



Devrukh Shikshan Prasarak Mandal's

**Nya. Tatyasaheb Athalye Arts, Ved. S.R. Sapre Commerce and
Vid. Dadasaheb Pitre Science College (Autonomous)**

Late Kakasaheb Pandit Educational Campus,

Devrukh, Dist: Ratnagiri- 415 804, Maharashtra

NAAC Accredited 'A' Grade (Third Cycle), Mumbai University Best College Award 2009-10

BOS in Botany Meeting Minutes of 25/04/2019

Agenda

25/04/2019

1. Welcome of all members of Board of Studies
2. To review and reframe the old syllabus of F. Y. B. Sc.
3. Discussion on the feedbacks given by the stakeholders on old syllabus
4. Discussion on the Internal Evaluation System
5. Discussion on Question paper pattern
6. To prepare the panel of external examiners and paper setters
7. Academic planning for upcoming year 2019-20
8. To start skill based certificate courses
9. Methodologies for innovative teaching and evaluation techniques
10. Any other relevant matter with the permission of chairperson

Minutes of the BOS in Botany meeting convened on April 25, 2019 in Botany Laboratory of the college.

The meeting BOS in Botany meeting held on April 25, 2019 at Botany laboratory at 10:30 am. Following members were present for the meeting.

- 1 Dr. Pratap Naikwade - Chairman of BOS
2. Dr. Ranjit Bansode - Member of BOS as faculty in the dept.
3. Dr. Avinash Ade - Member as subject experts from outside the Parent University
4. Dr. Vinod Shimpale - Member as subject experts from outside the Parent University
- 5 Dr. Rajendra Shinde - Member as expert to be nominated by the Vice-Chancellor
- 6 Dr. Vinayak Kedage -Member as representative from industry/ allied area
7. Ms. Sharayu Dalavi - Member as postgraduate meritorious alumnus
- 8 Dr. Prakash Sanap - Member as Experts from outside the college
- 9 Dr. Hemant Chavan - Member as staff of the same faculty

The meeting commenced with the warm welcome of all the members of BOS by the BOS Chairman.

Dr. Pratap Naikwade informed the members that UGC and University of Mumbai conferred Autonomous status on the college w.e.f Academic Year 2019-20 for the initial period 10 years. Dr. Naikwade briefed about the vital role of the BOS in maintaining academic excellence in autonomous College.

Dr. Vinod Shimpale congratulated the Principal, management and staff for being the first college in the Konkan milieu that expressed preparedness to the UGC for obtaining and acquiring the Autonomy Status.

Agenda-

- 2. To review and reframe the old syllabus of F. Y .B. Sc.**

Dr. Naikwade reviewed the old syllabus of Botany Paper I (Theory and Practical) of F.Y B.Sc., while Dr. Bansode reviewed the old syllabus of Botany Paper II (Theory and Practical) of F.Y. B.Sc. In the previous syllabus, the classification of algae, fungi, bryophyte, pteridophyte and gymnosperms were not included. Before study of each group of plants it is necessary to study salient features of plant group and its classification. Now they introduced. Economic importance of bryophytes also added in the Paper I for the theory and practical as well that was not considered in the previous one. The types of cells and basic concept of genetics were included in the new syllabus in Paper II. Both teachers informed other members about the need of mandatory changes regarding the local relevance and current trends.

Resolution: It is unanimously resolved that the changes modified in the old syllabus were accepted.

Proposed by Dr. Prakash Sanap

Seconded by Ms. Hemant Chavan

Annexure I : Draft of new syllabus with comparison and reasoning

3. Discussion on the feedbacks given by the stakeholders on old syllabus

Dr. Bansode put forth feedbacks taken from stakeholders on old syllabus. All members discussed on the proposed changes suggested by stakeholders in syllabus.

Resolution: It is unanimously resolved that feedbacks from the stakeholders were taken into the consideration while framing the syllabus.

Proposed by Dr. Vinod Shimpale

Seconded by Ms. Sharayu Dalavi

4. Discussion on the Internal Evaluation System

Dr. Naikwade told that 30 marks of Internal evaluation can be divided as 10 marks for class test, 10 marks for project/field report/ PPT presentation and 10 marks for overall conductance. After discussion it was accepted by all members.

Resolution: It is unanimously resolved that Internal Evaluation System was approved.

Proposed by Dr. Pratap Naikwade

Seconded by Dr. Dr. Vinod Shimpale

5. Discussion on Question paper pattern

Dr. Bansode put forth theory and practical question papers for F.Y. B.Sc. Botany.

No.	Question Pattern	Marks
Q.1	a) Fill in the blanks by choosing appropriate options (5 MCQs) b) Answer in one /two sentences	05 05
Q.2	Answer any two. (based on Unit I) a) Long Answer Question b) Long Answer Question c) Long Answer Question d) Two short notes	20
Q.3	Answer any two. (based on Unit II) a) Long Answer Question b) Long Answer Question c) Long Answer Question d) Two short notes	20
Q.4	Answer any two. (based on Unit III) a) Long Answer Question b) Long Answer Question c) Long Answer Question d) Two short notes	20
Total		70

After discussion it was accepted by all members.

Resolution: It is unanimously resolved that question paper pattern was approved.

Proposed by Dr. Ranjit Bansode

Seconded by Dr. Prakash Sanap

6. To prepare the panel of external examiners and paper setters

Dr. Bansode told that it is a need to prepare the panel of external paper setters, examiners and moderators for the FY and SY BSc Botany for the current academic year. It is decided that the selection will be based on the criteria of outside the vicinity. Rather the preference will be given to the persons belonging to the vicinity for the sake of convenience as the college resides in the utmost rural milieu.

Resolution: It is unanimously resolved that panel of external paper setters, examiners and moderators for the BSc. Botany was approved.

Proposed by Dr. Ranjit Bansode

Seconded by Dr. Vinod Shimpale

Annexure II: Panel of examiners

7. Academic planning for upcoming year 2019-20

Dr. Bansode initiated the discussion about various innovative and useful activities throughout the year such as Climate Ambassadors, Estimation of carbon sequestration in sacred groves and its conservation, Promotion of local food, Plant health clinic etc. The discussion took place with a grand support of other members of the BOS.

Resolution: It is unanimously resolved that Academic planning for upcoming year 2019-20 of Botany was approved.

Proposed by Dr. Ranjit Bansode

Seconded by Ms. Sharayu Dalavi

Annexure III: Academic planning for upcoming year 2019-20

8. To start skill based certificate courses

Dr. Naikwade accelerated the discussion about various skill based certificate courses conducted every year. Ms. Sharayu Dalavi initiated the discussion by saying that the multiple options to be made available to the students in selecting their course. After discussion four certificate courses viz. Certificate course in bio fertilizers, Certificate course in Ethnobotany, Certificate course in plant diversity and human welfare, Mushroom culture Technology were finalized. In addition to that Dr. Bansode introduced commencing the courses under the SWAYAM-online platform.

Resolution: It is unanimously resolved that skill based certificate courses were accepted.

Proposed by Dr. Pratap Naikwade

Seconded by Ms. Sharayu Dalavi

9. Methodologies for innovative teaching and evaluation techniques

Dr. Sanap told that in changing era it is very much required to use new innovative teaching and evaluation techniques. Dr. Naikwade told that publication of *Botanica* wallpaper with the involvement of students, participation of students in maintenance of Botanical garden,

Field study, research projects etc. are regular practices of the Botany department. Other members also shared their experiences.

Resolution: It is unanimously resolved that Methodologies for innovative teaching and evaluation techniques are approved.

Proposed by Dr. Prakash Sanap

Seconded by Dr. Pratap Naikwade

10. Any other relevant matter with the permission of chairperson

No other proposal.

Dr. Naikwade said that all the matters on the agenda have been discussed thoughtfully and the good decisions have been taken. He also said at this happy moment I take a privilege to thank everyone present here for the BOS meeting and for fruitful discussions as well as their contribution in designing the syllabus.

The meeting was over at 2:00 pm.

B. Sc. General (Semester Pattern) B. Sc. First Year**BOTANY – CURRICULUM**

Semester	Paper	Lectures /Practicals	Marks			Credits
			External	Internal	Total	
Semester I	Theory Paper I - Plant Diversity 1	45	70	30	100	02
	Theory Paper II – Form and Function 2	45	70	30	100	02
	Practical Paper I – Plant Diversity 1	09	35	15	50	01
	Practical Paper II – Form and Function 2	10	35	15	50	01
Semester II	Theory Paper I - Plant Diversity 1	45	70	30	100	02
	Theory Paper II – Form and Function 2	45	70	30	100	02
	Practical Paper I – Plant Diversity 1	11	35	15	50	01
	Practical Paper II – Form and Function 2	09	35	15	50	01

Semester I Paper I - Plant Diversity 1			Lecture	Credits	
Unit	Existing syllabus of Mumbai University	Proposed Syllabus Draft	45	02	Reason
Unit I Algae	1. Structure, life cycle and systematic position of Nostoc and Spirogyra. 2. Economic importance of Algae.	1. Algae: General Characters, Classification of algae 2. Chlorophyta: Distribution, range of thallus, reproduction and life cycle 3. Nostoc and	15		Classification of algae is necessary to identify Chlorophyta, Phaeophyta, Bacillariophyta etc.

		<p>Spirogyra: Occurrence, Structure, systematic position reproduction and life cycle 4. Economic importance of algae</p>			
Unit II Fungi	<p>1. Structure, life cycle and systematic position of Rhizopus and Aspergillus</p> <p>2. Economic importance of Fungi. 3. Modes of nutrition in Fungi (Saprophytism and Parasitism).</p>	<p>1.Fungi: General Characters, Classification of fungi</p> <p>2. Phycomycetes: Distribution, structure, reproduction and life cycle 3. Rhizopus and Aspergillus: Occurrence, Structure, systematic position reproduction and life cycle 4. Economic importance of Fungi. 5. Modes of nutrition in Fungi (Saprophytism and Parasitism).</p>	15		<p>Classification of fungi is necessary to identify Phycomycetes, Zygomycetes, Ascomycetes etc.</p>
Unit III Bryophyta	<p>1.General characters of Hepaticae 2. Structure, life cycle and systematic position of Riccia.</p>	<p>1.Bryophyta: General Characters, Classification of Bryophyta 2. Hepaticae : Distribution, structure, reproduction and life cycle 3. Riccia. Occurrence, Structure, systematic position reproduction and life</p>	15		<p>Classification of Bryophyta is necessary to identify Hepaticae, Anthocerotae, Musci</p> <p>Economic importance of Bryophytes is necessary</p>

		cycle 4. Economic importance of Bryophytes			
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Semester I Paper II – Form and Function 1			Lecture	Credits	
Unit	Existing syllabus of Mumbai University	Proposed Syllabus Draft	45	02	Reason
Unit I Cell Biology	1. General structure of plant cell: cell wall Plasma membrane (bilayer lipid structure, fluid mosaic model) 2 Ultra structure and functions of the following cell organelles: Endoplasmic reticulum and Chloroplast	1. Cell: Introduction, Types of cells 2 General structure of plant cell: cell wall Plasma membrane (bilayer lipid structure, fluid mosaic model) 3 Cell organelles: Introduction, Functions 4 Ultra structure and functions of the following cell organelles: Endoplasmic reticulum and Chloroplast	15		Types of cells are necessary to understand the differences between prokaryotic and eukaryotic cells. Same case for cell organelles
Unit II Ecology	1. Energy pyramids, energy flow in an ecosystem. 2. Types of ecosystems: aquatic and terrestrial.	1. Ecology: Introduction 2. Energy flow in an ecosystem, energy pyramids 3. Ecosystem: Introduction, Types of ecosystems: aquatic and terrestrial	15		To understand the importance of ecology and ecosystem in energy transfer in living organism
Unit III Genetics	1 Phenotype/Genotype, Mendelian Genetics- monohybrid, dihybrid;	1. Genetics: Introduction, Basics of Genetics,	15		Basic concept of genetics

	test cross; back cross ratios.	Genotype and Phenotype			
	2 Epistatic and non epistatic interactions; multiple alleles.	2. Mendelian Genetics- monohybrid, Dihybrid; test cross; back cross ratios			
		3. Epistatic and non epistatic interactions; multiple alleles.			

Semester I Practical Paper I – Plant Diversity 1		
Unit Existing syllabus of Mumbai University	Proposed Syllabus Draft	Reason
1 Study of stages in the life cycle of Nostoc from fresh/ preserved material and permanent slides.	1 Study of stages in the life cycle of Nostoc from fresh/ preserved material and permanent slides.	Economic importance of Bryophytes with special reference to Sphagnum must be added
2 Study of stages in the life cycle of Spirogyra from fresh/ preserved material and permanent slides.	2 Study of stages in the life cycle of Spirogyra from fresh/ preserved material and permanent slides.	
3 Economic importance of algae: Ulva (Biofuel), Spirulina (Neutraceutical), Gelidium (Agar)	3 Economic importance of algae: Ulva (Biofuel), Spirulina (Neutraceutical), Gelidium (Agar)	
4 Study of stages in the life cycle of Rhizopus from fresh/ preserved material and permanent slides.	4 Study of stages in the life cycle of Rhizopus from fresh/ preserved material and permanent slides.	
5 Study of stages in the life cycle of Aspergillus from fresh/ preserved material and permanent slides.	5 Study of stages in the life cycle of Aspergillus from fresh/ preserved material and permanent slides.	
6 Economic importance of Fungi: Mushroom , Yeast, wood rotting fungi (any bracket fungus).	6 Economic importance of Fungi: Mushroom , Yeast, wood rotting fungi (any bracket fungus).	
7 Study of stages in the life cycle of Riccia from fresh/ preserved	7 Study of stages in the life cycle of Riccia from fresh/ preserved material.	

material.		
8 Study of stages in the life cycle of Riccia with the help of permanent slides.	8 Study of stages in the life cycle of Riccia with the help of permanent slides.	
	9. Economic importance of Bryophytes: Sphagnum	

Semester I Practical Paper II- Form And Function 1		
Unit Existing syllabus of Mumbai University	Proposed Syllabus Draft	Reason
1 Examining various stages of mitosis in root tip cells (Allium)	1 Examining various stages of mitosis in root tip cells (Allium)	No Change is required
2 Cell inclusions: Starch grains (Potato and Rice); Aleurone Layer (Maize); Cystolith (Ficus); Raphides (Pistia); Sphaeraphides (Opuntia).	2 Cell inclusions: Starch grains (Potato and Rice); Aleurone Layer (Maize); Cystolith (Ficus); Raphides (Pistia); Sphaeraphides (Opuntia).	
3 Identification of cell organelles with the help of photomicrograph: Plastids: Chloroplast, Amyloplast, Endoplasmic Reticulum and Nucleus	3 Identification of cell organelles with the help of photomicrograph: Plastids: Chloroplast, Amyloplast, Endoplasmic Reticulum and Nucleus	
4 Identification of plants adapted to different environmental conditions: Hydrophytes: Floating: Free floating (Pistia/Eichornia); Rooted floating (Nymphaea); Submerged (Hydrilla)	4 Identification of plants adapted to different environmental conditions: Hydrophytes: Floating: Free floating (Pistia/Eichornia); Rooted floating (Nymphaea); Submerged (Hydrilla)	
5 Mesophytes (any common plant); Hygrophytes (Typha/Cyperus)	5 Mesophytes (any common plant); Hygrophytes (Typha/Cyperus)	
6 Xerophytes : Succulent (Opuntia); Woody Xerophyte (Nerium); Halophyte (Avicennia pneumatophore) No sections in ecology, only identification and description of specimens. Morphological adaptations only.	6 Xerophytes : Succulent (Opuntia); Woody Xerophyte (Nerium); Halophyte (Avicennia pneumatophore) No sections in ecology, only identification and description of specimens. Morphological adaptations only.	
7 Calculation of mean, median and	7 Calculation of mean, median and	

mode. 8 Calculation of standard deviation. 9 Frequency distribution, graphical representation of data- frequency polygon, histogram, pie chart. 10 Study of Karyotypes: Human: Normal male and female, Allium cepa .	mode. 8 Calculation of standard deviation. 9 Frequency distribution, graphical representation of data- frequency polygon, histogram, pie chart. 10 Study of Karyotypes: Human: Normal male and female, Allium cepa .	
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Semester II Paper I - Plant Diversity 1			Lecture	Credits	
Unit	Existing syllabus of Mumbai University	Proposed Syllabus Draft	45	02	Reason
Unit I Pteridophytes	1 Structure life cycle, systematic position and alternation of generations in Nephrolepis 2 Stelar evolution	1. Pteridophytes: General Characters, Classification of Pteridophytes 2. Pterophyta or Filicophyta: Distribution, range of thallus, reproduction and life cycle 3. Nephrolepis: Occurrence, Structure, systematic position reproduction and life cycle 4. Stelar evolution 5. Economic importance of Pteridophytes	15		Classification of Pteridophyta is necessary to identify Psilophyta, Lycophyta, Pterophyta etc. Economic importance of Pteridophytes is necessary
Unit II Gymnosperms	1 Structure life cycle systematic position and alternation of generations in	1. Gymnosperms: General Characters, Classification of Gymnosperms	15		Classification of Gymnosperms is necessary to identify

	<p>Cycas</p> <p>2 Economic importance of Gymnosperms</p>	<p>2. Cycadopsida: Distribution, range of thallus, reproduction and life cycle</p> <p>3. Cycas: Occurrence, Structure, systematic position reproduction and life cycle</p> <p>4. Economic importance of Gymnosperms</p>			<p>Cycadopsida, Coniferopsida, Gnetopsida</p>
<p>Unit III Angiosperms</p>	<p>1. Leaf: simple leaf, types of compound leaves, Incisions of leaf, venation, phyllotaxy, types of stipules, leaf apex, leaf margin, leaf base, leaf shapes. Modifications of leaf: spine, tendril, hooks, phyllode, pitcher, Drosera or insectivorous plants.</p> <p>2 Inflorescence: Racemose: simple raceme, spike, catkin, spadix, panicle. Cymose: monochasial, dichasial, polychasial. Compound: corymb, umbel, cyathium, capitulum, verticillaster, hypanthodium.</p> <p>3 Study of following</p>	<p>1. Taxonomy: Introduction, Hierarchy in classification, Binomial nomenclature</p> <p>2. Root: Introduction, types (taproot and adventitious)</p> <p>3. Stem: Introduction, modifications (stem tendril, runner, and rhizome)</p> <p>3. Leaf: Introduction, structure of typical leaf (Hibiscus), Types of leaf apex and margin, Types, Phyllotaxy and Venation.</p>	15		<p>Basics of taxonomy is necessary</p> <p>Basics of Plant morphology is necessary</p>

	families: Malvaceae, Amaryllidaceae.	4. Inflorescence: Introduction, structure of typical inflorescence, Types- Racemose and Cymose. 5. Flower: Introduction, structure of typical flower (Hibiscus), symmetry and types (hypogynous, epigynous, perigynous). 6. Study of following families: Malvaceae, Amaryllidaceae.			
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Semester II Paper II – Form and Function 1			Lecture	Credits	
Unit	Existing syllabus of Mumbai University	Proposed Syllabus Draft	45	02	Reason
Unit I Anatomy	1 Simple tissue, complex tissues. 2 Primary structure of dicot and monocot root, stem and leaf. 3 Epidermal tissue system: types of hair, monocot and dicot stomata.	1. Tissues: Introduction, Types of Tissues, Simple tissues, complex tissues. 2. Primary structure of dicot and monocot root, stem and leaf. 3. Epidermal tissue system: types of hair, monocot and dicot stomata.	15		Types of tissues on the basis of their dividing ability and composition
Unit II Physiology	1 Photosynthesis: Light reactions, photolysis of water, photophosphorylation (cyclic and non cyclic), carbon fixation phase	1 Photosynthesis: Introduction, Significance 2. Light reactions- photophosphorylation (cyclic and non	15		To understand the difference between light and

	(C3, C4 and CAM pathways).	cyclic), Photolysis of water, 3 Dark reactions- carbon fixation phase (C ₃ , C ₄ and CAM pathways).			dark reaction
Unit III Medicinal Botany	1 Concept of primary and secondary metabolites, difference between primary and secondary metabolites. 2 Grandma's pouch: Following plants have to be studied with respect to botanical source, part of the plant used, active constituents present and medicinal uses: Oscimum sanctum, Adathoda vasica, Zinziber officinale, Curcuma longa, Santalum album, Aloe vera.	1. Metabolites, Introduction, Concept of primary and secondary metabolites, Differences between primary and secondary metabolites. 2 Grandma's pouch: Following plants have to be studied with respect to botanical source, part of the plant used, active constituents present and medicinal uses: Oscimum sanctum, Adathoda vasica, Zinziber officinale, Curcuma longa, Santalum album, Aloe vera.	15		Metabolite is the important concept in medicinal botany

Semester II Practical Paper I – Plant Diversity 1		
Existing syllabus of Mumbai University	Proposed Syllabus Draft	Reason
1 Study of stages in the life cycle of Nephrolepis : Mounting of ramentum, hydathode, T.S. of rachis. 2 T.S. of pinna of Nephrolepis passing through sorus. 3 Stellar evolution with the help of permanent slides: Protosteles:	1 Study of stages in the life cycle of Nephrolepis : Mounting of ramentum, hydathode, T.S. of rachis. 2 T.S. of pinna of Nephrolepis passing through sorus. 3 Stellar evolution with the help of permanent slides: Protosteles: haplosteles,	Practicals on importance of Pteridophytes and plant morphology are necessary

haplostele, actinostele, plectostele, mixed protostele, siphonostele: ectophloic, amphiphloic, dictyostele, eustele and atactostele.	actinostele, plectostele, mixed protostele, siphonostele: ectophloic, amphiphloic, dictyostele, eustele and atactostele.	
4 Cycas: T.S of leaflet (Cycas pinna)	4. Economic importance of Pteridophytes	
5 Megasporophyll, microsporophyll, coralloid root, microspore, L.S. of ovule of Cycas – all specimens to be shown.	5 Cycas: T.S of leaflet (Cycas pinna)	
6 Economic importance of Gymnosperms: Pinus (turpentine, wood, seeds)	6 Megasporophyll, microsporophyll, coralloid root, microspore, L.S. of ovule of Cycas – all specimens to be shown.	
7 Leaf morphology : as per theory	7. Economic importance of Gymnosperms: Pinus (turpentine, wood, seeds)	
8 Types of inflorescence: as per theory	8 Plant morphology (Root, Stem, Leaf) : as per theory	
9 Malvaceae	9 Types of inflorescence and flower: as per theory	
10 Amaryllidaceae	10 Malvaceae	
	11 Amaryllidaceae	

Semester II Practical Paper II – Form and Function 1		
Existing syllabus of Mumbai University	Proposed Syllabus Draft	Reason
1 Primary structure of dicot and monocot root.	1 Primary structure of dicot and monocot root.	No change is required
2 Primary structure of dicot and monocot stem.	2 Primary structure of dicot and monocot stem.	
3 Study of dicot and monocot stomata.	3 Study of dicot and monocot stomata.	
4 Epidermal outgrowths: with the	4 Epidermal outgrowths: with the help of mountings	

<p>help of mountings Unicellular: Gossypium/Radish Multicellular: Lantana/Sunflower Glandular: Drosera and Stinging: Urtica – only identification with the help of permanent slides. Peltate: Thespesia Stellate: Erythrina/Sida acuta/Solanum/Helecteris T-shaped: Avicennia</p>	<p>Unicellular: Gossypium/Radish Multicellular: Lantana/Sunflower Glandular: Drosera and Stinging: Urtica – only identification with the help of permanent slides. Peltate: Thespesia Stellate: Erythrina/Sida acuta/Solanum/Helecteris T-shaped: Avicennia</p>	
<p>5 Separation of chlorophyll pigments by strip paper chromatography.</p>	<p>5 Separation of chlorophyll pigments by strip paper chromatography.</p>	
<p>6 Separation of amino acids by paper chromatography.</p>	<p>6 Separation of amino acids by paper chromatography.</p>	
<p>7 Change in colour because of change in pH: Anthocyanin: black grapes/Purple cabbage</p>	<p>7 Change in colour because of change in pH: Anthocyanin: black grapes/Purple cabbage</p>	
<p>8 Test for tannins: tea powder/catechu.</p>	<p>8 Test for tannins: tea powder/catechu.</p>	
<p>9 Identification of plants or plant parts for grandma’s pouch as per theory.</p>	<p>9 Identification of plants or plant parts for grandma’s pouch as per theory.</p>	

Reference Books

1. College Botany Volume I and II Gangulee, Das and Dutta latest edition. Central Education enterprises
2. Cryptogamic Botany Volume I and II by G M Smith, McGraw Hill.
3. Text book of Fungi by O.P. Sharma, Tata McGraw
4. Morphology and Evolution of Vascular Plants by Gifford, E. M. and Foster, A. S.,
W.H. Freeman & Co., New York.

5. Cryptogamic Botany Vol. I & II (2nd Edition) by Gilbert, M. S., Tata Mcgraw Hill Publishing Co., Ltd New Delhi.
6. Introductory Phycology by Kumar, H. D. 1988,. Affiliated East-West Press Ltd.,New York.
7. Comparative Morphology of Vascular Plants Foster, A. S. and Gifford, A.E.M. jr.
Vakils, Peffer & Simons Pvt., Ltd.
8. The Morphology of Angiosperms by Sporne, K.R. B.I. Publication, Bombay.
9. Taxonomy of Vascular Plants. Lawrance. G.H.M. 1951. MacMillan, NewYork.
10. Environmental Science: A Global Concern by Cunningham.W.P. and Saifo S.W. 1997.
WCB. McGraw Hill.
11. Biochemistry and Molecular Biology of Plants. By Buchanan. B.B. Grussem. W. and Jones. R.L. 2000. American Society of Plant Physiologists, Maryland, USA.
12. Plant Melabolism (2nd Edition) by Collins. H.A. and Edwards D.H. Lefebvre. D.D. and Layzell. D.B. (eds) 1997. Longman, Essex, England
13. Genetics by Russel. Wesley Longman inc publishers. (5th edition)
14. Plant Physiology by Taiz and Zeiger Sinauer Associates inc. publishers
15. Fundamentals of Ecology by E P Odum and G W Barrett. Thompson Asia Pvt Ltd. Singapore.
16. Cell Biology by De Robertis
17. A Text Book of Systematic Botany by Sutaria R N
18. Taxonoy of Angiosperms by Pandey S N and Mishra S D
19. A text book of Plant Ecology Ambasht R.S.
20. Fundamentals of Cytology by L. W. Sharp.

Evaluation Pattern

External evaluation: Internal evaluation (70:30)

Theory:-External evaluation (70 Marks) Question Paper Pattern

Time: 2.5 hours

No.	Question Pattern	Marks
Q.1	a) Fill in the blanks by choosing appropriate options (5 MCQs)	05
	b) Answer in one /two sentences	05
Q.2	a) Long Answer Question (based on Unit I) OR	10
	a) Long Answer Question/ Two short notes (based on Unit I)	10
	b) Long Answer Question (based on Unit I) OR	10
	b) Long Answer Question/ Two short notes (based on Unit I)	10
Q.3	a) Long Answer Question (based on Unit II) OR	10
	a) Long Answer Question/ Two short notes (based on Unit II)	10
	b) Long Answer Question (based on Unit II) OR	10
	b) Long Answer Question/ Two short notes (based on Unit II)	10
Q.4	a) Long Answer Question (based on Unit III) OR	10
	a) Long Answer Question/ Two short notes (based on Unit III)	10
	b) Long Answer Question (based on Unit III) OR	10
	b) Long Answer Question/ Two short notes (based on Unit III)	10
Total		70

Theory:-Internal evaluation (30 Marks)

Description	Marks
Test	10
Project	10
Overall Conductance	10
Total	30

Practical:- External evaluation (35 Marks) Question Paper Pattern

No.	Question Pattern	Marks
Q.1	Identify, Classify and Describe the given Specimen A	06
Q.2	Identify, Classify and Describe the given Specimen B	06
Q.3	Identify, Classify and Describe the given Specimen C	06
Q.4	Identify and describe given Spot D, E and F	09
Q.5	Certified Journal	04
Q.6	Viva-voce	04
Total		35

Practical:- Internal evaluation (15 Marks)

Description	Marks
Performance in Regular Practicals	10
Active participation in Botanical Excursion	05
Total	15

Expected Learning Outcomes

(Programme Outcomes, Programme Specific Outcomes, Course Outcomes)

B.Sc. Botany

Programme Outcomes

PO1. Knowledge and understanding of: 1. The range of plant diversity in terms of structure, function and environmental relationships. 2. Plant classification. 3. Plant pathology and physiology. 4. Genetics and biotechnology 5. The role of plants in the functioning of the global ecosystem. 6. Statistics as applied to biological data. 7. Modern techniques to study plants 8. Current trends in plant sciences

PO2. Intellectual skills Students able to: 1. Think logically and organize tasks into a structured form. 2. Assimilate knowledge and ideas based on wide reading and through the internet. 3. Transfer of appropriate knowledge and methods from one topic to another within the subject. 4. Understand the evolving state of knowledge in a rapidly developing field. 5. Construct and test hypothesis. 6. Plan, conduct and write a report on an independent term project.

PO3. Practical skills: Students learn to carry out practical work, in the field and in the laboratory, with minimal risk. They gain introductory experience in applying each of the following skills and gain greater proficiency in a selection of them depending on their choice of optional modules. 1. Interpreting plant morphology and anatomy. 2. Plant identification. 3. Vegetation analysis techniques. 4. A range of physiochemical analyses of plant materials in the context of plant physiology and biochemistry. 5. Analyze data using appropriate statistical methods. 6. Plant pathology to be added for sharing of field and lab data obtained.

PO4. Transferable skills: 1. Use of IT (word-processing, use of internet, statistical packages and databases). 2. Communication of scientific ideas in writing and orally. 3. Ability to work as part of a team. 4. Ability to use library resources. 5. Time management. 6. Career planning.

PO5. Scientific Knowledge: Apply the knowledge of basic science, life sciences and fundamental process of plants to study and analyze any plant form.

PO6. Problem analysis: Identify the taxonomic position of plants, formulate the research literature, and analyze non reported plants with substantiated conclusions using first principles and methods of nomenclature and classification in Botany.

PO7. Design/development of solutions: Design solutions from medicinal plants for health problems, disorders and disease of human beings and estimate the phytochemical content of plants which meet the specified needs to appropriate consideration for the public health.

PO8. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and development of the information to provide valid conclusions.

PO9. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern instruments and equipments for Biochemical estimation, Molecular Biology, Biotechnology, Plant Tissue culture experiments, cellular and physiological activities of plants with an understanding of the application and limitations.

PO10. The Botanist and society, Effective Citizenship: Apply reasoning informed by the contextual knowledge to assess plant diversity, its importance for society, health, safety, legal and environmental issues and the consequent responsibilities relevant to the biodiversity conservation practice.

PO11. Environment and sustainability: Understand the impact of the plant diversity in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO12. Ethics: Apply ethical principles and commit to environmental ethics and responsibilities and norms of the biodiversity conservation.

PO13. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO14. Communication: Communicate effectively on complex forms and functions of plants with Botanists community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO15. Self-directed and Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of plant study.

Programme Specific Outcomes: (PSO)s of B.Sc. Botany:

PSO 1. Critically evaluation of ideas and arguments by collection relevant information about the plants, so as recognize the position of plant in the broad classification and phylogenetic level.

PSO 2. Identify problems and independently propose solutions using creative approaches, acquired through interdisciplinary experiences, and a depth and breadth of knowledge/expertise in the field of Plant Identification.

PSO 3. Accurately interpretation of collected information and use taxonomical information to evaluate and formulate a position of plant in taxonomy.

PSO 4. Students will be able to apply the scientific method to questions in botany by formulating testable hypotheses, collecting data that address these hypotheses, and analyzing those data to assess the degree to which their scientific work supports their hypotheses.

PSO 5. Students will be able to present scientific hypotheses and data both orally and in writing in the formats that recommended for research.

PSO 6. Students will be able to access the primary literature, identify relevant works for a particular topic, and evaluate the scientific content of these works.

PSO 7. Students will be able to apply fundamental mathematical tools (statistics, calculus) and physical principles (physics, chemistry) to the analysis of relevant biological situations.

PSO 8. Students will be able to identify the major groups of organisms with an emphasis on plants and be able to classify them within a phylogenetic framework. Students will be able to compare and contrast the characteristics of plant groups, and differentiate them from each other and from other forms of life.

PSO 9. Students will be able to use the evidence of comparative biology to explain how the theory of evolution offers the only scientific explanation for the unity and diversity of life on earth. They will be able to use specific examples to explicate how descent with modification has shaped plant morphology, physiology, and life history.

PSO 10. Students will be able to explain how Plants function at the level of the gene, genome, cell, tissue, Flower development. Drawing upon this knowledge, they will be able to give specific examples of the physiological adaptations, development, reproduction and mode of life cycle followed by different forms of plants.

PSO 11. Students will be able to explain the ecological interconnectedness of life on earth by tracing energy and nutrient flow through the environment. They will be able to relate the physical features of the environment to the structure of populations, communities, and ecosystems.

PSO 12. Students will be able to demonstrate proficiency in the experimental techniques and methods of analysis appropriate for their area of specialization within biology.

Course Outcomes of B.Sc. Botany

After completion of course following learning outcomes are expected.

Students will learn and understand the syllabus.

*Annexure II***Panel of Examiners/Paper Setters**

Sr. No.	Name of Teacher	Institution	Mob. No.
1.	Dr. Sangita Ghadge	Head Dept of Botany, Loknete Gopinath Mundhe College, Mandangad, Dist. Ratnagiri	7218083799
2.	Dr. Raghunath Ghalme	Head, Dept. of Botany, Dapoli Urban Bank College, Dapoli, Dist. Ratnagiri	9421143701
3.	Dr. Anil Avhad	Department of Botany, Ramnarayan Jhunjhunwala. College, Ghatkopar (W)Mumbai	9322270124
4.	Dr. U. L.Dethe	Head, Dept. of Botany, SPK College, Sawantwadi, Dist. Sindhudurg	9421143071
5.	Dr. Ashutosh J. Pahurkar	Department of Botany, Siddharth College of Arts, Science and Commerce, Fort, Mumbai	9821120219
6.	Dr. Nitin Labhane	Department of Botany, Bhavan College, Andheri (W), Mumbai	9765393101
7.	Dr. Kalyan Sawant	Department of Botany, Rajarshi Shahu College(Autonomous), Latur (S.R.T.M. University, Nanded)	9403591841
8.	Dr. Navnath Kashid	Department of Botany, Vasant Mahavidyalaya, Kaij,Dist. Beed (Dr. B.A. M. University, Aurangabad)	9423339459
9.	Dr. Arun Chandore	Department of Botany, Abasaheb Marathe Arts and New Commerce Science College Rajapur Dist. Ratnagiri	923021796
10.	Mr. Ramesh Prakash Kahetti	Department of Botany, Anandibai Raorane Arts, Commerce & Science College, Vaibhavwadi Dist. Sindhudurg	9730460853
11.	Dr. Vijay Ashruba Paithane	Department of Botany, Anandibai Raorane Arts, Commerce & Science College, Vaibhavwadi Dist. Sindhudurg	9158629007
12.	Dr. Umesh Mogle	Department of Botany, R.G.Bagdia Arts, S.B. Lakhotia Commerce and R. Bezonji Science College, Jalna.	9420633777
13	Dr. Shrimant Survase.	Department of Botany, Lalbahadur Shastri Senior College, Partur Dist Jalna	9860318549
14	Dr. Sunil Sangale	Department of Botany, Rajaram College, Kolhapur	9923978938
15	Dr. Swapnil Mahamune	Department of Botany, Govt Vidarbha Institute of Science, Amaravati	9049707293

Department of Botany

Academic Planning for Year calendar 2019-20

Sr. No.	Month	Proposed Activity	Purpose	Expected Outcome	Budgetary Provision
1	June	Inspirational Lecture	To motivate students	Students will be motivated for study	-
2		1. Sending teaching plan to students' semester wise 2. Sending syllabus with expected learning outcome	To help students to understand expected outcomes of syllabus and prepare themselves as per teaching plan	Students will understand expected outcomes of syllabus and prepare themselves as per teaching plan	-
3		Formation of group of students and a mentor for group	To give personal attention to each student and give support to student	Mentoring will result in overall progress of student throughout year	-
4	July	Celebration of Maharashtra Krishi Din- 1 July	To make students aware of Agriculture, nature, problems and probable solutions	Students will aware about importance nature, problems and solutions of agriculture	-
5		Training for internet surfing and ID creation for students	To create E mail ID for students and orient them for use of computer and Internet	Students will use E mail for submission of articles for Botanica and will surf internet for study	-
6		Birth Anniversary of Mendel-22 July	To make aware students about work of Mendel and genetics	Students will be made aware about work of Mendel and genetics concept	-
7		First Issue of <i>Botanica</i>	To motivate students for use of Internet for gathering information about particular aspect of Botany and	Students will be searching, reading additional information on Internet for better understanding of Botany and are technosavy	-

			regular use of email		
8	From July to December	Field projects and Research Projects for Avishkar	To learn Botany through participative and innovative learning through field and research projects	Interest about study and research will be developed in students and participative learning	Rs. 10,000
9	August	Exhibition of books related to Botany	To make students familiar with books of Botany in library and motivate students for use of library	Students will be well known with books of Botany in library and using them for study	-
10		Formation of Plant Health Clinic	To provide consultancy service to farmers about plant cultivation, growth, diseases etc.	Nearby farmers will get benefits to increase yield of crops due to this social activity	-
11		Second Issue of <i>Botanica</i>	Same as above mentioned about <i>Botanica</i>	Same as above mentioned about <i>Botanica</i>	-
12	September	Botanical Excursion (First/Third Semester)	To study Botany in nature and appreciation	Students will understand concepts of botany in nature in better away	Rs. 5,000
13		Third Issue of <i>Botanica</i>	Same as above mentioned about <i>Botanica</i>	Same as above mentioned about <i>Botanica</i>	
14	October	Estimation of carbon in sacred groves	To estimate carbon sequestration in trees of sacred groves and social awareness programs for conservation of sacred groves	Students will learn skill of estimation of carbon sequestration in trees; they knew importance of sacred grove for environment protection. People will be made aware about importance of sacred grove and it's conservation	Rs. 2,000
15	November	Fourth Issue of <i>Botanica</i>	Same as above mentioned about <i>Botanica</i>	Same as above mentioned about <i>Botanica</i>	

16	December	Fifth Issue of <i>Botanica</i>	Same as above mentioned about <i>Botanica</i>	Same as above mentioned about <i>Botanica</i>	
17		Workshop/ Seminar on biodiversity, climate change, environment	To discuss environment related issues with Students, teachers, farmers, local people, academicians, and increase participative role of all in environment protection	Different issues of environment will be discussed and participation for protection of environment will be increased	sponsored by Srushtidnyan
18	January	Organic farming Training programme & workshop for Farmers	To provide training to farmers about preparation and use of organic manures (Lab to land)	Farmers are preparing and using organic manures in their farm	
19		Botanical Excursion (Second/Fourth Semester)	To study Botany in nature and appreciation	Students will understand concepts of Botany in nature in better way	Rs. 15,000
20		Sixth Issue of <i>Botanica</i>	Same as above mentioned about <i>Botanica</i>	Same as above mentioned about <i>Botanica</i>	
21	February	Seventh Issue of <i>Botanica</i>	Same as above mentioned about <i>Botanica</i>	Same as above mentioned about <i>Botanica</i>	
22		National Science Day -28	To increase interest of students in science (Science popularization Program)	College and school students will learn some facts of science. Student's interest about science as career will be increased.	
23	Throughout the year	Climate Ambassador Program	To create awareness among students about climate change, Students will work as Climate Ambassadors and	Students will learn about climate change and social awareness about climate change by different activities, promotion of local food	Fund will be provided by NGOs viz. Srushtidnyan,

			aware school students and common people regarding climate change and mitigation measures		Climate Action, Future Earth
24	Through out the year	To maintain Biodiversity register of Devrukh region	Devrukh area is in Western ghat which is well known as 8 th biodiversity hotspot. However complete record of flora and fauna (biodiversity) is not available so objective is complete documentation of biodiversity of this area.	Record of biodiversity of flora and fauna of Devrukh area will be available in form of published book and soft copy	Rs. 15,000
25	Through out the year	Two certificate courses will be conducted each year 1. Certificate Course in organic farming for SY B.Sc. students. 2. Certificate Course in Human molecular genetics for FY Students	To enrich students with extra knowledge of organic farming and human molecular genetics	In FY, Students will learn basics of human molecular genetics. In SY, students will learn skills of organic farming which will be beneficial for them for employment	Rs. 10,000 + Rs. 10,000



Pratap

Dr. Pratap V. Naikwade,
Chairman, Board of studies in Botany
ASP College (Autonomous) Devrukh