



BHAKTA KAVI NARSINH MEHTA UNIVERSITY, JUNAGADH

Syllabus on the bases of Choice Based Credit System (CBCS)

For

SEMESTER – III

Paper No. B – 301: Plant Diversity – 2

SEMESTER – IV

**Paper No. B – 401: Study of Plants with reference to Anatomy,
Embryology, Physiology, Ecology and Application.**

INFORCE FROM JUNE – 2019



FOREWORD

Renewing and updating of the curriculum is an essential part of any vibrant university academic system. Revising the curriculum should be continues process to provide an updated education to the students at large. To meet the need and requirement of the society and in order to enhance the quality and standards of education, updating and restructuring of the curriculum must continue as a perpetual process. As a part of duty of study board, we the member of botany study board designed the new curriculum for Second year (i.e. semester III & IV) botany students. For designing of the curriculum we followed the UGC guideline for model curriculum. The exercise would not have been possible without the support of our respected faculties of botany. We hope that the results will fulfill expectations of the society.

**Members of Botany Study Board
Bhakta Kavi Narsinh Mehta University,
Junagadh**

Syllabus of Semester – III & IV (S.Y. B.Sc.) Botany
Effective from June 2019

This curriculum consists of two theory papers and two practical. Syllabus has been divided in to two semesters (i.e. semester – III and IV). Students have to study one paper in each semester and two practical based on theory papers. The course is to be completed by assigning six periods for each theory and six periods for each practical per week. Practical periods are inclusive of field study.

GENERAL DETAILS OF TEACHING HOURS AND COURSE CREDIT

Paper no.	Title of the papers	Lectures	Theory Credit	Practical Credit	Total Credit
B – 301	Plant Diversity – 2	60	04	03	07
B – 401	Study of Plants with reference to Anatomy, Embryology, Physiology, Ecology and Application.	60	04	03	07

Pattern of Examination:

Students will have to attend theory and practical both during the semester and at the end of semester, University exams will be conducted. Examination contains 70% external and 30% internal marks. A student's performance during every practical session is assessed and marks for a maximum of 15 is recorded. External practical evaluation will carry 35 marks, so total 50 marks for each practical per paper examination will be counted. Internal assessment for theory can be following any one as mention below.

Semester	Theory					Practical			
	Internal				External	Total	Performance during practical sessions	External	Total
	Exam	Assignment	MCQ	Attendance					
III	10	10	05	05	70	100	15	35	50
IV	10	10	05	05	70	100	15	35	50

SKELETON OF THEORY EXAMINATION (EXTERNAL)

QUESTION 1 – UNIT 1		
Q 1 A	Objective type questions	4 Marks
Q 1 B	Answer in brief(Any 1 out of 2)	3 Marks
Q 1 C	Write a note on(Any 1 out of 2)	7 Marks
QUESTION 2 – UNIT 2		
Q 2 A	Objective type questions	4 Marks
Q 2 B	Answer in brief (Any 1 out of 2)	3 Marks
Q 2C	Write a note on (Any 1 out of 2)	7 Marks
QUESTION 3– UNIT 3		
Q 3 A	Objective type questions	4 Marks
Q 3 B	Answer in brief (Any 1 out of 2)	3 Marks
Q 3 C	Write a note on (Any 1 out of 2)	7 Marks
QUESTION 4 – UNIT 4		
Q 4 A	Objective type questions	4 Marks
Q 4 B	Answer in brief (Any 1 out of 2)	3 Marks
Q 4 C	Write a note on (Any 1 out of 2)	7 Marks
QUESTION 5 – UNIT 5		
Q 5 A	Objective type questions	4 Marks
Q 5 B	Answer in brief (Any 1 out of 2)	3 Marks
Q 5 C	Write a note on (Any 1 out of 2)	7 Marks
TOTAL MARKS : 70 TOTAL TIME : 2½ HOURS		

Minimum requirements of plant material and Instruments for Botany Practical based on Paper B - 301 and Paper B - 401

- Use of one micro scope for two students in practical batch
- Fresh plant material as well preserve material as per syllabus
- Different types of stain for slide preparation
- Charts for life cycles
- Original plant / Photographs / charts for Medicinal plants.
- Different types of stain for slide preparation
- Paper chromatography chamber and their equipment's & Chemicals
- Twig of plant and charts for Families

Student Startup and Innovation Policy (SSIP)

Government of Gujarat has developed a policy for providing assistance to Startups/ Innovation. Under this scheme, any individual/ group of individuals having innovative idea/ Concept will be eligible and/ or Universities/ education institutions, Incubation Centre/ PSUs/ R&D Institutions/ Private and other establishments will be eligible as an institution to support and mentor to innovators as approved by Committee. Startups in an economy's technology sectors are an important indicator of technological performance for several reasons.

Key Objectives

The Student Startup & Innovation Policy of Government of Gujarat aims to create an integrated, state-wide, university-based innovation ecosystem to support innovations and ideas of young students and provide a conducive environment for optimum harnessing of their creative pursuit.

1. Developing student centric Innovation and Pre-incubation Ecosystem for Students (IPIES)
2. Creating environment for creativity to flourish and an end-to-end support system in educational institutions to allow ample support to ideas for better execution
3. Build internal capacity of educational institutions and key components of the innovation ecosystem to enable deployed processes to make sustainable impact at scale
4. Create pathways for mind to market by harnessing and handholding projects/ research/ innovation/ ideas of students in Gujarat
5. Creating and facilitating sectoral and regional innovation efforts in state around educational institutions
6. Create a common platform to showcase, support and upscale innovations for motivating stakeholders as well as for an opportunity to create value for money and value for many
7. Leverage public system initiatives at state and central level, academia, industries and by other ecosystem stakeholders / domain experts and institutions to make an inclusive effort

Key Goals

1. Empower all universities to set-up and execute the broad agenda of innovation and pre-incubation
2. Aim to create an environment that converts at least 1% graduates into job creators by innovation and allied means
3. Support at least 1,000 student-led innovations per year and aim to file 1000 patents from universities in the state every year
4. Harness 500 student startups in the next 5 years, and upscale
5. Empower universities and educational institutes to build a robust Innovation and Pre-incubation support systems within
6. Create incentives, awards, appreciations and benchmarks for innovation and student startups and associated efforts at all layers
7. Build capacity for at least 200 educational institutes in the state in the next five years, to have a robust preincubation support for student / alumni startups and Innovations
8. Undertake strategic interventions to empower all universities in the state to develop full-fledged preincubation ecosystem in the next 5 years
9. Ensure that the innovation processes link academia, society and SMEs through systematic ways so that students and faculty solve their challenges and create further entrepreneurial opportunities

Under this scheme our **Bhakta Kavi Narsinh Mehta University, Junagadh** also provide facilities to fulfill objectives and goals of **SSIP**. Under this scheme following links are listed for online courses, which are available on portal. For each courses extra credit will provided.

- ✓ <https://swayam.gov.in>
- ✓ <https://onlinecourses.nptel.ac.in/>
- ✓ <https://www.edx.org/>
- ✓ <https://www.coursera.org/>

BOTANY PAPER – 301
(PLANT DIVERSITY – 2)

UNIT – I : ALGAE (12 Lectures) 0.8 Credit

- I.1 Ultra structure of Eukaryotic algal cell.
- I.2 Ranges of Thallus Structure.
- I.3 Life history of the following genus (Excluding development)
(a) *Nostoc* (b) *Batrachospermum*
- I.4 Algae causing biological disturbances.

UNIT – II : FUNGI (12 Lectures) 0.8 Credit

- II.1 Ultra structure of fungal cell.
- II.2 Life history of the following genus (Excluding development)
(Classification according to Ainsworth)
(a) *Aspergillus* (b) *Saccharomyces*
- II.3 Industrial applications of above mention species.

UNIT – III : BRYOPHYTA (12 Lectures) 0.8 Credit

- III.1 Vegetative reproduction in Bryophytes.
- III.2 Life history of the following genus (Excluding development)
(a) *Marchantia* (b) *Funaria*
- III.3 Economic importance of Bryophytes.

UNIT – IV : PTERIDOPHYTA (12 Lectures) 0.8 Credit

- IV.1 Life history of the following genus (Excluding development)
(a) *Sellaginella* (b) *Adiantum*
- IV.2 Heterospory and seed habitat.
- IV.3 Types of stele and stellar evolution.
- IV.4 Telome Theory.

UNIT – V: GYMNOSPERM AND ANGIOSPERMS

(12 Lectures) 0.8 Credit

- V.1 Embryogeny and life history of *Pinus*.

V.2 Study of following plants families with 2 – 3 plants belonging to the families with reference to classification system of Bentham & Hooker's

(A) Dicotyledons

(1) Fabaceae

(2) Apiaceae

(3) Combretaceae

(4) Euphorbiaceae

(5) Verbenaceae

(6) Acanthaceae

(B) Monocotyledons

(1) Commelinaceae

(2) Amaryllidaceae

Semester – 3 (S.Y.B.Sc.) – BOTANY

PRACTICAL: P - 301

(Based on paper – 301-P)

1. Study of algal genera with reference to the types mentioned in theory
2. Study of fungal genera with reference to the types mentioned in theory
3. Study of Bryophytes genera with reference to the types mentioned in theory
4. Study of Pteridophytes genera with reference to the types mentioned in theory
5. Study of Gymnosperms genera with reference to the types mentioned in theory
6. Families are to be studied with the help of available plants as per theory.
 - ❖ A twig of plant with flower / inflorescences
 - ❖ Whole flower (various plants)
 - ❖ L.S. of flower
 - ❖ T.S. of flower
 - ❖ Floral formula
 - ❖ Floral diagram
 - ❖ Botanical names
7. Study of various steles by section cutting.

BOTANY PAPER – 401
**(Study of Plants with reference to Anatomy, Embryology, Physiology,
Ecology and Application)**

UNIT – I PLANT ANATOMY (12 Lectures) 0.8 Credit

- I.1 Anatomical studies of monocot and Dicot plants (Root, stem and leaf)
- I.2 Secondary growth in monocotyledons and dicotyledonos (Stem)
- I.3 Anomalous secondary growth in *Salvadora* and *Dracaena*.

UNIT – II PLANT EMBRYOLOGY (12 Lectures) 0.8 Credit

- II.1 Megasporogenesis
- II.2 Types of embryo sac
- II.3 Development of male gametophytes
- II.4 Double Fertilization.

UNIT – III PLANT PHYSIOLOGY (12 Lectures) 0.8 Credit

- III.1 Absorption of minerals
- III.2 Translocation of organic solutes.
- III.3 Diffusion, Imbibitions and Osmosis.
- III.4 Vernalization.
- III.5 Physiology of Seed dormancy.

UNIT – IV ECOLOGY (10 Lectures) 0.7 Credit

- IV.1 Edaphic factors – Soil: Composition, Origin & development, Soil profile
- IV.2 Soil erosion
- IV.3 Soil conservation
- IV.4 Remote sensing as a tool for vegetational analysis.

UNIT – V APPLIED BOTANY (14 Lectures) 0.9 Credit

- V.1 Artificial Seeds.
- V.2 Herbarium - Tool and technique
- V.3 Polyploidy in plants
- V.4 Pure line and mass selection
- V.5 Maternal Influence on inheritance
 - V.5.1 Cytoplasmic inheritance in Yeast
 - V.5.2 Cytoplasmic inheritance in *Mirabilis jalapa*

Semester -4 (S.Y.B.Sc.) – BOTANY

PRACTICAL: P – 401

(Based on paper – 401-P)

1. Study of different simple tissue systems of plants through section cutting.
2. To study of xylem component by maceration technique.
3. Anatomical studies of Secondary growth in Stem.
4. Study of anomalous secondary growth in *Salvadora* and *Dracaena*.
5. Germination of pollen grain
6. Mounting of embryo (Dicot/Monocot).
7. To study L.S. of Maize grain.
8. Imbibitions experiment.
9. Thistle funnel experiment for Osmosis.
10. Conduction of water through Xylem.
11. To demonstrate water holding capacity.
12. Test for the presence of carbonate, nitrate and pH of the soil.
13. Study tour – Farm / Research laboratory / Institutes / University for current trends in applied botany.

A list of reference books

1. *A text book of Algae* A.V.S.S.Sambamurty
2. *Algae* B.R.Vashishta
3. *Algae* G.L.Chopra
4. *The fungi* B.P.Pandey
5. *Introduction to fungi* Dayal & Raizada
6. *Bryophytes* B.R.Vashishta
7. *Cryptogamic Botany Vol. – I & Vol. – II* G.M.Smith
8. *Pteridophyta : New look* O.P.Sharma
9. *Pteridophytes* P.C.Vashishta
10. *Gymnosperms* O.P.Sharma
11. *A textbook of Systematic Botany* R.N.Sutaria
12. *An introduction to taxonomy of angiosperms* Shukla P. & S.P.Sharma
13. *Taxonomy of angiosperms* B.P.Pandey
14. *Taxonomy of angiosperms* V.H.Naik
15. *The Embryology of Angiosperms* Bhojwani & Bhatnagar
16. *A text book of Botany* Singh, Pande & Jain
17. *A textbook of ecology* Vashishta & Gill
18. *A textbook of Practical Botany Vol.–I & Vol.–II* Bendra & Kumar
19. *Anatomy and embryology* Singh, Pandey & Jain
20. *College Botany Vol. – I & Vol. – II* B.P.Pandey
21. *Ecology and Environment* P.D.Sharma
22. *Ecology and Soil Science* Shukla & Sharma
23. *Ecology and sustainable development* S.Ramkrishnan
24. *Embryology* P.Maheshwary
25. *Fundamentals of Ecology* E.P.Odum
26. *Plant Anatomy* B.P.Pandey
27. *Plant Anatomy* P.J.Chandurkar
28. *Plant Physiology* P.L.Kocchar
29. *Plant Physiology* Pandey & Sinha
30. *Plant Physiology* Salisbury & Ross
31. *Plant Physiology* V.K.Jain
32. *Plant Physiology* V.Verma