



MAHARAJA KRISHNAKUMARSINHJI BHAVNAGAR UNIVERSITY
NAAC Accreditation Grade "B"
(With effect from Academic Year: 2016-17)

Bachelor of Science (B.Sc.)
SEMESTER - I
Core Course - BOTANY

BOT-CC -101 (Theory) &
BOT-CC -102 (Practical)

The course content has been designed on **Semester pattern**.

There shall be **01 Theory** paper having **05 Units**. (4 lectures in a week set up by departments.)

There shall be **02 Practicals** (6 lectures) in a week set up by departments.

There shall be **01 Theory paper** of **70 marks** and 2.30 hours duration in University Examination.

There shall be **01 Practical Paper** of **70 marks** and 03:00 hours duration in University Examination.

There shall be Continuous Internal Evaluation of 30 Marks

Course Type	Paper No.	Title of Paper	Total Marks EXT.+ INT* = TOTAL	Passing Standards EXT.+ INT= TOTAL Marks	Total Teaching Hours (in 15 weeks)	Total Teaching Hours (in a week)	Credits
Core Course Theory	BOT-CC- 101	PLANT SYSTEMATIC, ECONOMIC BOTANY BIOTECHNOLOGY & ECOLOGY	70+ 30* = 100	28+12* = 40	60 hrs	4 hrs	04
Core Course Practical	BOT-CC- 102	PRACTICAL BOTANY-1	70+ 30*= 100	28+12* =40	90 hrs	6 hrs	06
	TOTAL		140+60=200		150 hrs	10 hrs	10



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B.Sc. BOTANY
SEMESTER – I

BOT-CC -101 (Theory)

Title of Paper: **PLANT SYSTEMATIC, ECONOMIC BOTANY, BIOTECHNOLOGY & ECOLOGY**

Teaching Hours: 04 hours

Credits: 4

Marking Scheme:	Semester End Examination:	70
	Internal Examination:	30
	TOTAL	100

Unit	Detailed syllabus	Teaching Hours	Mark weightage
Unit-1	ANGIOSPERMS MORPHOLOGY : 1 The leaf: Venation, Simple and compound leaves Phyllotaxy: Definition and Types Stipules: Types and its modification Inflorescence: Definition and its Types: Raceme, Spike, head, Capitulum, Umbel, Solitary- Axillary & Terminal, Biparous cyme, Multiparous cyme, Hypanthodium and Cyathium.	12 hrs	14 marks
Unit-2	ANGIOSPERMS MORPHOLOGY: 2 Flower: Structure and types of Calyx, Corolla, Aestivation, Reproductive structure: Androecium and Gynoecium Ovary: Superior & Inferior Placentation: Marginal, Parietal, Axile, Basal. ANGIOSPERM FAMILIES: (As per Bentham & Hooker's classification system) General characters, Floral: Structure, formula, diagram and Common examples of local & Economic important plants. Study of Families: 1. Malvaceae 2. Rubiaceae 3. Nyctaginaceae. 4. Amaryllidaceae.	12 hrs	14 marks
Unit-3	ECONOMIC BOTANY : Food: Cereals (<i>wheat, rice, maize</i>), Pulses (<i>gram, green gram, pea</i>), Beverages: <i>Tea, Coffee, cocoa</i> Medicinal plants: A brief account of plant drugs and their chief constituents used in medicine. <i>Adhatoda</i> (Ardusi), <i>Ocimum</i> (Tulsi), <i>Withania</i> (Ashwagandha), <i>Tinospora</i> (Galo), <i>Aloe</i> (Kunvarpathu) Plant Fibres: A brief account of plant fibers <i>Gossypium</i> (Cotton), <i>Cocos</i> (Coir), <i>Crotalaria</i> (Jute)	12 hrs	14 marks



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Unit-4	BIOTECHNOLOGY: Plant Tissue culture: Introduction, Aseptic Condition, Tools & Techniques Nutrient media, and it's Application. Genetic engineering: Tools & Techniques, Recombinant DNA Technology and Plants: Salient achievement of Genetic engineering in crop biotechnology and prospects	12 hrs	14 marks
Unit-5	ECOLOGY: Ecosystem: Natural, Artificial, Structure and Functions of Ecosystems Components of Freshwater Ecosystem (Pond), Energy flow in an Ecosystem, Biogeochemical Cycles-Carbon, Nitrogen, Water.	12 hrs	14 marks
		60 hours	70 marks



B.Sc. BOTANY
SEMESTER – I

BOT-CC -102 (Practical)

Title of Paper: PRACTICAL BOTANY-1

Teaching Hours: 06 hours per week

Credits: 06

Marking Scheme: Semester End Examination: 100

TOTAL 100

Detailed syllabus

Study of following through fresh / preserved materials, charts and permanent slides.

1. Study of Botany Laboratory Introduction.
2. Study of Leaf Venation (Vinca , Zizyphus , Castor , Canna , Grass/Maize, Fan-palm)
3. Study of Stipules (Free lateral, Adnate, Interpetiolar, Intrapetiolar, Ochreate)
4. Study of Phyllotaxy: Anona, Citrus, Ficus, Calotropis, Quisqualis, Nerium
5. Study of Simple & Compound leaves -1: Hibiscus (Jasud), Rose, Cassia (Garmalo), Delonix (Gulmohr), Moringa (Saragavo)
6. Study of Compound leaves -2 : Citrus , Balanites (Ingorio), Aegle (Bili), Marselia, Bombax (Shimlo)
7. Study of Inflorescence-1: Raceme, Spike, Head, Capitulum, Umbel
8. Study of Inflorescence-1: Solitary-Axillary & Terminal , Uniparous cyme, Biparous cyme, Multiparous cyme, Hypanthodium, Cyathium
9. Study of Flower: Calyx- Free Sepal, United Sepal. Corolla- Free petal, United Petal, Perianth
10. Study of Aestivum: Valvate, Twisted, Imbricate, Quinqancial, Vexillary
11. Study of Androecium-Hibiscus, Pea/Fabaceae plant, Bombax
12. Study of Gynoecium-Hibiscus. Rose, Pea/Fabaceae plant
13. Study of Ovary: Superior and Inferior Ovary
14. Placentation: Axile, Parietal, Marginal, Basal
15. Study of family: Malvaceae*.(Jasud)
16. Study of family: Rubiaceae* (Ixora)
17. Study of family: Nyctaginaceae* (Bougainvel)
18. Study of family: Amaryllidaceae* (Gulchhadi)
19. Study of Plants used as Food: Cereals (*wheat, rice, maize*)
20. Study of Plants used as Pulses: (*gram, green gram, pea*)
21. Study of Plants used as Beverages: *Tea, Coffee, cocoa*
22. Study of Plants used as Medicinal plants: Arduci, Tulsi, Ashwagandha, Galo, Kunvarpathu
23. Study of Plants used as Plant Fibres: Cotton, Coir, Jute
24. Study of Biogeochemical Cycle: Carbon, Nitrogen, Water. (Models / Charts)

There shall be local Botanical Excursion, Environment camp and Participate and perform the program about awareness for conservation of Forest & Natural resources.

Students are expected to record the work done in the laboratory in the journal. The journal is to be certified by the in charge teacher and Head of the department. Certified journals have to be produced while appearing at the time of examination.



B.Sc. BOTANY
SEMESTER – I

BOT-CC -101(Theory)

Title of Paper: **PLANT SYSTEMATIC, ECONOMIC BOTANY, BIOTECHNOLOGY & ECOLOGY**

BOT-CC -102 (Practical)

Title of Paper: **PRACTICAL BOTANY-1**

References Books

1. Dutta,A.C.: Botany for Degree Students.
2. Das,Dutta & Ganguly: Botany Volume-1,New central Book agency
3. Das,Dutta & Ganguly, Kar : Botany Volume :II1 New central Book agency
4. Kumarsen Annie : Taxonomy of Angiosperms , Saras Publication
5. Sutaria, R. N : Systematic botany. Khadayata Book Depot.
6. Pandey B.P : A Textbook of Botany: Angiosperms, S. Chand & Co., New Delhi
7. Bhatt ,D.C.& Mitaliya ,K.D. : Textbook of angiosperm taxonomy
8. S.K.Jain : Medicinal plants
9. A.V.S. Sambhamurthy, & N.S. Subramanyam. Textbook of economic botany Wiley Eastern Ltd.
10. Saras publication Ecology, environment & pollution
11. Saras publication
12. Sharma, P.D. Ecology & Environment.
13. Pandey & Chaddha: Economic Botany –Vikas Publishing House Pvt.Ltd. New Delhi.
14. B.P. Pandey, : Economic Botany –Chand & Co., New Delhi
15. V.Kumarsen : Plant ecology and phytogeography , Saras Publication
16. S. Narayanswamy : Plant cell and tissue culture –, Tara McGraw Hill
17. V.Kumarsen : Plant Biotechnology , Saras Publication
18. H.S.Chawla : An Introduction to Plant Biotechnology, Oxford & IBH publishing Co.Pvt.Ltd.
19. Ramawat ,K.G.: Plant Biotechnology, Bendre & Kumar, Practical botany : Vol . I , Vol. II, Vol . III



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B.Sc. BOTANY
SEMESTER - II

BOT-CC-201 (Theory) &
BOT-CC -202 (Practical)

The course content has been designed on **Semester pattern**.

There shall be **01 Theory** paper having **05 Units**. (4 lectures in a week set up by departments.)

There shall be **02 Practicals** (6 lectures) in a week set up by departments

There shall be **01 Theory paper** of **70 marks** and 2.30 hours duration in University Examination

There shall be **01 Practical Paper** of **70 marks** and 03:00 hour's duration in University Examination

There shall be Continuous Internal Evaluation of 30 Marks.

Course Type	Paper No.	Title of Paper	Total Marks EXT.+ INT* = TOTAL	Passing Standard s EXT.+ INT= TOTAL Marks	Total Teaching Hours (in 15 weeks)	Total Teaching Hours (in a week)	Credits
Core Course Theory	BOT-CC-201	PLANT DIVERSITY & ANATOMY	70+ 30* = 100	28+12* =40	60 hrs	4 hrs	04
Core Course Practical	BOT-CC-202	PRACTICAL BOTANY-2	70+ 30*= 100	28+12* =40	90 hrs	6 hrs	06
	TOTAL		140+60= 200		150 hrs	10 hrs	10



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B.Sc. BOTANY
SEMESTER - II

BOT-CC -201 (Theory)

Title of Paper: **PLANT DIVERSITY & ANATOMY**

Teaching Hours: 04 hours

Credits: 04

Marking Scheme:	<u>Semester End Examination:</u>	70
	<u>Internal Examination:</u>	30
	TOTAL	100

Unit	Detailed syllabus	Teaching Hours	Mark weightage
Unit-1	PLANT DIVERSITY: General account of Habitat, form, Life span and Nutrition mode in plants. CYNOBACTERIA: General account of Cynobacteria. Study of life history and economic importance of blue-green algae: Spirulina ALGAE: Classification (As per F.E.Fristch), life history and economic importance: Chlorophyceae: Spirogyra, Volvox.	12 hrs	14 marks
Unit-2	FUNGI: Classification (As per Ainsworth), life history and economic importance: Zygomycotina: Mucor, Yeast (Sachharomyces) LICHENS: General account and economic importance of lichens.	12 hrs	14 marks
Unit-3	BRYOPHYTES: Classification (As per G.M.Smith), anatomy, reproduction, life history, alternation of generation. (Developments of organs are excluded) Hepataceae: Marchantia, Musci: Funaria (Moss) PTERIDOPHYTES: Classification (As per G.M.Smith), anatomy, reproduction, life history, alternation of generation. (Developments of organs are excluded) Pterophyta: <u>Nephrolepis</u> (Fern)	12 hrs	14 marks
Unit-4	GYMNOSPERMS: Classification (As per Chamberlain), anatomy, reproduction, life history alternation of generation (Developments of organs are excluded) Cycadales: <i>Cycas</i> ANGIOSPERMS: Life history & Alternation of generation in <i>Sunflower</i> . Differences between Angiosperm & Gymnosperm	12 hrs	14 marks
Unit-5	PLANT ANATOMY : Primary structure of Dicot Root & Monocot Root. Primary structure of Dicot Stem & Monocot Stem. Secondary growth in <i>Sunflower</i> root & <i>Sunflower</i> stem. Anomalous Secondary growth in <i>Amaranthus</i> . Anatomy of C3-C4 Plants Stomata : - Structure & Types.	12 hrs	14 marks
		60 hours	70 marks



B.Sc. BOTANY
SEMESTER - II

Paper BOT-CC -202 (Practical)

Title of Paper: **PRACTICAL BOTANY-2**

Teaching Hours: 06 hours per week

Credits: 6

Marking Scheme: Semester End Examination: 100
TOTAL **100**

Detailed syllabus

Study of following types through fresh / preserved materials, charts and permanent slides

1. Study of **Spirulina** (Study of Structure & Reproduction)
2. Study of **Spirogyra** (Study of Structure & Reproduction)
3. Study of **Volvox** (Study of Structure & Reproduction)
4. Study of **Mucor** (Study of Structure & Reproduction)
5. Study of **Yeast** (Study of Structure & Reproduction)
6. Study of **Lichens** (Study of Structure & Reproduction)
7. Study of Marchantia (Gametophyte)
8. Study of Marchantia (Sporophyte)
9. Study of Funaria (Gametophyte)
10. Study of Funaria (Sporophyte)
11. Study of Nephrolepis (Fern) (Sporophyte, mounting of Remanta, Hydathode, Sori)
12. Study of Nephrolepis (Fern) (Gametophyte)
13. Study of Cycas (Plant part Root, Leaf Structure & leaf Anatomy)
14. Study of Cycas (Reproduction part Structure & Anatomy of Seed, Ovule)
15. Study of Primary structure of Monocot Root. (T.S.) Permanent Slides
16. Study of Primary structure of Dicot Root (T.S.) Permanent Slides
17. Study of Primary structure of Monocot Stem. (T.S.) Permanent Slides.
18. Study of Primary structure of Dicot Stem. (T.S.) Permanent Slides.
19. Study of Secondary growth in Sunflower stem. (T.S.)
20. Study of Mounting of Stomata: (Dicot and Monocot Leaf)
21. Study of Anomalous Secondary growth in Amaranthus.
22. Study of Anatomy of C3- Plants (Datura leaf)
23. Study of Anatomy of C4- Plants (Maize leaf)
24. Study of Leaf Stomata: Dicot (Nagarvel) & Monocot (Maize)



B.Sc. BOTANY
SEMESTER - II

BOT-CC -201 (Theory)

Title of Paper: **PLANT DIVERSITY & ANATOMY**

BOT-CC -202 (Practical)

Title of Paper: **PRACTICAL BOTANY-2**

References Books

Gangulee & Kar	College botany Vol-II
S.K. Mukherji	College botany Vol -III
Dutta , A.C.	Botany for degree students
Bendre& Kumar	Practical botany: Vol-I, Vol-II, Vol-III
B.R. Vashishta	Botany for Degree students: Algae, Fungi, Bryophyta Pteridophytes and Gymnosperms
Alexopoulos,	Introductory Mycology
Bilgrami & Dube	A text book of modern plant pathology.
Dube H.C.	Bacteria, viruses and fungi
Vasishtha, B.R.	Botany for degree students: Fungi
Kumar, H. D.	Introductory Psychology
Vasishtha, B.R.	Botany for degree students: Algae
Vasishtha, B.R.	Botany for degree students: Bryophytes
Vashishta, P.C.	Botany for degree students: Pteridophyta
Vasishtha P.C.	Botany for degree students: Gymnosperms
Fahn, A. 1990	Plant Anatomy
Pandey, B.P.	Plant anatomy
Singh, Pandey & Jain	Plant anatomy & Embryology