Exercise :8 Study the External feature and structure of thallus *Marselia,* Identification and Classification of *Marselia.* Ecercise: 9 Study of starch grains, aleurone grains, Exercise:10 Study of inulin crystals, raphides, cystolith.					

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SEMESTER 6
B. Sc.: BOTANY INTERNAL PRACTICAL
Course Code: MJBOT-606-P
Course Title: Paleobotany, Phanerogams, Phytoremediation & phytochemistry
Total Marks: 15

Instructions: Strictly follow the instructions given by examiner(s).	
Ex: 1. Specimen A. (Do as Directed)	04
Ex: 2. Specimen B (Do as Directed)	04
Ex: 3. Specimen C. (Do as Directed)	04
Ex: 4. Viva-voice, submission	03

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SEMESTER 6
B. Sc.: BOTANY UNIVERSITY PRACTICAL
Course Code: MJBOT-606-P
Course Title: Paleobotany, Phanerogams, Phytoremediation & phytochemistry
Total Marks: 10

Instructions: Strictly follow the instructions given by examiner(s).	
Ex: 1. Specimen A. (Do as Directed)	03
Ex: 2. Specimen B (Do as Directed)	02
Ex: 3. Specimen C. (Do as Directed)	03
Ex: 4. Journal	02

Note: Excursion/ Project work/ Visit/ Tour/ report and submission of specimens / Charts/ Model/ Fresh Material/ Herbarium (Given by teacher or as a part of Syllabus) will be mandatory for all the students.

KSKV Kachchh University, Bhuj - Kachchh
(Effective from June 2025-26 UNDER NEP-2020)
SEMESTER 6
(Course code: MN BOT- 607)
Course Title: Forest forestry and Conservation
Credit: 3

Course Objectives

1. After completing a course in Conservation, Forest, and Forestry, students should be able to understand forest ecosystems, biodiversity, sustainable management, wildlife ecology, and conservation principles, along with skills in monitoring, and habitat restoration.
2. Understand how forests and watersheds respond to natural disturbances or management activities.
3. Understand the importance of biodiversity and the threats to forest ecosystems, as well as conservation strategies
4. Understand the social and political context of forestry and relevant policies, laws, and regulations.
5. Understand principles and practices for managing forests in a sustainable way, balancing resource use with ecological integrity.
6. Students should be able to design and conduct scientific research projects in wildlife ecology and conservation.

DISCIPLINE SPECIFIC CORE COURSES (MINOR)

COURSE	SEMESTER	COURSE CODE	COURSE TITLE	THEORY			
				Credits	Lectures	External	Internal
Degree Course	B.Sc.	MN BOT-607	Forest forestry and Conservation	3	45	40 Marks	35 Marks

UNIT	TOPIC
Unit 1	**Conservation of Natural Resources** Types of natural resources; Objectives, Methods, and Importance, Chipko Movement. **Forests and Forest Management:** Forest (Definition, classification, ecological significance), Deforestation, its causes, Forest Management (Aspects, Conservation, commercial forestry, Social Forestry, Forest management programme activities), Agroforestry. **Forest products** – Major and minor with reference to Gujarat Major Forest products: **Timber**: Azadirachta indica, Bamboo **Fire wood:** Acacia nilotica, Prosopis cineraria **lac**: Selichera oleosa, Prosopis juliflora Minor forest products: **Seed Oil**: Madhuca indica, Pongamia pinnata **Dye:** Butea monosperma, Wrightia tinctoria **Gum**: Sterculia urens, Commiphora wightii
Unit 2	**Phytoresource Conservation.** Principles of conservation; (Objectives; introduction; plant biodiversity; species diversity; genetic diversity; extincitons; environmental status of plants based on International Union for Conservation of Nature; IUCN Categories of Threatened Species; Red data book; **Strategies for conservation** –Objective; in *situ* conservation: International efforts and Indian initiatives; Steps Taken by Government for Biodiversity Protection; **protected areas in India** – wildlife sanctuaries, national parks, biosphere reserves, Sacred groves; wetlands; Ramsar Convention; mangroves and coral reefs for conservation of wild biodiversity.
Unit 3	***Ex situ* conservation:** Objectives; Principles and practices; conventional methods of ex-situ conservation (gene banks; field gene banks; Seed Banks; botanical gardens,) *Biotechnology Method of Ex-Situ Conservation (*in *vitro* Conservation; cryobanks; other method **Institutions/ Agencies Working for Protection\ Conservation:** General account of the activities of Botanical Survey of India (BSI); Department of Biotechnology (DBT). International

	Collaboration. **Autonomous Institutions:** Indian Agricultural Research Institute (IARI); The National Bureau of Plant Genetic Resources (NBPGR), Council of Scientific & Industrial Research (CSIR).

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(Effective from June 2025-26 UNDER NEP-2020)

SEMESTER 6

Course Title: Forest forestry and Conservation

Practical/ Lab course (Course code: MN BOT-608-P)

Credit: 1

Course Outcome & Objectives

After the completion of the course the students will be able to:

1. In practical forestry courses, students gain hands-on skills in identifying forest resources, conducting soil analysis, understanding forest ecosystems, and applying forestry techniques for sustainable management and conservation.
2. Students will learn to differentiate between different tree species, forest types, and forest products (timber, non-timber forest products, etc.).
3. Students will learn how to measure and inventory forest vegetation, including tree diameters, heights, and species composition.
1. Students should understand the benefits and challenges of tourism in protected areas and how it can be managed sustainably.

DISCIPLINE SPECIFIC CORE COURSE(MAJOR)						
COURSE	**SEMESTER**	**COURSE CODE**	**COURSE TITLE**	**PRACTICAL**		
				Credits	**Lectures**	**Internal/External**
Degree Course	**B.Sc.**	**MN BOT-608-P**	Forest, forestry and Conservation	**1**	**30**	**25Marks (15+10)**
UNIT	***TOPIC***					
	Exercise 1: Study of biodiversity composition of different types of forest in India. Exercise2: Measurement of tree height using non instrumental methods. Identification of forest products and their sources Exercise 3: **Timber**: Azadirachta indica, Bamboo Exercise 4: **Fire wood:** Acacia nilotica, Prosopis cineraria Exercise 5: **lac**: Selichera oleosa, Prosopis juliflora Exercise 6**: Seed Oil**: Madhuca indica, Pongamia pinnata Exercise 7**: Dye:** Butea monosperma, Wrightia tinctoria Exercise 8: **Gum**: Sterculia urens, Commiphora wightii Exercise 9: Mapping of National Parks and Sanctuary on India map. Exercise 10: Submission of field report.					

- Visit to National Parks and/ or Sanctuary and/or Nursery to study its management. Report to be submitted during practical exam.
- Visit to Seed Banks and /or botanical gardens Report to be submitted during practical exam.

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SEMESTER 6
B. Sc.: BOTANY INTERNAL PRACTICAL
Course Code: MN BOT-608-P
Course Title: Forest forestry and Conservation
Total Marks: 15

Instructions: Strictly follow the instructions given by examiner(s).	
Ex: 1. Specimen A. (Do as Directed)	04
Ex: 2. Specimen B (Do as Directed)	04
Ex: 3. Specimen C. (Do as Directed)	04
Ex: 4. Viva-voice, submission	03

KSKV Kachchh University, Bhuj - Kachchh
(Effective from June 2025-26 UNDER NEP-2020)
SEMESTER 6
B. Sc.: BOTANY UNIVERSITY PRACTICAL
Course Code: MN BOT-608-P
Course Title: Forest forestry and Conservation
Total Marks: 10

Instructions: Strictly follow the instructions given by examiner(s).	
Ex: 1. Specimen A. (Do as Directed)	03
Ex: 2. Specimen B (Do as Directed)	02
Ex: 3. Specimen C. (Do as Directed)	03
Ex: 4. Journal	02

Note: Excursion/ Project work/ Visit/ Tour/ report and submission of specimens / Charts/ Model/ Fresh Material/ Herbarium (Given by teacher or as a part of Syllabus) will be mandatory for all the students.

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(Effective from June 2025-26 UNDER NEP-2020)

SEMESTER 6

(Course code: INT BOT- 612)

Course Title: INTERNSHIP IN MAJOR SPECIFIC COURSE

(Includes Dissertation/Project work/ Internship (other than self-institute)/ Review work/other relevant)

Credit: 4

The credit weight age for Internship/Apprenticeship/OJT is suggested to be 30 hrs. Per credit if they have only practical exposure or lab-based activities. Accordingly, the students must dedicate required number of hours for the same. The guidelines offer scope for providing hands on learning with classroom experience. In case of field visit or experiential learning, 1 credit is equivalent to 40-45Hours.

Both HEIs & Industries can decide mutually for the duration of classroom lecture and industry visit.

Credit allocation:

		For earning 4 credit
Lab based activities or practical exposure	30hrs/ credit	120 hrs for paper
Field visit or experimental learning	40-45 hrs/credit	160-180 hrs per paper
Please refer 3.4.2 & 3.4.3 of SOP page no.		

Evaluation:

- **Marking system will be 60% and 40% for Supervisor and faculty respectively. 60% of the marking should be given by the external supervisor while 40% internal assessment will be based on viva and report submission.**
- **Report** of the training will be must for proper documentation.
- **Certificate** from SKP will be required on successful completion.

General Rules:

- The Internship or skill earning can be from any organization/industry/Govt. body/NGO/any other institute/ SKP (Skill Knowledge Provider) etc.
- For Industry or other institute internship please refer 3.4.3 of SoP.
- The concerned can issue a certificate or letter for work completion after successful completion of OJT/Internship/Apprenticeship activities by students.