# Bhakta Kavi Narsinh Mehta University



# Choice Based Credit System (CBCS) Syllabus For Semester V & VI (B.Sc.) "BOTANY"

### Semester – V

**Paper No.-501**: Biology of Seed Plants

Paper No.-502 : Ecology

Paper No.-503 : Instrumentation, Forest and Forestry, Micro-techniques, Medicinal

Plants and Horticulture

### Semester – VI

**Paper No.-601** : Cryptogamic Botany and Gymnosperms

Paper No.-602 : Physiology, Biochemistry, Biostatistics, Microbiology and

Pathogy

Paper No.- 603 Cytogenetics, Molecular Biology, Genetic Engineering, Advance

techniques

### **INFORCE FROM JUNE - 2020**

### **FOREWORD**

The renewal and updating of the course curriculum are the ingredients to any vibrant acedemic institution. The revision of the curriculum in the different subjects should be a continuous process with a view to providing the updated and thorough education to the students as well. To meet the requirements in todays perspectives and in order to enhance the quality and standards of education, updating and restructuring the curriculum from time to time must be continued as a perpetual process. In recent past, our Saurashtra University has implemented the Choice Based Credit System (CBCS) which is the need of hour for the sake of the students. We, the member of study board in Botany have designed the new curriculum for the students of third year (i.e. Semester V and VI) Botany. For designing the curriculum we followed the guidelines of UGC with respect to model syllabus. The excersise would not have been possible without the support of our faculty members. We hope that the aims and the objectives of our university will be accomplished and the students will come to the expectations of our society.

> Members of Botany Study Board Bhakta Kavi Narsinh Mehta University Junagadh

# Bhakta Kavi Narsinh Mehta University, Junagadh Revised syllabus of B.Sc. Botany as per UGC guidelines Effective from June 2018

This curriculum consists of six theory papers and six practicals. Syllabus has been divided in to two semesters (i.e. semester – V and VI). Students have to study three papers in each semester and three practical's 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 to field study.

#### **GENERAL DETAILS OF THEORY PAPERS**

Paper no.	Title of the papers
501	Biology of Seed Plants
502	Ecology
503	Instrumentation, Forest and Forestry, Micro-techniques, Medicinal Plants and
	Horticulture
601	Cryptogamic Botany and Gymnosperms
602	Physiology, Biochemistry, Biostatistics, Microbiology and Pathogy
603	Cytogenetics, Molecular Biology, Genetic Engineering, Advance techniques

#### **Pattern of Examination:**

There should be two internal exams per semester. An average 10 marks should be given for internal exams and that marks will be included in final aggregate results of the semester. Besides internal examination there are two assignments of the subjects to be submitted by the students and four surprise quizes should be attended by the students. 10 marks for assignments and 10 marks for quize will be added to the final results of the semester. Total 30 marks are internally assessed and 70 marks for external (University Exams) exams, per paper. A student's performance in every practical session is assessed and marks for a maximum of 15 is given. External practical evaulation will carry 35 marks, so total 50 marks for each practical per paper examination will be counted. The pattern of semester exam will be as follows.

# SKELETON OF QUESTION PAPER FOR THEORY PAPERS (EXTERNAL EXAMS) Total Scheme of evaluation

Semester	Theory			Practical				
		Internal		External	Total	Performance	External	Total
	Exam	Assignment	Quiz			during practical sessions		
V	10	10	10	70	100	15	35	50
VI	10	10	10	70	100	15	35	50

### Distribution of three theory papers and three practicals for each semester is as follows

	SEMESTER – V					
Papers	Title of the papers	Duration	Marks			
V	Biology of Seed Plants	150 min	70			
VI	Ecology	150 min	70			
VII	Instrumentation, Forest and Forestry, Micro-techniques, Medicinal Plants and Horticulture	150 min	70			
	SEMESTER – VI					
VIII	Cryptogamic Botany and Gymnosperms	150 min	70			
IX	Physiology, Biochemistry, Biostatistics, Microbiology and Pathology	150 min	70			
X	Cytogenetics, Molecular Biology, Genetic Engineering, Advance techniques	150 min	70			

# **Practicals**

SEMESTER – V				
Practicals	Title of the practicals	Duration	Marks	
I	Biology of Seed Plants	3 Hours	35	
II	Ecology	3 Hours	35	
III	Instrumentation, Forest and Forestry, Micro-techniques, Medicinal Plants and Horticulture	3 Hours	35	
	SEMESTER – VI			
IV	Cryptogamic Botany and Gymnosperms	3 Hours	35	
V	Physiology, Biochemistry, Biostatistics, Microbiology and Pathology	3 Hours	35	
VI	Cytogenetics, Molecular Biology, Genetic Engineering, Advance techniques	3 Hours	35	

### **Project work**

Science is the field of experiment research and comprehensible reading. In order to fulfill these requirements our university has introduce the project work. So that student can have habit for reading research articles and able to understand the possible cause of current problems or can visualize the diverse nature of ecosystems and its organisms. Project work contains 100 marks. Project report (50 marks) should be submitted at the end of sixth semester and its viva voce and ppt presentation (50 marks) can be arranged during practical exams of sixth semester.

### **Submission work**

- Permanent slides (minimum 6)
   Giant Chromosomes 1, Mitosis -1, Meiosis -1, Double Stain 2, Embryo 1
- 2. Herbarium Sheets (minimum 10)
- 3. Rolling chart / project with academic value
- 4. During the academic year compulsorily arrange one study tour of rich biodiversity region of the state and students have to submit tour report.
- 5. The students should visit to one of the following institution for study purpose
  - Agriculture University Junagadh
  - National Research Center for Ground nut (NRCG) Junagadh
  - Aurvedic College
  - Pharmaceutical college or Institute

# $\begin{array}{c} Semester-V\\ New\ theory\ Syllabus \end{array}$

# BOTANY PAPER: - 501

(BIOLOGY OF SEED PLANTS)

	Concept of taxon and taxono I.2.1 Taxonomic categorie I.2.2 Concept of genus and I.2.3 Concept of families Classification systems of I.3.1 Bentham and Hooker	S	0.8 Credit
UNIT: II &		DIES OF FOLLOWING FAMI	
	(According to Bentham and	d Hooker System) [24 Hour	s ] 1.6 Credits
II.1	Detailed studies of family of II.1.1 Anonaceae II.1.3 Cucurbitaceae	Polypetalae II.1.2 Capparidaceae II.1.4 Tiliaceae	
II.2	II.1.5 Lythraceae Detailed studies of family of II.2.1 Asteraceae II.2.3 Convolvulaceae	Gamopetalae II.2.2 Asclepiadaceae II.2.4 Solanaceae	
II.3	II.2.5 Bignoneaceae Detailed studies of family of II.3.1 Amaranthaceae II.3.3 Moraceae	II.3.2 Polygonaceae	
II.4	Detailed studies of family of II.4.1 Canaceae	Monocotyledon II.4.2 Cypraceae	
Reference B	ooks:		
1. A tex	tbook of Systematic Botany	R.N.Sutaria	
2. Taxor	nomy of Angiosperm & utilizat	tion of plants A. K. Sharma	
3. Taxon	nomy of angiosperms	B.P.Pandey	
UNIT:- IV III.1 III.2 III.3 III.4 III.5 Refer	1	[12 Hours] nocotyledons and dicotyledonos d Applications	0.8 Credit
1. Emb	ryology	P.Maheshwary	
2. Anato	omy and embryology	Singh, Pandey &	Jain

UNIT:- V ECONOMIC BOTANY [12 Hours] 0.8 Credit

IV.1 Tea

IV.2 Coffee

IV.3 Tobacco

IV.4 Fiber yielding plants

IV.5 Oil seeds

**Reference Books:** 

1. A textbook of economic Botany V.Verma

2. Economic Botany B.P.Pandey

3. A phytochemical approach to economic botany Dr. S. D. Sabnis

# Semester – V New theory Syllabus

# **BOTANY PAPER: - 502**

(ECOLOGY)

UNIT:- I	ECOLOGY AND AUTECOLOGY	[ 12 Hours]	0.8 Credit
I.1 I.2 I.3 I.4	Basic concept of ecology Ecological factors I.2.1 Climatic I.2.2 Biotic (Interaction Biological clocks Liebig's law of the minimum; Shelford's 1		ms)
Reference Bo	ooks:		
	Fundamentals of ecology A textbook of ecology		P. D. Sharma Vashistha & Gill
UNIT:- II	PLANT COMMUNITY		
II.1 II.2 II.3 Reference Be	Characters of community Characters used in community structures Methods of ecological studies  ooks:	[ 12 Hoi	urs] 0.8 Credit
1. Ecolo	gy and Environment	P.D.Sharma	
2. Ecolo	gy and Soil Science	Shukla & Sharn	na
3. Ecolo	gy and sustainable development	S.Ramkrishnan	
UNIT:- III  III.1  III.2  III.3  Reference Be	SUCCESSION & POPULATION  Plant succession: Causes, trends, types, pro Population characteristics Ecological niche  poks:	[ 12 House cess, examples of	•
1. Funda	mentals of Ecology	E.I	P.Odum
2. A text	book of plant ecology	V.	Verma
UNIT:- IV	ECOSYSTEM	[ 12 Ho	urs] 0.8 Credit
IV.1 IV.2 IV.3 IV.4 IV.5 <b>Reference Bo</b>	Structure of ecosystem Types of ecosystems Energy flow in ecosystem system Productivity of ecosystem Ecological pyramids books: io., mole. bio., gen., evo. & ecology	ì	V.Arumugam
	onmental biology		H. R. Singh

### UNIT:- V BIODIVERSITY [12 Hours] 0.8 Credit

- V.1 Concepts of biodiversity and it's level
- V.2 Keystone species
- V.3 Measuring biodiversity
- V.4 Pytogeographical regions of India
- V.5 Conservation of Biodiversity

### **Reference Books:**

1. Environmental studies

2. Biodiversity

N. Arumugam

S. chakraborty

## Semester-V

# New theory Syllabus BOTANY PAPER: - 503

# (INSTRUMENTATION, FOREST AND FORESTRY, MICROTECHNIQUES,

MEDICINAL PLANTS AND HORTICULTURE)

UNIT:- I	INSTRUMENTATION [12 Hou	rs]	0.8 Credit
	Principle, design, function of following instru	ments	
I.1	Laminar-flow Hood		
I.2	Autoclave		
I.3	Incubator		
I.4	Centrifuge		
I.5	Oven		
Reference Bo			
	sysics and Bioinstrumentation	Dr. N. Arumugam	
4. Bio st	at., com., appli., Bio info., Instrumentation	Dr. N. Arumugam	
UNIT:- II	FOREST AND FOREST MANAGEMENT	S [12 Hours]	0.8 Credit
II.1	Forest management		
II.2	Importance of forest		
II.3	Silviculture, Afforestation, Agro-forestry		
II.4	Deforestation		
II.5	Endemism		
Reference Bo	ooks:		
1. Forest	t and Forestry k	K.P.Sagariya	
2. Ecolo	gy and Environment F	P.D.Sharma	
UNIT:- III	MICROTECHNIQUES	[12 Hours]	0.8 Credit
III.1	Techniques for preservation of plant materials		
III.2	Teasing, smear preparation, squash methods,		
III.3	Microtomy.	whole mounting.	
Reference Bo	· · · · · · · · · · · · · · · · · · ·		
1. Bio tec		Dr. S. V. S. Rana	
	1	r. D. B. Tembhare	
UNIT:-IV		12 Hours]	0.8 Credit
IV.1	Brief introduction, constituents and uses of fo	llowing medicinal plant	ts
	IV.1.1 Terminalia bellirica	C I	
	IV.1.2 Terminalia chebula		
	IV.1.3 Emblica officinalis		
	IV.1.4 Tinospora cordifolia		
	IV.1.5 Withania somnifera		
	IV.1.6 Tribulus terrestris		
11.7	IV.1.7 Aegal marmelose		
IV.2	Botanical uses of spices and condiments		
IV.3	Conservation methods for medicinal plant		

Refer	ence Books:		
1. Medic	inal Plants	S.K.Jain	
2. Econo	omic botany	S. N. Pandey	
3. Herbal	, Biotech. & Pharmacognosy	Dr. V. Kumarsan	
UNIT:- V	HORTICULTURE	[12 Hours]	0.8 Credit
V.1	Gardening	-	
V.2	Kitchen garden		
V.3	Indoor gardening		
V.4	Lawn making		
Reference Bo	ooks:		
1H	orticulture & plant breeding	Prof. V. Kumaresa	ın

Dr. P. P. Deshmukh

4. Dry land horticulture in India

# Semester – VI New theory Syllabus BOTANY PAPER: - 601

# (CRYPTOGAMIC BOTANY & GYMNOSPERMS)

UNIT:- I	ALGAE	[12 Hours]	0.8 Credit		
I.1	Life history of following genus (Excluding development)				
	I.1.1Coleochetae	I.1.2 Caulerpa			
	I.1.3 Chara	I.1.4 Ectocarpus			
I.2	General Accounts and ed	conomic importance of Diatoms			
I.3	Evolution of sex in algae				
Reference Bo	ooks: t book of Algae	A.V.S.S.Sambamur	tsi		
	_		•		
2. Algae		Dr. A R Ragnald &	et.al		
3. Algae		B.R.Vashishta			
4. Algae		G.L.Chopra			
UNIT:- II	FUNGI	[12 Hours]	0.8 Credit		
II.1	Life history of following II.1.1 <i>Penicillium</i>	g genus (Excluding development) II.1.2 <i>Puccinia</i>			
II.2 II.3	Heterothallism in fungi	s in fungi			
Reference Bo		D. D. D 1			
1. The fi	_	B.P.Pandey			
2. Introd	luction to fungi	Dayal & Raizada			
3. Fungi		B. R. Vashishta			
UNIT:- III	BRYOPHYTES	[12 Hours]	0.8 Credit		
III.1	Life history of following	genus (Excluding development)			
	III.1.1 Anthoceros	III.1.2 Sphagnum			
III.2	Evolutionary trends of sp	porophyte			
Reference Bo		D D W 111			
<ol> <li>Bryop</li> <li>Bryop</li> </ol>	3	B. R. Vashishta N. Arumugan & et.al			
2. 21jop	, in j 100	TW TH'umugun es enur			
UNIT:- IV	PTERIDOPHYTES &	GYMNOSPERM [12 Hours]	0.8 Credit		
IV.1	Life history of following	g genus (Excluding development)			
	IV.1.1 <i>Ophioglossum</i>	IV.1.2 Marsilea			
IV.2	Life history of following	genus (Excluding development)			
	V.1.1 Ephedra	V.1.2 Gnetum			

### **Reference Books:**

5. A text book of Botany

Singh, Pande & Jain

6. Pteridophyta

B. P. Panday

7. Gymnosperms

O. P. Sharma

### UNIT:- V PALEOBOTANY [12 Hours] 0.8 Credit

V.1 Nomenclature of fossils and types of fossils

V.2 Morphology and stem anatomy of following Pteridophytes fossils.

V.2.1 Rhynia V.2.2 Lepidodendron

V.2.3 Calamites

V.3 Morphology and stem anatomy of following gymnosperm fossils.

V.3.1 Lyginodendrone V.3.2 Cycadeoidea

V.3.3 Cordites V.3.4 Pentoxylon

#### **Reference books:**

1. Diversity of Ptrido., Gymno. & Paleobotany Satish Kumar

## Semester – VI

# **New theory Syllabus**

# **BOTANY PAPER: - 602**

# ( PHYSIOLOGY, BIOCHEMISTRY, BIOSTATISTIC, MICROBIOLOGY AND PATHOLOGY)

UNIT:- I	PLANT PHYSIOLOGY	[12 Hours]	0.8 Credit
I.1 I.2 I.3 I.4	Ascent of cell sap Transpiration Physiology of flowering Stress physiology		
Keier	ence Books: 1. Plant Physiology		P.L.Kocchar
	2. Plant Physiology		Pandey & Sinha
	3. Plant Physiology		Salisbury & Ross
	4. Plant Physiology		V.K.Jain
	5. Plant Physiology		V.Verma
UNIT:- II	BIOCHEMISTRY	[12 Hours]	0.8 Credit
II.1 II.2 II.3 II.4 II.5 Refere	Carbohydrates – classification, prop Proteins – classification and Structur (Primary, secondary, tertiary and qu Lipids – classification, structure and Enzymes – inhibition Alkaloids- General properties and exerce Books:	re and functions aternary) functions.	
	1. Laboratory manual in Biochem	istry	J.Jayraman
	2. Instant Notes : Biochemistry		B.D.Hames
	3. Fundamentals of biochemistry		N.Arumugam
UNIT:- III	BIOSTATISTIC	[12 Hours]	0.8 Credit
III.1 III.2 III.3 III.4 Reference Bo	Measures of central tendency: Mean Measures of dispersion: Standard de Chi-square test Variance		
Title Di	Introductory Biostatistics		Chap.T.Le
	2. Biostatistics		P. Ramakrishnan
	3. Introduction to biostatistics		P. K. Banerjee

UNIT:- IV	MICROBIOLOGY [12 Hours]		0.8 Credit
IV.1	Ultra structure of <i>E.coli</i> and Bacteriophage		
IV.2	Gram Staining and sterilization methods		
IV.3	<del>-</del>		
IV.4	•		
2,	IV.4.1 Alcohol fermentation		
	IV.4.2 Food processing		
	IV.4.3 Antibiotic		
	IV.4.4. Single Cell Protein		
Rofor	ence books:		
Kelei	1. Microbiology Vol. – I & Vol II	P.D.Sh	arma
UNIT:- V	PLANT PATHOLOGY	[12 Hours]	0.8 Credit
		[12 Hours]	0.8 Credit
V.1	Introduction and classification of plant diseases	[12 Hours]	0.8 Credit
V.1 V.2	Introduction and classification of plant diseases General symptoms of diseases	[12 Hours]	0.8 Credit
V.1	Introduction and classification of plant diseases General symptoms of diseases Study of different diseases of plants	[12 Hours]	0.8 Credit
V.1 V.2	Introduction and classification of plant diseases General symptoms of diseases Study of different diseases of plants V.3.1 Tikka disease of ground nut	[12 Hours]	0.8 Credit
V.1 V.2	Introduction and classification of plant diseases General symptoms of diseases Study of different diseases of plants V.3.1 Tikka disease of ground nut V.3.2 Red rot of sugarcane	[12 Hours]	0.8 Credit
V.1 V.2 V.3	Introduction and classification of plant diseases General symptoms of diseases Study of different diseases of plants V.3.1 Tikka disease of ground nut V.3.2 Red rot of sugarcane V.3.3 Whip smut of sugarcane V.3.4 Citrus canker	[12 Hours]	0.8 Credit
V.1 V.2	Introduction and classification of plant diseases General symptoms of diseases Study of different diseases of plants V.3.1 Tikka disease of ground nut V.3.2 Red rot of sugarcane V.3.3 Whip smut of sugarcane V.3.4 Citrus canker Different methods of Plant disease control.	[12 Hours]	0.8 Credit

# Semester – VI

# **New theory Syllabus**

### **BOTANY PAPER: - 603**

# (CYTOGENETICS, MOLECULAR BIOLOGY, GENETIC ENGINEERING AND ADVANCE TECHNIQUES)

UNIT:- I	CYTOLOGY	[12 Hours	s]	0.8 Credit
I.1 I.2 I.3 I.4 <b>Refer</b>	Cell wall Nucleus Chloroplast Mitochondria ence Books:			
	1. Cell Biology Anatomy and micro-techn	niques	Annie	Ragland
	2. Cell Biology		Singh	a & Tomar
	3. Cell Biology and molecular Biology		N.Arı	ımugam
UNIT:- II	GENETICS	[12 H	ours]	0.8 Credit
II.1 II.2 II .3 II.4 II.5 Reference Bo	Linkage Crossing over Chromosome map Gene mutation Hardy-Weinberg's law			
	book of genetics			. Rastogi amin & lewin
	ics Today			t Singh
4. Genet	•			Winchester
	MOLECULAR BIOLOGY Structure of RNA Genetic code Isolation of DNA. Lac-operon concept DNA repair mechanism	[12 Hours]	0.8 C	redit
Reference Bo	1. Molecular biology		N.Aru	ımugam
	2. Molecular biology & tools & tech.		D.M.	0
UNIT:- IV	GENETIC ENGENERING	[12 H		0.8 Credit
IV.1 IV.2	Concept of Genetic Engendering Tools used in Genetic Engendering IV.2.1 Enzyme used in Genetic Engenderin	g		

IV.2.3 Coupling tools Methods' of Genetic Engenering IV.3 IV.3.1 Preparation of desired genes IV.3.2 Isolation of DNA vector IV.3.3 Construction of recombinant DNA IV.3.4 Introduction of recombinant DNA in the host cell IV.3.5 Selection and multiplication of recombinant host cell IV.3.6 Expression of cloned gene Transgenic plant IV.4 **Reference Books:** N.Arumugam 1. Genetic Engineering 3. Elements of Biotechnology P. K. Gupta ADVANCE TECHNIQUES IN BOTANY UNIT:- V [12 Hours] 0.8 Credit Chromatography V.1 V.1.1 TLC V.1.2 GC V.1.3 HPLC Electrophoresis V.2 V.3 **PCR Reference Books:** 1. Chromatography B.K. Sharma 2. Principle & tech. of biophysics N.Arumugam

IV.2.2 Gene cloning vector

### BOTANY PRACTICAL – 1 Semester – V (Based on paper – 501 – P)

- 1. To study the different plant families mentioned in theory paper (minimum two plants should be studied in each family).
- 2. To study the different types of ovules through permanent slides:
- 3. Dissection and mounting of various types of embryo.
- 4. Economic importance of plants mention in theory paper.

### BOTANY PRACTICAL – 2 Semester – V (Based on paper – 502 – P)

- 1. To determine the minimum size of the quadrate by species area curve.
- 2. To demonstrate the frequency of various species occurring in a given area.
- 3. To demonstrate the density and abundance of various species occurring in given area.
- 4. To demonstrate the vegetational cover in a given area.
- 5. To study the species composition of an area for analyzing the biological spectrum and comparison with Raunkiar's normal biological spectrum.
- 6. Comparison of dissolved oxygen (DO) content of polluted and non-polluted water by iodometric titration method.
- 7. Estimation of water hardness.
- 8. To study Bacteria in T.S. of root nodule.

### **BOTANY PRACTICAL – 3**

### Semester – V

### (Based on paper -503 - P)

- 1. To study the principle, functions and applications of the instruments mentioned in the theory.
- 2. To measure the height of the trees in college campus.
- 3. Find out the basal cover and canopy cover of the plants of college campus.
- 4. To create a design of residential land scape garden (minimum three).
- 5. To study medicinal properties of medicinal plants mention in theory syllabus.
- 6. Microtomy: Block preparation, sectioning, staining methods.
- 7. To study botanical uses of spices and condiments.
- 8. To demonstrate herbarium techniques.

### **BOTANY PRACTICAL – 4**

### Semester – VI

### (Based on paper -601 - P)

- 1. Studies of algal genera with reference to the genus mentioned in theory with the help of class work materials and permanent slides for their vegetative and reproductive structures.
- Studies of fungal genera with reference to the genus mentioned in theory with the help of class work materials and permanent slides for their vegetative and reproductive structures.
- 3. Studies of morphology, anatomy and reproductive structure of representative bryophytes mentioned in theory paper.
- 4. Studies of morphology, anatomy and reproductive structure of representative Pteridophytes mentioned in theory paper.
- 5. Studies of morphology, anatomy and reproductive structure of representative gymnosperms mentioned in theory paper.
- 6. Studies of fossil genera through slides and specimens mentioned in theory papers.

### **BOTANY PRACTICAL - 5**

### Semester - VI

### (Based on paper -602 - P)

- 1. To study different type of stomata.
- Qualitative analysis of carbohydrates (Fehling's test, Benedict's test, Barfoed's test, Molisch's test, Anthrone test).
- 3. Qualitative analysis of proteins (Xanthoproteic Reaction, Biuret test, Millon's test, Hopkin's test)
- 4. Qualitative test for lipid (Sudan-II, Acrolein test, Solubility test, Emulsification test)
- 5. Estimation of fatty acid by titration.
- 6. Calculation of central tendencies –mean, median and mode (minimum four exercise)
- 7. Calculation of standard deviation (minimum three exercise)
- 8. Calculation of Variance. (minimum three exercise)
- 9. Calculation of chi-square test (minimum three exercise)
- 10. To study the bacterial cell morphology through Gram's staining.
- 11. To study plat disease as per theory.

## PRACTICAL – 6 Semester – VI (Based on paper – 603 – P)

- 1. Demonstration of salivary gland chromosomes from *Chironomous* larva by Aceto orcein technique.
- 2. To detect presence of cell wall components.(Cellulose, Lignin, Mucilage & suberin)
- 3. To study chloroplast in plants.
- 4. To study the mitosis by Squash technique of onion root tip.
- 5. To study meiosis by smear technique
- 6. To prepare the TLC slides and separate the given biological mixture.
- 7. Double stain (Permanent slide) preparation.

#### **Reference Books:**

A textbook of Practical Botany Vol.–I,II & III
 Bendra & Kumar
 Modern Practical Botany Vol.I,II & III
 B.P. Pandey

### **B.Sc. – BOTANY PRACTICAL SKELETON**

Semester -	$-\mathbf{V}$	Practical – 1
Times:- 3	(Based on paper – 501 – P) hours	Total Marks:- 35
Question: 1	Identify and classify given Specimen A, B &	<b>C</b> and write floral
	formula floral diagram	[12]
Question: 2	Identify the given family by dissect the flo	wer and expose the
floral parts sho	ow it to examiner <b>Specimen D</b>	[04]
Question: 3	Prepare the slide of given <b>Specimen E</b> .	[03]
Question: 4	Rotation: Identify & Describe Specimen F, G	[06]
Question: 5	Viva voce	[05]
Question: 6	Certified Journal	[05]

### **B.Sc. – BOTANY PRACTICAL SKELETON**

Semester – V Practical – 2

(Based on paper -502 - P)

Times:- 3 hours Total Marks:- 35

Question: 1 Measure the DO/Hardness of given water sample. [12]

**Question: 2** Find out frequency/density/abundance/veg.cover of plant species

[10]

Question: 3 Prepare slide of given material and show to the examiner [05]

Question: 4 Viva voce [04]

Question:5 certified Journal [04]

## **B.Sc. – BOTANY PRACTICAL SKELETON**

Semester -	- v Practical	-3
	(Based on paper – 503– P)	
Times:- 3	hours Total M	arks:- 35
Question: 1	Measure the Hight/Canopy cover/Basel cover of the tree.	[07]
Question: 2	Create a design of resident land scape garden	[07]
	Or	
Question: 2	Take a thin section from given block and prepare the slide	<b>.</b>
Question: 3	Rotation: Identify & Describe Specimen A, B & C	[09]
Question: 4	Submission: Ten herbarium sheets	[07]
Question: 5	Certified Journal	[05]
B.Sc. – BOTANY PRACTICAL SKELETON  Semester – VI Practical – 4  (Paged on pager 601 B)		
Semester -	- VI Practical	<b>- 4</b>
Semester - Times:- 3	- VI Practical (Based on paper – 601– P)	– 4 arks:- 35
	- VI Practical (Based on paper – 601– P)	
Times:- 3	- VI Practical (Based on paper – 601– P) hours Total M	
Times:- 3	(Based on paper – 601– P)  hours  Total M  Identify, classify & describe with labeled diagram	arks:- 35
Times:- 3  Question: 1	- VI Practical (Based on paper – 601– P) hours Total M  Identify, classify & describe with labeled diagram  Specimen A, B & C	[12] [08]
Times:- 3  Question: 1  Question: 2	-VI (Based on paper – 601– P) hours  Total M  Identify, classify & describe with labeled diagram  Specimen A, B & C  Identify & Describe Specimen D & E	[12] [08]
Times:- 3  Question: 1  Question: 2  Question: 3	(Based on paper – 601– P)  hours  Total M  Identify, classify & describe with labeled diagram  Specimen A, B & C  Identify & Describe Specimen D & E  Expose and show the preparation of Specimen	[12] [08] F to the

## **B.Sc. – BOTANY PRACTICAL SKELETON**

Semester	- VI Practic	al – 5
Times:- 3	(Based on paper – 602– P) hours Total	Marks:- 35
Question: 1	Two qualitative test for given sample(carbo./pro./lipid)	[06]
Question: 2	Quantitative estimation of given sample	[04]
Question: 3	Calculation of given exercise (any two can be ask)	[08]
Question:4 p	prepare a slide of stomata of given specimen & show to examiner	[05]
Question: 5	Perform Gram's staining	[04]
Question: 6	Identify and describe plant disease specimen	[05]
Question: 7	Certified Journal	[03]
Semester	– VI Practic (Based on paper – 603– P)	al – 6
Times:- 3	hours Total	Marks:- 35
Question: 1	Prepare a slide from a given sample (giant chromosome/ow to examiner	
Question: 1	Prepare a slide from a given sample (giant chromosome/	/chloroplast)
Question: 1	Prepare a slide from a given sample (giant chromosome/ ow to examiner Prepare a slide from a given sample (mitosis / meios	/chloroplast)
Question: 1 and she Question: 2	Prepare a slide from a given sample (giant chromosome/ ow to examiner Prepare a slide from a given sample (mitosis / meios	/chloroplast) [06] sis) and
Question: 1 and she Question: 2 show to exam Question: 3	Prepare a slide from a given sample (giant chromosome/ ow to examiner Prepare a slide from a given sample (mitosis / meios niner	/chloroplast) [06] sis) and [05]
Question: 1 and she Question: 2 show to exam Question: 3	Prepare a slide from a given sample (giant chromosome/ ow to examiner  Prepare a slide from a given sample (mitosis / meios niner  To detect presence of cell wall	/chloroplast) [06] sis) and [05] component
Question: 1 and she Question: 2 show to exam Question: 3 (cellulose/lig	Prepare a slide from a given sample (giant chromosome/ ow to examiner  Prepare a slide from a given sample (mitosis / meios niner  To detect presence of cell wall nin/mucilage/suberin)	/chloroplast) [06] sis) and [05] component [06]
Question: 1  and she Question: 2  show to exan Question: 3  (cellulose/lig Question: 4	Prepare a slide from a given sample (giant chromosome/ ow to examiner  Prepare a slide from a given sample (mitosis / meios niner  To detect presence of cell wall nin/mucilage/suberin)  separate the given biological sample with TLC	/chloroplast) [06] sis) and [05] component [06]
Question: 1  and she Question: 2  show to exan Question: 3  (cellulose/lig Question: 4	Prepare a slide from a given sample (giant chromosome/ ow to examiner  Prepare a slide from a given sample (mitosis / meios niner  To detect presence of cell wall nin/mucilage/suberin)  separate the given biological sample with TLC  Submission work:	/chloroplast) [06] sis) and [05] component [06] [05]