

Botany Department
P. V. P. Mahavidyalaya, Kavathe Mahankal
Teaching Plan 2019-20



TEACHER NAME: Prof. T.G. Patil

CLASS: B. SC. I

SEMESTER: I/II

PAPER NO. II: DSC-14A

Sr. No.	Month	Theory/ Practical	Name of unit/ Topic/practical
1	June	Theory	Bryophytes and Pteridophytes Unit 1 – Bryophytes 1-a) General Characters, Adaptation to land habit, Classification as per G.M. Smith up to order Alternation of Generations. Economic Importance.
2	July	Theory	1-a) Morphology, anatomy & life Cycle Hepaticopsida – <i>Riccia</i> Bryopsida – <i>Funaria</i> .
		Practical	1. Study of Bacteria 2. Study of <i>Nostoc</i> 3. Study of <i>Spirogyra</i> . 4. Study of <i>Mucor</i>
3	August	Theory	Unit – 1- Pteridophytes. 1-b – General Characters, Classification as per G.M. Smith upto order. Life Cycle of a) Lycopsida – <i>Selaginella</i> .
		Practical	5. Study of <i>Penicillium</i> 6. Study of <i>Riccia</i> 7. Study of <i>Funaria</i> . 8. Study of <i>Selaginella</i> . 9. Study of <i>Pteris</i> .
4	September	Theory	1.b) Pteropsida – <i>Pteris</i>
		Practical	10. Study of <i>Gnetum</i> 11. Study of metrological Instruments. 12. Water holding Capacity of Soils. 13. Soil & Water PH by universal Indicator/ PH paper.

			14. Adaptations in Hydrophytes – <i>Hydrilla</i> , <i>Eichhornia</i>
5	October	Theory	1-b. Heterospory & seed habitat.
		Practical	15. Adaptations in Xerophytes – <i>Aloe</i> , <i>Nerium</i> 16. Adaptation in Epiphytes & Parasites, <i>Cuscuta</i>
6	November	Practical	Adaptations in Epiphytes and Parasites, <i>Cuscuta</i> .
7	December	Theory	Unit - 1. Plant Communities & Succession 1.b Plant communities 1.b. Plant Succession
		Practical	17. Ecological pyramids 18. Phytogeographical regions 19. Study of flowering twig morphology - Vegetative Characters. 20. Study of flowering twig morphology – floral/reproductive characters
8	January	Theory	2. Ecosystem 2.b. Biogeochemical Cycles.
		Practical	21. Primitive & advanced Characters in flowers. 22. Family – Caesalpinaceae.
9	February	Practical	23) Family – Solanaceae. 24) Family – Nyctaginaceae. 25) Family - Liliaceae.
10	March	Practical	Practical Repetition
11	April		University Examination

Botany Department

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Teaching Plan 2019-20

TEACHER NAME: Prof. T.G. Patil

CLASS: B. SC. II

SEMESTER: III & IV

PAPER NO. V, VI, VII, VIII

Sr. No.	Month	Theory/ Practical	Name of unit/ Topic/practical
1	June	Theory	Embryo and Endosperm Development, Polyembryony and Apomixis. 2.a.) Embryo & Endosperm Development. 2.1) Structure and Development of embryo in monocotyledons.
2	July	Theory	2-a) Embryo and Endosperm 2.2) Structure and Development of embryo in Dicotyledons.
		Practical	1) Study of Structure of Stomata & Stomatal Density. 2) Stomatal & Cuticular Transpiration. 3) Role & deficiency symptoms of P,K, Ca, Mg. 4) Estimation of chloroplast by calorimetric/Spectrophotometric method.
3	August	Theory	2.3) Development of endosperm, Types of Endosperm – Nuclear, Helobial & Cellular
		Practical	5) Paper Chromatography. 6) Kranz Leaf anatomy in C ₄ Plants. 7) Estimation of TAN Value in CAM plants. 8) Analysis of vegetative growth
4	September	Theory	2-b) Polyembryony and Apomixis 2.4) Polyembryony : Introduction, Types of polyembryony – True polyembryony, False Polyembryony causes of polyembryony & Significance.
		Practical	9) Effect of different conc. of IAA on seed germination. 10) Effect of diff. conc., of G.A. on seed germination. 11) Study of evolution of oxygen during photosynthesis. 12) Effect of light intensity on photosynthesis.

5	October	Theory	2.5) Apomixis – Introduction, causes of apomixis & Types. Gametophytic & sporophytic, Significance of Apomixis.
		Practical	14) Detection of Ca, P, K&Fe in plant tissue by biochemical Tests. 15) Demonstration of Endo & Exo-osmosis. 16) Determination of sugar percentage by Handretractorometer.
6	November	Practical	17) Permeability of Plasma membrane.
7	December	Theory	1. Plant water relationship. 1.1) Introduction physiological importance of water. 1.2) Water transport process – Mechanism of water absorption active & passive absorption theories, water transport through xylem & tracheid.
		Practical	18) Study of Typical flower & its parts. 19) Study of young mature anther by permanent slides. 20) Study of germination of pollen grains.
8	January	Theory	1.3.) Transpiration. Definition, Types of transpiration, mechanism of stomatal movement starch – sugar hypothesis factors affecting transpiration. & Significance.
		Practical	21) Pollen fertility. 22) Types of ovules.
9	February	Theory	1.b) Mineral nutritions. 1.4) Introduction macro & Micronutrients. 1.5) Criteria of essentiality. 1.6) Mineral Nutrient uptake, Passive uptake, Active uptake.
		Practical	23) Study of dicotyledonous & monocotyledon embryo. 24) Dissection of embryo endosperm from (Grevellia/Cucumis.)
10	March	Theory	1.7) Role & Deficiency disorders of macronutrients (P, K, Ca, Mg.) & Micronutrients (Fe. Mn.) in plants & its recovery.
11	April	Practical	Practical Repetition & other work related to practical Exam Etc.

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Teaching Plan 2019-20

TEACHER NAME: Prof. T.G. Patil

CLASS: B. SC. III

SEMESTER: V

PAPER NO. IXth

Sr. No.	Month	Theory/ Practical	Name of unit/ Topic/practical
1	June	Theory	Paper – IX Biology of Non vascular Plants Unit -1 Algae – 1.1. Occurrence and distributions of Algae. 1.2. Origin and evolution of sex in Algae. 1.3. Types of life cycles in Algae – Haplontic, Diplontic, Haplodiplontic, Isomorphic, Heteromarpthic, Haplobiontic, Diplobiontic, Triphasic. 1.4. Study of Life cycle of. <i>a. Chara</i> <i>b. Ectocarpus.</i>
		Practical – I	1) Identification of Algae. <i>a) Oscillatoria</i> <i>b) Zygnema</i> <i>c) Caulerpa</i> <i>d) Padiana</i>
2	July	Theory	Unit – 3 Bryophytes – 3.1) Comparative account of Brayophytes with respect to morphology, gametophyte and Sporophyte. 3.2) Alternation of Generations in Bryophytes 3.3) Study of life cycle of <i>Funaria</i> .
		Practical – I	2) Life Cycle of <i>Chara</i> . 3) Life Cycle of <i>Ectocarpus</i> 4) Identification Of Fungi <i>a) Phyllachora</i> <i>b) Alternaria</i> <i>c) Clavaria</i> <i>d) Melampsora</i>
3	August	Theory	Botany Paper – XI Fundamentals of Plant Physiology and Ecology Unit – 3 3.1. Concept of Population. 3.2. Density, Natality, and Mortality. 3.3. Limiting factors of Population – Abiotic

			Factors Nutrients, and moisture Biotic Factors – Competition and density.
		Practical	5) Study of life Cycle of <i>Albugo</i> . 6) Life Cycle of <i>Uncinula</i> . 7) Identification of Bryophytes a) <i>Marchantia</i> b) <i>Targionia</i> c) <i>Plagiochasma</i> d) <i>Asterella</i>
4	September	Theory	Unit – 4 Ecosystem. 4.1. Introduction 4.2. Types and components of ecosystem 4.3. Dynamics of Ecosystem food chain, Trophic levels, food web, ecological, Pyramids, energy flow.
		Practical – I	8-9) Life Cycle of <i>Funaria</i> . 10) Identification of Pteridophytes a) <i>Adiantum</i> b) <i>Asplenium</i> c) <i>Asmunda</i> d) <i>Blechnum</i>
5	October	Theory	Unit – 4 Ecosystem. 4.4. Phases & Types of Biogeochemical cycle, Hydrobiological cycle, Nitrogen cycle, Phosphorus cycle.
		Practical	11) Life Cycle of <i>Marsilea</i> 12) Life Cycle of <i>Gnetum</i> .
6	November	Practical	Practical Repetition.
		Theory	Semester – VI, Paper No. XIII Biology of Vascular Plants. Unit – 1 Pteridophytes. 1.1. General account of Pteridophytes with reference to a) Structure of gametophytes, b) Alternation of Generations, c) Stellar evolution. 1.2. Study of life cycle of <i>Marsilea</i> .
		Practical – I	22-24) Plant diseases as per theory. 25) Study of fermentation by yeast.
7	December	Theory	Unit – 2 – Gymnosperms – 2.1. Study of life cycle of <i>Gnetum</i> . 2.2. Evolutionary significance.
		Practical – III	8) Microtomy Technique. 9) Microtomy Technique.
8	January	Theory	Sem. – VI, Sem. – XIV Unit 3 – Plant Pathology. Unit 4 – Study of Plant Diseases.

		Practical - IV	1) Methods of Emasculation 2) Breeding Technique in a) Malvaceae b) Fabaceae c) Poaceae.
9	February	Theory	Semester VI, Paper – XV Unit – 4- Horticulture. 4.1 Gardening, Definition & Scope, Types of gardening, planning & Layout gardening plant materials & design.
		Practical	6) Identification of common ornamental Plants. 7) Identification of common edge and hedge plants.
10	March	Theory	4.2. Ornamental Plants. Types and classification, flowering, trees, flowering shrubs, Indoors Plants, Hedges, Edges & Lawn
		Practical	8) Identification of common Foliage and flowering plants. 9) Nursery Techniques.
11	April	Practical	Practical Repetition



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TEACHER NAME: DR. B. T. JADHAV

CLASS: B. SC. I

SEMESTER: I/II

PAPER NO. II: DSC-13B: PLANT ECOLOGY

Sr. No.	Month	Theory/ Practical	Name of unit/ Topic/practical
1	July	Theory	
		Practical	1. Study of forms of bacteria 2. Study of <i>Nostoc</i> 3. Study of <i>Spirogyra</i> 4. Study of <i>Mucor</i>
2	August	Theory	
		Practical	5. Study of <i>Penicillium</i> 6. Study of <i>Riccia</i> 7. Study of <i>Funaria</i> 8. Study of <i>Selaginella</i>
3	September	Theory	
		Practical	9. Study of <i>Pteris</i> 10. Study of <i>Gnetum</i> 11. Study of Metrological Instruments 12. Study of WHC of soils
4	October	Theory	
		Practical	13. Determination of soil and water P ^{II} 14. Study of Morphological and anatomical adaptation in hydrophytes
5	November	Theory	2.b Fungi General characters, classification, General characters of each division, Economic Importance of algae. Morphology and life cycle of following types.

		Practical	15. Study of Morphological and anatomical adaptation in xerophytes 16. Study of Morphological and anatomical adaptation in epiphytes
6	December	Theory	Unit 1: Ecological factor and adaptation 1.a Introduction, Definition and scope of ecology Edaphic factor: Soil and Water
		Practical	17. Study of ecological pyramid 18. Study of phytogeographical regions 19-20. Study of flowering twig morphology 21. Study of primitive and advanced characters of flower.
7	January	Theory	Climatic factor: Light and Temperature Ecological adaptation: Hydrophytes and Xerophytes
		Practical	22. Caesalpiaceae 23. Solanaceae
8	February	Theory	Ecological adaptation: Epiphytes and Parasites
		Practical	24. Nyctaginaceae 25. Liliaceae
9	March	Theory	
		Practical	24. Nyctaginaceae 25. Liliaceae
10	April	-	-


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TEACHER NAME: DR. B. T. JADHAV

CLASS: B. SC. II

SEMESTER: III/IV

Paper No. VI: DSC- C14: PLANT PHYSIOLOGY

Paper No. VII: DSC-D13: PLANT ANATOMY

Sr. No.	Month	Theory/ Practical	Name of unit/ Topic/practical
1	June	Theory	Unit:1 Plant water relationship and mineral nutrition 1.a- Plant water relationship 1.1 Introduction, Physiological importance of water. 1.2 Water transport process 1.3 Transpiration
		Practical	PRACTICAL-II 1. Study of shoot and root apex 2. Study of Simple tissue 3. Study of complex tissue
2	July	Theory	1.b Mineral nutrition 1.4 Introduction, Macro and micronutrients 1.5 Criteria of essentiality 1.6 Mineral nutrient uptake 1.7 Role and deficiency disorder of macro and micronutrients in plants and its recovery.
		Practical	4. Study of Primary Structure of monocot and dicot root 5. Study of Primary Structure of monocot and dicot stem 6. Study of Normal secondary growth in dicot stem
3	August	Theory	Unit:2 Photosynthesis, Growth and Development 2.a Photosynthesis 2.1 Introduction 2.2 Photosynthetic pigments
		Practical	7. Study of Anomalous secondary growth in <i>Bignonia</i> 8. Study of Anomalous secondary growth in <i>Dracaena</i> . 9. Study of Periderm and Lenticel
4	September	Theory	2.3 Mechanism of Photosynthesis: a) Light reaction b) Dark reaction Significances of Photosynthesis
		Practical	10. Double stained permanent micropreparation 11. Study of anatomy of porous and non-porous wood

			12. Maceration technique 13. Study of Epidermal Tissue System
5	October	Theory	Unit:2 bGrowth and Development 2.5 Definition, Region of Growth, Phases of Growth, growth curve, Grand period of growth 2.6 Plant growth Regulators
		Practical	14. Study of Secretary Tissue System 15. Study of Mechanical Tissue System 16. Study of anatomical peculiarities 17. Study of excretory product
6	November	Theory	2.7 Plant responses to light and temperature a) Photoperiodism b) Mechanism of Photoperiodism 2.8 Vernalization.
		Practical	18. Determination of rate of Respiration 19. Breaking of seed dormancy 20. Study of effect of P ^H on catalase enzyme activity
7	December	Theory	Paper No. VII: Plant Anatomy Unit: 1 Organization of higher plant body and tissues 1.a – Organization of higher plant body 1.1 The plant organs 1.2 Development of plant body 1.3 Internal organization
		Practical	21. Study of effect of temperature on malate dehydrogenase enzyme activity 22. Janus green B staining technique for mitochondria
8	January	Theory	1.b-Meristematic and Permanent Tissue 1.4 Meristem a) Introduction b) Theories of structural development 1.5 Permanent Tissue I) simple Tissue II) Complex Tissue 1.6 Types of vascular bundles
9	February	Theory	Unit:2 Primary and Secondary Structure of Plant Body and Tissue System 2.a- Primary and Secondary Structure of Plant Body 2.1 Primary Structure of monocot and dicot root stem and leaf. 2.2 Normal secondary growth in dicot stem and root. 2.3 Anomalous secondary growth in <i>Bignonia</i> and <i>Dracaena</i> . 2.4 Periderm and Lenticel
		Practical	23. Demonstration of Fermentation 24. Study of biofertilizers 25. Separation of amino acids by TLC.
10	March	Theory	2.b- Tissue System

			2.5 Epidermal Tissue System 2.6 Secretary Tissue System
11	April	Theory	2.7 Mechanical Tissue System



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TEACHER NAME: SHRI. S. M. SABALE

CLASS: B. SC. I

SEMESTER: I/II

PAPER NO. II: DSC-14A: BIODIVERSITY OF ARCHEGONIATE

PAPER NO. IV: DSC-14B: PLANT TAXONOMY

Sr. No.	Month	Theory/ Practical	Name of unit/ Topic/practical
1	July	Theory	Paper II Unit II- Gymnosperms 2.1 General characters
2	August	Theory	Paper II Unit II- Gymnosperms 2.1 Classification as per Sporne upto classes 2.2 General characters of class with suitable example
		Practical	3) Study of <i>Spirogyra</i>
3	September	Theory	Paper II Unit II- Gymnosperms 2.3 Economic importance 2.4 Morphology of <i>Gnetum</i>
		Practical	10) Study of male cone of <i>Gnetum</i>
4	October	Theory	Paper II Unit II- Gymnosperms 2.5 Anatomy of <i>Gnetum</i> 2.6 Life cycle of <i>Gnetum</i>
		Practical	10) Study of female cone of <i>Gnetum</i>
5	November	Theory	Paper IV Unit II- Angiosperms and system of classification 2.1 Classification of angiosperms i) Salient features of Angiosperms
6	December	Theory	Paper IV Unit II- Angiosperms and system of classification 2.1 Classification of angiosperms ii) Types of classification
		Practical	22) Study of angiosperm family - Caesalpiniaceae
7	January	Theory	Paper IV Unit II- Angiosperms and system of classification

			2.1 Classification of angiosperms iii) Bentham and Hookers system of classification
		Practical	23) Study of angiosperm family –Solanaceae 24) Study of angiosperm family - Nyctaginaceae
8	February	Theory	Paper IV Unit II- Angiosperms and system of classification 2.2 Study of angiosperm families i) Caesalpiniaceae ii) Solanaceae
		Practical	25) Study of angiosperm family – Liliaceae
9	March	Theory	Paper IV Unit II- Angiosperms and system of classification 2.2 Study of angiosperm families iii) Nyctaginaceae iv) Liliaceae

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TEACHER NAME: SHRI. S. M. SABALE

CLASS: B. SC. II

SEMESTER: III/IV

PAPER NO. V: DSC C13: EMBRYOLOGY OF ANGIOSPERMS

PAPER NO. VIII: DSC D14: PLANT METABOLISM

Sr. No.	Month	Theory/ Practical	Name of unit/ Topic/practical
1	July	Theory	Paper V Unit II- Embryo & endosperm development, polyembryony & apomixis 2a Embryo & endosperm development 2.1 Development of embryo-Monocotyledons
2	August	Theory	Unit II- Embryo & endosperm development, polyembryony & apomixis 2a Embryo & endosperm development 2.2 Development of embryo-Dicotyledons 2.3 Development of endosperm 2.4 Types of Endosperm
3	September	Theory	Unit II- Embryo & endosperm development, polyembryony & apomixis 2b Polyembryony and apomixis 2.5 Introduction 2.6 Types of polyembryony 2.7 Causes of polyembryony
		Practical	Practical I 18) Study of typical flower 19) Study of young mature anther
4	October	Theory	Unit II- Embryo & endosperm development, polyembryony & apomixis 2b Polyembryony and apomixis 2.8 Significance of polyembryony 2.9 Apomixis – Introduction 2.10 Types of apomixis
		Practical	Practical I 20) Study of germination of pollen grains

5	November	Theory	Paper VIII Unit I 1a: Enzymes 1.1 Introduction
6	December	Theory	Unit I 1a: Enzymes 1.2 Classification & nomenclature 1.3 Structure & properties 1.4 Mechanism of enzyme action 1.5 Factors affecting on enzyme
		Practical	Practical I 21) Pollen fertility by staining technique 22) Types of ovules
	January	Theory	Unit I 1a: Enzymes 1.5 Factors affecting on enzyme 1.6 Enzyme inhibition 1b: Nitrogen metabolism 1.7 Introduction
		Practical	Practical I 23) Dicot and Monocot embryo 24) Dissection of embryo
8	February	Theory	Unit I 1b: Nitrogen metabolism 1.8 Biological nitrogen fixation 1.9 Mechanism of nitrogen fixation 1.10 Nitrate reduction
		Practical	Practical II 25) TLC 24) Study of biofertilizers
9	March	Theory	Unit I 1b: Nitrogen metabolism 1.11 Ammonia assimilation 1.12 nif genes
		Practical	Practical II 22) Janus green B technique 18) Ganongs respirometer


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Teaching Plan 2019-20

TEACHER NAME: SHRI. S. M. SABALE

CLASS: B. SC. III

SEMESTER: V/VI

PAPER NO. XII: PLANT BIOCHEMISTRY

PAPER NO. XIII: BIOLOGY OF VASCULAR PLANTS

PAPER NO. XV: PLANT BREEDING, BIOSTATISTICS, ETHNOBOTANY & HORTI

Sr. No.	Month	Theory/ Practical	Name of unit/ Topic/practical
1	July	Theory	Paper XII – Plant Biochemistry Unit I- Carbohydrate metabolism 1.1 Intro and classification 1.2 Properties
2	August	Theory	Unit I- Carbohydrate metabolism 1.3 Isomer, Enantiomer, Epimers 1.4 Significance of carbohydrates
		Practical	Practical II 1) Annonaceae 2) Meliaceae
3	September	Theory	Unit II –Lipid Metabolism 2.1 Introduction and classification 2.2 Saturated and unsaturated fatty acids
		Practical	Practical II 3) Fabaceae 4) Rubiaceae
4	October	Theory	Unit II –Lipid Metabolism 2.3 Beta oxidation 2.4 Gluconeogenesis 2.5 Significans of lipids
		Practical	Practical II 5) Convolvulaceae 6) Acanthaceae
5	November	Theory	Paper XIII – Biology of vascular plants Unit III- Angiosperms

			3.1 Origin of angiosperms
6	December	Theory	Unit III- Angiosperms 3.2 System of classification i) Takhtajan ii) APG 2009 3.3 Modern taxonomy
		Practical	Practical II 7) Euphorbiaceae 8) Polygonaceae
7	January	Theory	Unit III- Angiosperms 3.4 Flower i) Flower as modified shoot ii) Structure of anther iii) Structure of pistil 3.5 Pollination and Fertilization
		Practical	Practical II 9) Cannaceae 10) Poaceae 13) Study of meristems
8	February	Theory	Unit IV- Anatomy 4.1 meristem i) Apical cell theory ii) Histogen theory iii) Tunica-carpus theory 4.2 Tissue systems i) Epidermal ii) Secretory iv) Mechanical
		Practical	Practical II 11) Identification of genus and species 12) Structure of stigma and style 13) Types of ovules 14) Epidermal tissue system
9	March	Theory	Paper- XV Unit II- Ethnobotany 2.1 Introduction, Scope, Objectives 2.2 Methodology of Ethnobotany 2.3 Role of Ethnobotany in modern medicine
		Practical	15) Mechanical tissue system 16) Secretory tissue system Practical IV 5) Common plants used in ethnobotany



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CLASS: B. SC. I

SEMESTER: I/II

PAPER NO. II: DSC-13B: PLANT ECOLOGY

Sr. No.	Month	Theory/ Practical	Name of unit/ Topic/practical
1	July	Theory	Viruses
		Practical	1. Study of forms of bacteria 2. Study of <i>Nostoc</i> 3. Study of <i>Spirogyra</i>
2	August	Theory	Viruses
		Practical	5. Study of <i>Penicillium</i> 6. Study of <i>Riccia</i>
3	September	Theory	
		Practical	9. Study of <i>Pteris</i> 10. Study of <i>Gnetum</i> 11 Study of Metrological Instruments 12. Study of WHC of soils
4	October	Theory	
		Practical	13. Determination of soil and water.P ^{II} 14. Study of Morphological and anatomical adaptation in hydrophytes
5	November	Theory	2.b Fungi General characters, classification, General characters of each division, Economic Importance of algae. Morphology and life cycle of following types.

		Practical	15. Study of Morphological and anatomical adaptation in xerophytes 16. Study of Morphological and anatomical adaptation in epiphytes
6	December	Theory	Unit 1: Ecological factor and adaptation 1.a Introduction, Definition and scope of ecology Edaphic factor: Soil and Water
		Practical	17. Study of ecological pyramid 18. Study of phytogeographical regions 19-20. Study of flowering twig morphology 21. Study of primitive and advanced characters of flower.
7	January	Theory	Climatic factor: Light and Temperature Ecological adaptation: Hydrophytes and Xerophytes
		Practical	22. Caesalpiniaceae 23. Solanaceae
8	February	Theory	Ecological adaptation: Epiphytes and Parasites
		Practical	24. Nyctaginaceae 25. Liliaceae


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CLASS: B. SC. II

SEMESTER: III/IV

Paper No. VI: DSC- C14: PLANT PHYSIOLOGY

Paper No. VII: DSC-D13: PLANT ANATOMY

Sr. No.	Month	Theory/ Practical	Name of unit/ Topic/practical
1	July	Theory	Unit:1 Plant water relationship and mineral nutrition 1.1 Introduction, Physiological importance of water. 1.2 Water transport process
		Practical	PRACTICAL-II 1. Study of shoot and root apex 2. Study of Simple tissue
2	August	Theory	1.b Mineral nutrition 1.4 Introduction, Macro and micronutrients 1.5 Criteria of essentiality
		Practical	4. Study of Primary Structure of monocot and dicot root 5. Study of Primary Structure of monocot and dicot stem 6. Study of Normal secondary growth in dicot stem
3	September	Theory	Unit:2 Photosynthesis, Growth and Development 2.a Photosynthesis 2.1 Introduction
		Practical	7. Study of Anomalous secondary growth in <i>Bignonia</i> 8. Study of Anomalous secondary growth in <i>Dracaena</i> .
4	October	Theory	2.3 Mechanism of Photosynthesis: a) Light reaction
		Practical	10. Double stained permanent micropreparation 11. Study of anatomy of porous and non-porous wood

5	November	Theory	Unit:2 b Growth and Development 2.5 Definition, Region of Growth, Phases of Growth, growth curve, Grand period of growth 2.6 Plant growth Regulators
		Practical	14. Study of Secretary Tissue System 15. Study of Mechanical Tissue System
6	December	Theory	a) Photoperiodism b) Mechanism of Photoperiodism
		Practical	18. Determination of rate of Respiration 19. Breaking of seed dormancy 20. Study of effect of P ^H on catalase enzyme activity
7	January	Theory	Paper No. VII: Plant Anatomy Unit: 1 Organization of higher plant body and tissues 1.a – Organization of higher plant body
		Practical	24. Study of biofertilizers 25. Separation of amino acids by TLC.
8	February	Theory	2.b- Tissue System


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CLASS: B. SC. III

SEMESTER: V/VI

PAPER NO. IX: BIOLOGY OF NON-VASCULAR PLANTS AND PALAEOBOTANY

PAPER NO. XVI: PLANT BIOTECHNOLOGY

Sr. No.	Month	Theory/ Practical	Name of unit/ Topic/practical
1	July	Theory	PAPER-IX Unit 4: Palaeobotany 4.3 Study of following form of genera a) <i>Lyginopteris</i> b) <i>Enigmocarpon</i> 4.4 Application of Palaeobotany.
		Practical	PRACTICAL-II 1-9 Study of following plant families I) Fabaceae
2	August	Theory	PAPER NO. X Unit:1 – Sex chromosomes, Determination and Population Genetics 1.2 Mechanism of sex determination 1.3 a) Polygene inheritance b) Population Genetics Unit:2 –Extra-chromosomal Inheritance 2.1 Introduction 2.2 Mitochondrial Inheritance
		Practical	II) Acanthaceae
3	September	Theory	Unit:3- Chromosome structure and variation 3.1 Chromosome Number- Introduction, Types.

		Practical	10. Identification of genus and species 11. Diversity in the structure of stigma and style 12. Types of ovule
4	October	Theory	3.2 Chromosome structure
		Practical	15. Study of Mechanical tissue system 16. Study of Secretary tissue system
5	November	Theory	3.3 Mutation Definition, Types, significance
		Practical	18. Separation of photosynthetic pigments 19. Study of Kranz leaf anatomy
6	December	Theory	SEMESTER-VI PAPER NO. XIII Unit: 4-Anatomy 4.1 Meristem 4.2 Tissue system and their function
		Practical	20. Estimation of TNA value in CAM plants
7	January	Theory	PAPER NO. XVI Unit 1: Nucleic Acid 1.1 Introduction, composition and Structure. Unit 2: Recombinant DNA technology 2.1 Introduction and Principles 2.2 Southern and Northern Blotting techniques 2.3 PCR, DNA sequencing and concept of Gene bank
		Practical	22. Study of chart quadrate
8	February	Theory	3.1 Principles and Terminologies, Laboratory requirement, Culture media, Totipotency and cellular differentiation. 3.2 Micro propagation Unit 4: Palaeobotany 4.1 General account, GTS, Process of Fossilization, Types of Fossils. 4.2 Study of following form of genera a) <i>Lyginopteris</i>
		Practical	25. Analysis of Electric Conductivity, Temperature and PH of water samples


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TEACHER NAME: Prof. T.G. Patil

CLASS: B. SC. I

SEMESTER: I/II

PAPER NO. III: DSC-13 B – Plant Ecology.

Sr. No.	Month	Theory/ Practical	Name of unit/ Topic/practical
1	April	Theory	Unit – 1 Ecological factors and Adaptations. 1-a.) Introduction, Definition and scope of Ecology. Ecological Factors, Edaphic Factors. Soil – Origin and formation, Composition, soil profile. water. Climatic Factors Ecological Adaptations in Hydrophytes, Xerophytes, Epiphytes and parasites.
2	May	Theory	Unit – 1 Plant Communities and Succession. 1-b) Plant Communities Introduction, general characters, forms & structure, Raunkiers life forms Plant Succession Characters and Process and types – Hydrosere, Xerosere.
		Practical	11) Study of Meterological Instruments.
3	June	Theory	Unit – 2 Ecosystem and Phytogeography. 2.a.) Ecosystem. Introduction, composition – Abiotic, and Biotic Components. Types of Ecosystem – Aquatic and Terrestrial (one example of each type) Food chain and web. Ecological Pyramids – Number, Biomass and Energy with suitable example.

4	July	Theory	Unit 2.b.- Biogeochemical Cycle Introduction, phosphorus and Nitrogen Cycle. (Phytogeographical Regions as per Chatterjee and mani)
5	August	Practical	12) Study of water Holding Capacity. 13) Determination of Soil and Water PH by universal Indicator / PH Paper.



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TEACHER NAME: Prof. T.G. Patil

CLASS: B. SC. II

SEMESTER: III

PAPER NO. V: DSC-C- 13.

Sr. No.	Month	Theory/ Practical	Name of unit/ Topic/practical
1	June	Theory	1.a. Organization of Flower. 1.1. Concept of flower as a modified shoot, structure of typical flower. 1.2. Structure of typical androecium, Structure of Tetrasporangiate anther and pollen grain.
2	July	Theory	1.a. Organization of Flower. 1.3. Structure of typical gynoecium, Structure of typical ovule, Types of Ovules.
3	August	Theory	1.b. Pollination and Fertilization. 1.4. Definition, Types mechanism in Anemophily (Zea mays) Entomophily (Calotropis) and Hydrophily (Vallisneria) 1.5. Microsporogenesis, Pollen germination & Male gametophyte.
4	September	Theory	1.b. Pollination and Fertilization. 1.6. Megasporogenesis, structure of embryo sac, monosporic (Polygonum) and Bisporic (Allium) Female gametophyte. 1.7. Fertilization- Double fertilization & triple fusion Significance of double fertilization.
5	October	Theory	Embryo and Endosperm Developments Poly Embryony & Apomixis. 2.a. Embryo & Endosperm Development. 2.1. Structure & development of embryo in Monocotyledons. 2.2. Structure & development of embryo in Dicotyledons. 2.3. Development of endosperm – Nuclear, Helobial & Cellular.

		Practical	<p>1) Structure of Stomata & stomatal density. 2) Stomatal & Cuticular Transpiration by CO_2 paper. 3) Deficiency Symptoms P, K, Ca, Mg. 4) Estimation of Chlorophyll.</p>
6	November	Theory	<p>2-b. Polyembryony & Apomixis. 2.4. Polyembryony : Introduction. Types of polyembryony True Polyembryony Causes of polyembryony, Significance of polyembryony.</p>
		Practical	<p>5) Paper Chromatography. 6) Kranz leaf Anatomy in C_4 Plants.</p>
7	December	Theory	<p>Polyembryony and Apomixis 2.5. Apomixis : Introduction Causes of Apomixis & Types : Gametophytic and sporophytic, significance of apomixis.</p>
		Practical	<p>7) Estimation of TAN Value in CAM Plants. 8) Analysis of Vegetative Growth. 9) Effect of Different Conc. of Auxins (IAA) on seed germination.</p>
8	January	Theory	<p>1-a. Enzymes 1.1. Introduction 1.2. Classification & Nomenclature of enzymes. 1.3. Structure and Properties of Enzymes. 1.4. Mechanism of enzyme action – Lock & Key hypothesis and Induced fit hypothesis. 1.5. Factors affecting enzyme activity Temperature & PH. 1.6. Enzyme inhibition.</p>
9.	February	Theory	<p>1-b. Nitrogen Metabolism 1.7. Introduction. 1.8. Biological Nitrogen fixation Symbiotic and asymbiotic. 1.9. Mechanism of Nitrogen fixation. 1.10. Nitrate reduction. 1.11. Ammonia Assimilation. 1.12. Nif genes.</p>
10	March	Theory	<p>2-a. Respiration 2.1. Introduction 2.2. Types of respiration.</p>

			<p>2.3. Glycolysis. 2.4. Formation of Acetyl Co A. 2.5. TCA Cycle 2.6. ETS in mitochondria 2.7. Fermentation.</p>
11	April	Theory	<p>2-b. Seed dormancy and Germination 2.8. Concept of dormancy 2.9. Causes of dormancy 2.10. Methods of breaking of seed dormancy. 2.11. Seed germination Introduction and types 2.12. Factors affecting seed germination. 2.13. Biogeochemical Changes during seed germination.</p>
12	May	Practical	<p>10) Effect of different conc. of G.A. on seed germination. 11) Study of evolution of oxygen during photosynthesis. 12) Study of effect of light intensity on photosynthesis. 13) Acent of Sap. 14) Biochemical Tests. 15) Demonstration of Endo and Exo-osmosis.</p>
13	June	Practical	<p>16) Determination of sugar percentage by handrefractometer. 17) Study of permeability of plasma membrane. 18) Study of Typical flower & its parts. 19) Study of young & mature anther by permanent slides. 20) Germination of Pollen grains. 21) Detection of pollen fertility by staining technique. 22) Study of types of ovules.</p>
14	July	Practical	<p>23) Study of dicot & monocot embryo. 24) Embryo dissection.</p>



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TEACHER NAME: Prof. T.G. Patil


CLASS: B. SC. III

SEMESTER: V

PAPER NO. V: DSC-E- 26.

Sr. No.	Month	Theory/ Practical	Name of unit/ Topic/practical
1	June	Theory	Unit – 1 Microbiology. 1.1. Microorganisms in Biological world, Characteristic features of different. Groups : Phytoplasma and Actinomycetes. 1.2. Methods in microbiology : Staining for microbes : Bacteria, Sterilization methods, Culture Media, Pure Culture Techniques. 1.3. Recombination in Bacteria L Transformation and Transduction.
		Practical	1) Genetic Example on Linkage. 2) Genetic Examples on Crossing over.
2	July	Theory	Unit – 2 Industrial Microbiology. 2.1. Applications of microorganisms with reference to synthesis of Antibiotics (Penicillin) Organic Acids (Lactic Acid) Alcohol (Ethyl Alcohol) 2.2. Biopesticides – Concept, Types & Significance.
		Practical	3) Genetic Examples on Polygene inheritance. 4) Determination of Chromosome count in PMCS in (Allium / Cynoetis) 5) Detection of meiotic anomalies in chromosomes in Rheo. 6) Preparation of Karyotypes – Ideograms by using photographs.
3	August	Theory	Unit – 3 Plant Pathology 3.1. Classification of plant diseases on the basis of pathogens & symptoms. 3.2. Transmission of Pathogen – Air borne, seed borne, and soil borne. 3.3. Prevention & Control : Physical, Chemical and Biological Control, Role of Quarantine. 3.4. Study of Plant Diseases –

			<p>i) Grassy shoot of sugarcane (Phytoplasma) ii) Citrus canker (Bacterial) iii) Yellow vein Mosaic of Bhendi (Viral) iv) White Rust of Crucifers and Tikka Disease of Ground nut (Fungal)</p>
		Practical	<p>7) Methods of Emasculation. 8) Breeding techniques in - a) Malvaceae b) Fabaceae c) Poaceae. 9) Mounting of Floral parts. 10) Study of world map to show Vavilov's centres of origin of Cultivated plants. 11) Study of Botanical Name, Morphology Parts used and Economic importance of wheat. 12) Study of Botanical Name, morphology parts used and Economic importance of Gram & Soyabean.</p>
4	September	Theory	<p>Unit – 4 Mushroom Technology 4.1. History Types of mushrooms, Edible (Non poisonous) & in edible. (Poisonous) 4.2. Cultivation Technology :- Pure Culture : Medium, Sterilization, Preparation of Spawn, Multiplication, Mushroom bed Preparation, factors affecting the mushroom bed preparation and composting technology in mushroom production. 4.3. Storage : Short Term (Referigeration) Long Term Storage (Canning, Pickles, Papads. Drying in salt solutions. 4.4. Values of mushroom Nutrition : Proteins, amino acids, mineral elements nutrition – Carbohydrates, Crude fiber content – Vitamins.</p>
		Practical	<p>13) Study of Botanical Name, Morphology, parts used & Economic Importance of Clove & Black pepper. 14) Study of Botanical Name, Morphology, Parts used & Economic Importance of Groundnut.</p>


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SEMESTER: VI

PAPER NO. XIV: DSC-F- 26. Bioinformatics, Biostatistics and Economic Botany.

Sr. No.	Month	Theory/ Practical	Name of unit/ Topic/practical
1	March	Theory	<p>Unit – 1 Bioinformatics – 1.1. Introduction, Aim Scope and Branches of Bioinformatics. 1.1. Biological Databases – Classification format and Retrieval System of Biological Database, National Center for Biotechnological information (NCBI) Basic local Alignment Search Tool (BLAST) 1.3. Protein information Resource (PIR) Concept, Resources, Databases and Data Retrieval. 1.5. Applications of Bioinformatics – Molecular phylogeny (Concept, Methods, Analysis and Consistency)</p>
2	April	Theory	<p>Unit – 2 Biostatistics : 2.1) Introduction, definition, terminology. 2.2) Collection and Presentation of Data : Types of data, techniques of data, collection, census method, sampling method, simple random, stratified. 2.3) Measures of central tendency & dispersion – Arithmetic mean, mode, medium, Range, Deviation, Mean Deviation, Standard Deviation and Coefficient of variation. 2.4) Statistical methods for testing the hypothesis, Students T-Test Chi Square Test.</p>
		Practical	<p>8) Garden implements (Any five) Garden Shear, Sickle, cutter, Shovel, Budding, Knife, Secateur, Water can, Pruning scissors, Sprayer, Spade. 9) Study of ornamental plants – Rose, Gerbera, Marigold. 10) Study of hedge & edge plants. 11) Study of Indoor plants.</p>

			<p>12) Qualitative test for Sugar in plant material.</p> <p>13) Qualitative test for starch & Cellulose in plant material.</p> <p>14) Qualitative tests for proteins.</p>
3	May	Theory	<p>Unit – 3 Economic Botany : Cereals, Legumes and oils.</p> <p>3.1. Origin of Cultivated Plants – Concept of centers of origin, their importance with reference to various work.</p> <p>3.2 Cereals : Origin, Botanical Name, Morphology, Sources and Economic importance of Wheat.</p> <p>3.3. Legumes : Origin, Botanical Name, Morphology, Sources and Economic importance of Gram and Soybean.</p> <p>3.4. Oils and fats : Origin, Botanical Name, Morphology, Parts used and uses of Ground nut.</p> <p>Unit – 4 Economic Botany : Spices, Beverages and fibers.</p> <p>4.1) Spices & Condiments : Origin, Botanical Name, Morphology, Parts used and uses of clove and black pepper.</p> <p>4.2. Beverages - Origin, Botanical name, Morphology, Parts used uses of Tea.</p> <p>4.3. Fiber yielding Plants : Origin Botanical Name, Morphology, Parts used & uses of cotton.</p>
		Practical	<p>15) Qualitative test for Lipids.</p> <p>16) Identification of Sugars lay ascending paper Chromatography.</p> <p>17) Determination of fatty acid value of oil sample.</p> <p>18) Thin Layer Chromatography.</p> <p>19) Determination of ISO – Electric point of plant protein.</p> <p>20) Visit to nursery / Aesthetic or food industry. (Separate hand written report to be submitted by student.)</p>

PAPER NO. XVI: DSC-F- 28. Bio fertilizers and Herbal Drug Technology.

Sr. No.	Month	Theory/ Practical	Name of unit/ Topic/practical
4	June	Theory	<p>Unit – 1 Bio fertilizers : 1.1. Introduction, Importance, types and Study of : 1) Bacterial fertilizers : Rhizobium, Azotobactor, Azospirillum. 2) Blue Green Algal – Cyanobacteria (BGA) Nostoc, Anabaena. 3) My corrhizal association : VAM. 4) Fungal – Trichoderma.</p> <p>Unit – 2 Herbal Medicines : 2.1. Definition, Importance of herbal medicines. 2.2. Classification of crude drugs : Taxonomical, morphological and chemical. 2.3. Identification authentication collection, processing and storage of medicinal plants. 2.4. Introduction to general methods of extraction, isolation and purification of phy to constituents.</p>
5	July	Theory	<p>Unit – 3 Herbal Cosmetology 3.1. Application of herbs in cosmetics, shampoo (<i>Sapindus, laurifolius, acacia, concinna</i>) hair dye (<i>Lawsonia inermis</i>). 3.2. Facemask (<i>Santalum album</i>) Bath oil (<i>Rosa indica</i>) Perfume (<i>Jasminum Sambac</i>).</p> <p>Unit – 4 Pharmacognosy : 4.1. Pharmacognosy – Introduction and Definition. 4.2. Medicinal uses of Tulsi, Ginger, Methi, Avala. 4.3. Adulteration of drugs of natural origin : Evaluation by morphological, Chromatographical, Spectrophotometric. 4.4. Plant antioxidants, properties of antioxidants, vitamins (C and E).</p>


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TEACHER NAME: DR. B. T. JADHAV

CLASS: B. SC. I

SEMESTER: I/II

PAPER NO. II: DSC-13B: PLANT ECOLOGY

Sr. No.	Month	Theory/ Practical	Name of unit/ Topic/practical
1	November	Theory	Viruses
		Practical	1. Study of forms of bacteria 2. Study of <i>Nostoc</i> 3. Study of <i>Spirogyra</i> 4. Study of <i>Mucor</i>
2	December	Theory	Viruses
		Practical	5. Study of <i>Penicillium</i> 6. Study of <i>Riccia</i> 7. Study of <i>Funaria</i> 8. Study of <i>Selaginella</i>
3	January	Theory	

		Practical	9. Study of <i>Pteris</i> 10. Study of <i>Gnetum</i> 11 Study of Metrological Instruments 12. Study of WHC of soils
4	February	Theory	
		Practical	13. Determination of soil and water P^{II} 14. Study of Morphological and anatomical adaptation in hydrophytes
5	March	Theory	2.b Fungi General characters, classification, General characters of each division, Economic Importance of algae. Morphology and life cycle of following types.
		Practical	15. Study of Morphological and anatomical adaptation in xerophytes 16. Study of Morphological and anatomical adaptation in epiphytes
6	April	Theory	Unit 1: Ecological factor and adaptation 1.a Introduction, Definition and scope of ecology Edaphic factor: Soil and Water
		Practical	17. Study of ecological pyramid 18. Study of phytogeographical regions 19-20. Study of flowering twig morphology 21. Study of primitive and advanced characters of flower.
7	May	Theory	Climatic factor: Light and Temperature Ecological adaptation: Hydrophytes and Xerophytes

		Practical	22. Caesalpiniaceae 23. Solanaceae
8	June	Theory	Ecological adaptation: Epiphytes and Parasites
		Practical	24. Nyctaginaceae 25. Liliaceae


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TEACHER NAME: DR. B. T. JADHAV

CLASS: B. SC. II

SEMESTER: III/IV

Paper No. VI: DSC- C14: PLANT PHYSIOLOGY

Paper No. VII: DSC-D13: PLANT ANATOMY

Sr. No.	Month	Theory/ Practical	Name of unit/ Topic/practical
1	November	Theory	Unit:1 Plant water relationship and mineral nutrition 1.a- Plant water relationship 1.1 Introduction, Physiological importance of water. 1.2 Water transport process 1.3 Transpiration
		Practical	PRACTICAL-II 1.Study of shoot and root apex 2. Study of Simple tissue 3. Study of complex tissue
2	December	Theory	1.b Mineral nutrition 1.4 Introduction, Macro and micronutrients 1.5Criteria of essentiality 1.6 Mineral nutrient uptake 1.7Role and deficiency disorder of macro and micronutrients in plants and its recovery.
		Practical	4. Study of Primary Structure of monocot and dicot root 5. Study of Primary Structure of monocot and dicot stem 6. Study of Normal secondary growth in dicot stem

3	January	Theory	Unit:2 Photosynthesis, Growth and Development 2.a Photosynthesis 2.1 Introduction 2.2 Photosynthetic pigments
		Practical	7. Study of Anomalous secondary growth in <i>Bignonia</i> 8. Study of Anomalous secondary growth in <i>Dracaena</i> . 9. Study of Periderm and Lenticel
4	February	Theory	2.3 Mechanism of Photosynthesis: a) Light reaction b) Dark reaction Significances of Photosynthesis
		Practical	10. Double stained permanent micropreparation 11. Study of anatomy of porous and non-porous wood 12. Maceration technique 13. Study of Epidermal Tissue System
5	March	Theory	Unit:2 b Growth and Development 2.5 Definition, Region of Growth, Phases of Growth, growth curve, Grand period of growth 2.6 Plant growth Regulators
		Practical	14. Study of Secretary Tissue System 15. Study of Mechanical Tissue System 16. Study of anatomical peculiarities 17. Study of excretory product
6	April	Theory	2.7 Plant responses to light and temperature a) Photoperiodism b) Mechanism of Photoperiodism

			2.8 Vernalization.
		Practical	18. Determination of rate of Respiration 19. Breaking of seed dormancy 20. Study of effect of P ^H on catalase enzyme activity
7	May	Theory	Paper No. VII: Plant Anatomy Unit: 1 Organization of higher plant body and tissues 1.a – Organization of higher plant body 1.1 The plant organs 1.2 Development of plant body 1.3 Internal organization
		Practical	23. Demonstration of Fermentation 24. Study of biofertilizers 25. Separation of amino acids by TLC.
8	June	Theory	2.b- Tissue System 2.5 Epidermal Tissue System 2.6 Secretary Tissue System


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TEACHER NAME: DR. B. T. JADHAV

CLASS: B. SC. III

SEMESTER: V/VI

PAPER NO. IX: BIOLOGY OF NON-VASCULAR PLANTS AND PALAEOBOTANY

PAPER NO. X: GENETICS AND ANALYTICAL TECHNIQUES IN PLANT SCIENCE

PAPER NO. XIII: BIOLOGY OF VASCULAR PLANTS

PAPER NO. XVI: PLANT BIOTECHNOLOGY

Sr. No.	Month	Theory/ Practical	Name of unit/ Topic/practical
1	November	Theory	PAPER-IX Unit 4: Palaeobotany 4.1 General account, GTS, Process of Fossilization, Types of Fossils. 4.2 GTS 4.3 Study of following form of genera a) <i>Lyginopteris</i> b) <i>Enigmocarpon</i> 4.4 Application of Palaeobotany.
		Practical	PRACTICAL-II 1-9 Study of following plant families I) Annonaceae II) Meliaceae III) Fabaceae
2	December	Theory	PAPER NO. X Unit:1 – Sex chromosomes, Determination and Population Genetics 1.1 Autosomes and sex chromosomes 1.2 Mechanism of sex determination 1.3 a) Polygene inheritance b) Population Genetics

			Unit:2 –Extra-chromosomal Inheritance 2.1 Introduction 2.2 Plastid Inheritance 2.3 Mitochondrial Inheritance
		Practical	IV) Rubiaceae V) Convolvulaceae VI) Acanthaceae VII) Euphorbiaceae VIII) Polygonaceae
3	January	Theory	Unit:3- Chromosome structure and variation 3.1 Chromosome Number- Introduction, Types.
		Practical	IX) Cannaceae X) Poaceae 10. Identification of genus and species 11. Diversity in the structure of stigma and style 12. Types of ovule
4	February	Theory	3.2 Chromosome structure
		Practical	13. Study of apical meristems 14. Study of Epidermal tissue system 15. Study of Mechanical tissue system 16. Study of Secretary tissue system


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CLASS: B. SC. I

SEMESTER: I/II

PAPER NO. II: DSC-14A

Sr. No.	Month	Theory/ Practical	Name of unit/ Topic/practical
1	November	Theory	Unit 1 – Bryophytes 1-a) General Characters, Clash and Economic Importance. Hepaticapsida – <i>Riccia</i> Bryopsida – <i>Funaria</i> .
		Practical	1) Study of forms of Bacteria 2) Study of Nostoc.
2	December	Theory	Unit – 2 Pteridophytes. 1-b.) General Characters, classification and life cycle of following types. a) Lycopsida – <i>Selaginella</i> . b) Pteropsida – <i>Pteris</i> Hetrospory and seed habit.
		Practical	3) Study of <i>Spirogyra</i> . 4) Study of <i>Mucor</i> .
3	January	Theory	Unit – 2 Gymnosperms 2-a.) General Characters, Clash as per spare-1965, up to classes Economic Importance of Gymnosperms.
		Practical	5) Study of <i>Penicillium</i> 6) Study of <i>Riccia</i> .
4	February	Theory	Unit – 2 Morphology and Anatomy. 2-b.) Life cycle of following type. Gnetopsida – <i>Gnetum</i> .
5	March	Practical	7) Study of <i>Funaria</i> 8) Study of <i>Selaginella</i> 9) Study of <i>Pteris</i> .
6	April	Practical	10) Study of <i>Gnetum</i> .

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TEACHER NAME: Prof. T.G. Patil

CLASS: B. SC. I

SEMESTER: I/II

PAPER NO. III: DSC-13 B – Plant Ecology.

Sr. No.	Month	Theory/ Practical	Name of unit/ Topic/practical
1	November	Theory	Unit – 1 Ecological factors and Adaptations. 1-a.) Introduction, Definition and scope of Ecology. Ecological Factors, Edaphic Factors. Soil – Origin and formation, Composition, soil profile. water. Climatic Factors Ecological Adaptations in Hydrophytes, Xerophytes, Epiphytes and parasites.
2	December	Theory	Unit – 1 Plant Communities and Succession. 1-b) Plant Communities Introduction, general characters, forms & structure, Raunkiers life forms Plant Succession Characters and Process and types – Hydrosere, Xerosere.
		Practical	11) Study of Meterological Instruments.
3	January	Theory	Unit – 2 Ecosystem and Phytogeography. 2.a.) Ecosystem. Introduction, composition – Abiotic, and Biotic Components. Types of Ecosystem – Aquatic and Terrestrial (one example of each type) Food chain and web. Ecological Pyramids – Number, Biomass and Energy with suitable example.

4	March	Theory	Unit 2.b.- Biogeochemical Cycle Introduction, phosphorus and Nitrogen Cycle. (Phytogeographical Regions as per Chatterjee and mani)
5	April	Practical	12) Study of water Holding Capacity. 13) Determination of Soil and Water PH by universal Indicator / PH Paper.


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TEACHER NAME: Prof. T.G. Patil

CLASS: B. SC. II

SEMESTER: III

PAPER NO. V: DSC-C- 13.

Sr. No.	Month	Theory/ Practical	Name of unit/ Topic/practical
1	November	Theory	1.a. Organization of Flower. 1.1. Concept of flower as a modified shoot, structure of typical flower. 1.2. Structure of typical androecium, Structure of Tetrasporangiate anther and pollen grain.
2		Theory	1.a. Organization of Flower. 1.3. Structure of typical gynoecium, Structure of typical ovule, Types of Ovules.
3		Theory	1.b. Pollination and Fertilization. 1.4. Definition, Types mechanism in Anemophily (Zea mays) Entomophily (Calotropis) and Hydrophily (Vallisneria) 1.5. Microsporogenesis, Pollen germination & Male gametophyte.
4	December	Theory	1.b. Pollination and Fertilization. 1.6. Megasporogenesis, structure of embryo sac, monosporic (Polygonum) and Bisporic (Allium) Female gametophyte. 1.7. Fertilization- Double fertilization & triple fusion Significance of double fertilization.
5		Theory	Embryo and Endosperm Developments Poly Embryony & Apomixis. 2.a. Embryo & Endosperm Development. 2.1. Structure & development of embryo in Monocotyledons. 2.2. Structure & development of embryo in Dicotyledons. 2.3. Development of endosperm – Nuclear, Helobial & Cellular.

		Practical	<p>1) Structure of Stomata & stomatal density. 2) Stomatal & Cuticular Transpiration by CO_2 paper. 3) Deficiency Symptoms P, K, Ca, Mg. 4) Estimation of Chlorophyll.</p>
6	January	Theory	<p>2-b. Polyembryony & Apomixis. 2.4. Polyembryony : Introduction. Types of polyembryony True Polyembryony Causes of polyembryony, Significance of polyembryony.</p>
		Practical	<p>5) Paper Chromatography. 6) Kranz leaf Anatomy in C_4 Plants.</p>
7		Theory	<p>Polyembryony and Apomixis 2.5. Apomixis : Introduction Causes of Apomixis & Types : Gametophytic and sporophytic, significance of apomixis.</p>
		Practical	<p>7) Estimation of TAN Value in CAM Plants. 8) Analysis of Vegetative Growth. 9) Effect of Different Conc. of Auxins (IAA) on seed germination.</p>
8	March	Theory	<p>1-a. Enzymes 1.1. Introduction 1.2. Classification & Nomenclature of enzymes. 1.3. Structure and Properties of Enzymes. 1.4. Mechanism of enzyme action – Lock & Key hypothesis and Induced fit hypothesis. 1.5. Factors affecting enzyme activity Temperature & PH. 1.6. Enzyme inhibition.</p>
9.	April	Theory	<p>1-b. Nitrogen Metabolism 1.7. Introduction. 1.8. Biological Nitrogen fixation Symbiotic and asymbiotic. 1.9. Mechanism of Nitrogen fixation. 1.10. Nitrate reduction. 1.11. Ammonia Assimilation. 1.12. Nif genes.</p>
		Theory	<p>2-a. Respiration 2.1. Introduction 2.2. Types of respiration. 2.3. Glycolysis.</p>

			<p>2.4. Formation of Acetyl Co A. 2.5. TCA Cycle 2.6. ETS in mitochondria 2.7. Fermentation.</p>
10	May	Theory	<p>2-b. Seed dormancy and Germination 2.8. Concept of dormancy 2.9. Causes of dormancy 2.10. Methods of breaking of seed dormancy. 2.11. Seed germination Introduction and types 2.12. Factors affecting seed germination. 2.13. Biogeochemical Changes during seed germination.</p>
11	June	Practical	<p>10) Effect of different conc. of G.A. on seed germination. 11) Study of evolution of oxygen during photosynthesis. 12) Study of effect of light intensity on photosynthesis. 13) Acent of Sap. 14) Biochemical Tests. 15) Demonstration of Endo and Exo-osmosis.</p>


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TEACHER NAME: Prof. T.G. Patil

CLASS: B. SC. III

SEMESTER: V

PAPER NO. V: DSC-E- 26.

Sr. No.	Month	Theory/ Practical	Name of unit/ Topic/practical
1	November	Theory	Unit – 1 Microbiology. 1.1. Microorganisms in Biological world, Characteristic features of different. Groups : Phytoplasma and Actinomycetes. 1.2. Methods in microbiology : Staining for microbes : Bacteria, Sterilization methods, Culture Media, Pure Culture Techniques. 1.3. Recombination in Bacteria L Transformation and Transduction.
		Practical	1) Genetic Example on Linkage. 2) Genetic Examples on Crossing over.
2	December	Theory	Unit – 2 Industrial Microbiology. 2.1. Applications of microorganisms with reference to synthesis of Antibiotics (Penicillin) Organic Acids (Lactic Acid) Alcohol (Ethyl Alcohol) 2.2. Biopesticides – Concept, Types & Significance.
		Practical	3) Genetic Examples on Polygene inheritance. 4) Determination of Chromosome count in PMCS in (Allium / Cynoetis) 5) Detection of meiotic anomalies in chromosomes in Rheo. 6) Preparation of Karyotypes – Ideograms by using photographs.
3	January	Theory	Unit – 3 Plant Pathology 3.1. Classification of plant diseases on the basis of pathogens & symptoms. 3.2. Transmission of Pathogen – Air borne, seed borne, and soil borne. 3.3. Prevention & Control : Physical, Chemical

			<p>and Biological Control, Role of Quarantine.</p> <p>3.4. Study of Plant Diseases –</p> <p>i) Grassy shoot of sugarcane (Phytoplasma)</p> <p>ii) Citrus canker (Bacterial)</p> <p>iii) Yellow vein Mosaic of Bhendi (Viral)</p> <p>iv) White Rust of Crucifers and Tikka Disease of Ground nut (Fungal)</p>
		Practical	<p>7) Methods of Emasculation.</p> <p>8) Breeding techniques in - a) Malvaceae b) Fabaceae c) Poaceae.</p> <p>9) Mounting of Floral parts.</p> <p>10) Study of world map to show Vavilov's centres of origin of Cultivated plants.</p> <p>11) Study of Botanical Name, Morphology Parts used and Economic importance of wheat.</p> <p>12) Study of Botanical Name, morphology parts used and Economic importance of Gram & Soyabean.</p>
4	March	Theory	<p>Unit – 4 Mushroom Technology</p> <p>4.1. History Types of mushrooms, Edible (Non poisonous) & in edible. (Poisonous)</p> <p>4.2. Cultivation Technology :-</p> <p>Pure Culture : Medium, Sterilization, Preparation of Spawn, Multiplication, Mushroom bed Preparation, factors affecting the mushroom bed preparation and composting technology in mushroom production.</p> <p>4.3. Storage : Short Term (Refrigeration) Long Term Storage (Canning, Pickles, Papads. Drying in salt solutions.</p> <p>4.4. Values of mushroom Nutrition : Proteins, amino acids, mineral elements nutrition – Carbohydrates, Crude fiber content – Vitamins.</p>
		Practical	<p>13) Study of Botanical Name, Morphology, parts used & Economic Importance of Clove & Black pepper.</p> <p>14) Study of Botanical Name, Morphology,</p>

			<p>Parts used & Economic Importance of Groundnut.</p> <p>15) Study of Botanical Name, Morphology, Parts used & Economic Importance of Groundnut.</p> <p>16) Measures of central tendency of given data.</p> <p>17) Study of frequency distribution & its graphical representation.</p>
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TEACHER NAME: Prof. T.G. Patil

CLASS: B. SC. III

SEMESTER: V

PAPER NO. XII: DSC-E- 28.

Sr. No.	Month	Theory/ Practical	Name of unit/ Topic/practical
5	November	Theory	Unit – 1 Importance and divisions of Horticulture. 1.1. Introduction and importance of horticulture. 1.2. Division of Horticulture – Pomology, Olericulture, Floriculture, Landscape Gardening.
		Practical	18) Demonstration of Standard deviation of the given data. 19) Submission of PPT on the basis of gene transfer method.
6	December	Theory	Unit – 2 Horticultural Produce and Management of Pest & Disease. 2.1. Floriculture : a) Introduction, Cultivation of important pests and diseases : Rose, Gerbera and marigold. b) Flower arrangements, Packing and marketing of cut flowers. 2.2. Fruit preservation technology. a) Physical – Drying, freezing, heat. b) Chemical – Sugar, salt, Chemical preservatives.
7	January	Theory	Unit – 3 Nursery 3.1. Definition, objectives and scope, Infrastructure for nursery. 3.2. Propagation practices : Sexual & Asexual. a) Sexual : Seed : Sowing of seed, Transplanting of seedling, Advantages and Disadvantages.

			<p>b) Vegetative :</p> <p>i) Cutting – Definition, stem cutting (Hard wood stem and soft wood stem) use of PGT's for routing.</p> <p>ii) Layering – Definition, Simple layering, Air January layering.</p> <p>iii) Grafting – Definition, Whip grafting, Approach grafting.</p> <p>iv) Budding – Definition, T-budding, Patch budding.</p> <p>c) By specialized Vegetative structure – Bulbs, Corms, Tubers, Rhizomes.</p>
		Practical	<p>Practical – IV</p> <p>1) Study of budding technique – Patch & T-budding.</p> <p>2) Study of layering technique – Air layering.</p>
8	March	Theory	<p>Unit – 4 Landscape Gardening.</p> <p>4.1. Definition, scope and objectives.</p> <p>4.2. Indoor Garden – Indoor plants, bottle garden, dish garden, hanging basket, Bonsai Vertical Garden.</p>
9	April	Theory	<p>3.3. Outdoor Garden : Lawns, Lawn preparation, Lawn types, Rockery Terrace garden, water garden green house and polyhouse.</p> <p>3.4. Important aesthetic Gardens of India :</p> <p>i) Mughal garden, Delhi</p> <p>ii) Brindavan garden mysore.</p>
		Practical	<p>3) Study of Grating Technique – Whip and Approach.</p> <p>4) Technique of potting and repotting.</p>
10	May	Practical	<p>5) Demonstration of Bonsai.</p> <p>6) Demonstration of Bottle garden and hanging baskets.</p> <p>7) Floral arrangement – Flower pot, floral bouquet, floral Rangoli.</p>

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TEACHER NAME: Prof. T.G. Patil

CLASS: B. SC. III

SEMESTER: VI

PAPER NO. XIV: DSC-F- 26. Bioinformatics, Biostatistics and Economic Botany.

Sr. No.	Month	Theory/ Practical	Name of unit/ Topic/practical
1	November	Theory	<p>Unit – 1 Bioinformatics – 1.1. Introduction, Aim Scope and Branches of Bioinformatics. 1.1. Biological Databases – Classification format and Retrieval System of Biological Database, National Center for Biotechnological information (NCBI) Basic local Alignment Search Tool (BLAST) 1.3. Protein information Resource (PIR) Concept, Resources, Databases and Data Retrieval. 1.5. Applications of Bioinformatics – Molecular phylogeny (Concept, Methods, Analysis and Consistency)</p>
2	December	Theory	<p>Unit – 2 Biostatistics : 2.1) Introduction, definition, terminology. 2.2) Collection and Presentation of Data : Types of data, techniques of data, collection, census method, sampling method, simple random, stratified. 2.3) Measures of central tendency & dispersion – Arithmetic mean, mode, median, Range, Deviation, Mean Deviation, Standard Deviation and Coefficient of variation. 2.4) Statistical methods for testing the hypothesis, Students T-Test Chi Square Test.</p>

		Practical	<p>8) Garden implements (Any five) Garden Shear, Sickle, cutter, Shovel, Budding, Knife, Secateur, Water can, Pruning scissors, Sprayer, Spade.</p> <p>9) Study of ornamental plants – Rose, Gerbera, Marigold.</p> <p>10) Study of hedge & edge plants.</p> <p>11) Study of Indoor plants.</p> <p>12) Qualitative test for Sugar in plant material.</p> <p>13) Qualitative test for starch & Cellulose in plant material.</p> <p>14) Qualitative tests for proteins.</p>
3	January	Theory	<p>Unit – 3 Economic Botany : Cereals, Legumes and oils.</p> <p>3.1. Origin of Cultivated Plants – Concept of centers of origin, their importance with reference to various work.</p> <p>3.2 Cereals : Origin, Botanical Name, Morphology, Sources and Economic importance of Wheat.</p> <p>3.3. Legumes : Origin, Botanical Name, Morphology, Sources and Economic importance of Gram and Soybean.</p> <p>3.4. Oils and fats : Origin, Botanical Name, Morphology, Parts used and uses of Ground nut.</p> <p>Unit – 4 Economic Botany : Spices, Beverages and fibers.</p> <p>4.1) Spices & Condiments : Origin, Botanical Name, Morphology, Parts used and uses of clove and black pepper.</p> <p>4.2. Beverages - Origin, Botanical name, Morphology, Parts used uses of Tea.</p> <p>4.3. Fiber yielding Plants : Origin Botanical Name, Morphology, Parts used & uses of cotton.</p>
		Practical	<p>15) Qualitative test for Lipids.</p> <p>16) Identification of Sugars lay ascending paper Chromatography.</p> <p>17) Determination of fatty acid value of oil sample.</p>

			18) Thin Layer Chromatography. 19) Determination of ISO – Electric point of plant protein. 20) Visit to nursery / Aesthetic or food industry. (Separate hand written report to be submitted by student.)



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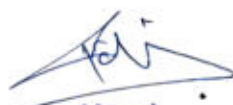
CLASS: B. SC. III

SEMESTER: VI

PAPER NO. XVI: DSC-F- 28. Bio fertilizers and Herbal Drug Technology.

Sr. No.	Month	Theory/ Practical	Name of unit/ Topic/practical
4		Theory	Unit – 1 Bio fertilizers : 1.1. Introduction, Importance, types and Study of : 1) Bacterial fertilizers : Rhizobium, Azotobactor, Azospirillum. 2) Blue Green Algal – Cyanobacteria (BGA) Nostoc, Anabaena. 3) My corrhizal association : VAM. 4) Fungal – Trichoderma. Unit – 2 Herbal Medicines : 2.1. Definition, Importance of herbal medicines. 2.2. Classification of crude drugs : Taxonomical, morphological and chemical. 2.3. Identification authentication collection, processing and storage of medicinal plants. 2.4. Introduction to general methods of extraction, isolation and purification of phy to constituents.
5	July	Theory	Unit – 3 Herbal Cosmetology 3.1. Application of herbs in cosmetics, shampoo (<i>Sapindus, laurifolius, acacia, concinna</i>) hair dye (<i>Lawsonia inermis</i>). 3.2. Facemask (<i>Santalum album</i>) Bath oil (<i>Rosa indica</i>) Perfume (<i>Jasminum Sambac</i>).

			<p>Unit – 4 Pharmacognosy :</p> <p>4.1. Pharmacognosy – Introduction and Definition.</p> <p>4.2. Medicinal uses of Tulsi, Ginger, Methi, Avala.</p> <p>4.3. Adulteration of drugs of natural origin : Evaluation by morphological, Chromatographical, Spectrophotometric.</p> <p>4.4. Plant antioxidants, properties of antioxidants, vitamins (C and E).</p>
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TEACHER NAME: DR. B. T. JADHAV

CLASS: B. SC. I

SEMESTER: I/II

PAPER NO. II: DSC-13B: PLANT ECOLOGY

Sr. No.	Month	Theory/ Practical	Name of unit/ Topic/practical
1	June	Theory	Viruses
		Practical	1. Study of forms of bacteria 2. Study of <i>Nostoc</i> 3. Study of <i>Spirogyra</i> 4. Study of <i>Mucor</i>
2	July	Theory	Viruses
		Practical	5. Study of <i>Penicillium</i> 6. Study of <i>Riccia</i> 7. Study of <i>Funaria</i> 8. Study of <i>Selaginella</i>
3	August	Theory	
		Practical	9. Study of <i>Pteris</i> 10. Study of <i>Gnetum</i> 11 Study of Metrological Instruments 12. Study of WHC of soils
4	September	Theory	
		Practical	13. Determination of soil and water P ^{II} 14. Study of Morphological and anatomical adaptation in hydrophytes
5	October	Theory	2.b Fungi General characters, classification, General characters of each division, Economic Importance of algae. Morphology and life cycle of following types.

		Practical	15. Study of Morphological and anatomical adaptation in xerophytes 16. Study of Morphological and anatomical adaptation in epiphytes
6	November	Theory	Unit 1: Ecological factor and adaptation 1.a Introduction, Definition and scope of ecology Edaphic factor: Soil and Water
		Practical	17. Study of ecological pyramid 18. Study of phytogeographical regions 19-20. Study of flowering twig morphology 21. Study of primitive and advanced characters of flower.
7	December	Theory	Climatic factor: Light and Temperature Ecological adaptation: Hydrophytes and Xerophytes
		Practical	22. Caesalpinaceae 23. Solanaceae
8	January	Theory	Ecological adaptation: Epiphytes and Parasites
		Practical	24. Nyctaginaceae 25. Liliaceae


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TEACHER NAME: DR. B. T. JADHAV

CLASS: B. SC. II

SEMESTER: III/IV

Paper No. VI: DSC- C14: PLANT PHYSIOLOGY

Paper No. VII: DSC-D13: PLANT ANATOMY

Sr. No.	Month	Theory/ Practical	Name of unit/ Topic/practical
1	June	Theory	Unit:1 Plant water relationship and mineral nutrition 1.a- Plant water relationship 1.1 Introduction, Physiological importance of water. 1.2 Water transport process 1.3 Transpiration
		Practical	PRACTICAL-II 1. Study of shoot and root apex 2. Study of Simple tissue 3. Study of complex tissue
2	July	Theory	1.b Mineral nutrition 1.4 Introduction, Macro and micronutrients 1.5 Criteria of essentiality 1.6 Mineral nutrient uptake 1.7 Role and deficiency disorder of macro and micronutrients in plants and its recovery.
		Practical	4. Study of Primary Structure of monocot and dicot root 5. Study of Primary Structure of monocot and dicot stem 6. Study of Normal secondary growth in dicot stem
3	August	Theory	Unit:2 Photosynthesis, Growth and Development 2.a Photosynthesis 2.1 Introduction 2.2 Photosynthetic pigments
		Practical	7. Study of Anomalous secondary growth in <i>Bignonia</i> 8. Study of Anomalous secondary growth in <i>Dracaena</i> . 9. Study of Periderm and Lenticel
4	September	Theory	2.3 Mechanism of Photosynthesis: a) Light reaction b) Dark reaction Significances of Photosynthesis
		Practical	10. Double stained permanent micropreparation 11. Study of anatomy of porous and non-porous wood

			12. Maceration technique 13. Study of Epidermal Tissue System
5	October	Theory	Unit:2 b Growth and Development 2.5 Definition, Region of Growth, Phases of Growth, growth curve, Grand period of growth 2.6 Plant growth Regulators
		Practical	14. Study of Secretary Tissue System 15. Study of Mechanical Tissue System 16. Study of anatomical peculiarities 17. Study of excretory product
6	November	Theory	2.7 Plant responses to light and temperature a) Photoperiodism b) Mechanism of Photoperiodism 2.8 Vernalization.
		Practical	18. Determination of rate of Respiration 19. Breaking of seed dormancy 20. Study of effect of P ^H on catalase enzyme activity
7	December	Theory	Paper No. VII: Plant Anatomy Unit: 1 Organization of higher plant body and tissues 1.a – Organization of higher plant body 1.1 The plant organs 1.2 Development of plant body 1.3 Internal organization
		Practical	23. Demonstration of Fermentation 24. Study of biofertilizers 25. Separation of amino acids by TLC.
8	January	Theory	2.b- Tissue System 2.5 Epidermal Tissue System 2.6 Secretary Tissue System


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TEACHER NAME: DR. B. T. JADHAV

CLASS: B. SC. III

SEMESTER: V/VI

PAPER NO. IX: BIOLOGY OF NON-VASCULAR PLANTS AND PALAEOBOTANY

PAPER NO. X: GENETICS AND ANALYTICAL TECHNIQUES IN PLANT SCIENCE

PAPER NO. XIII: BIOLOGY OF VASCULAR PLANTS

PAPER NO. XVI: PLANT BIOTECHNOLOGY

Sr. No.	Month	Theory/ Practical	Name of unit/ Topic/practical
1	June	Theory	PAPER-IX Unit 4: Palaeobotany 4.1 General account, GTS, Process of Fossilization, Types of Fossils. 4.2 GTS 4.3 Study of following form of genera a) <i>Lyginopteris</i> b) <i>Enigmocarpon</i> 4.4 Application of Palaeobotany.
		Practical	PRACTICAL-II 1-9 Study of following plant families I) Annonaceae II) Meliaceae III) Fabaceae
2	July	Theory	PAPER NO. X Unit:1 – Sex chromosomes, Determination and Population Genetics 1.1 Autosomes and sex chromosomes 1.2 Mechanism of sex determination 1.3 a) Polygene inheritance b) Population Genetics Unit:2 –Extra-chromosomal Inheritance 2.1 Introduction 2.2 Plastid Inheritance 2.3 Mitochondrial Inheritance
		Practical	IV) Rubiaceae V) Convolvulaceae

			VI) Acanthaceae VII) Euphorbiaceae VIII) Polygonaceae
3	August	Theory	Unit:3- Chromosome structure and variation 3.1 Chromosome Number- Introduction, Types.
		Practical	IX) Cannaceae X) Poaceae 10. Identification of genus and species 11. Diversity in the structure of stigma and style 12. Types of ovule
4	September	Theory	3.2 Chromosome structure
		Practical	13. Study of apical meristems 14. Study of Epidermal tissue system 15. Study of Mechanical tissue system 16. Study of Secretary tissue system
5	October	Theory	3.3 Mutation Definition, Types, significance
		Practical	17. Study of role and deficiency symptoms 18. Separation of photosynthetic pigments 19. Study of Kranz leaf anatomy
6	November	Theory	SEMESTER-VI PAPER NO. XIII Unit: 4-Anatomy 4.1 Meristem 4.2 Tissue system and their function
		Practical	20. Estimation of TNA value in CAM plants
7	December	Theory	PAPER NO. XVI Unit 1: Nucleic Acid 1.1 Introduction, composition and Structure. 1.2 DNA replication 1.3 gene expression Unit 2: Recombinant DNA technology 2.1 Introduction and Principles 2.2 Enzyme involved in DNA technology 2.3 Cloning vectors 2.4 Southern and Northern Blotting techniques 2.5 DNA fingerprinting, Molecular DNA markers 2.6 PCR, DNA sequencing and concept of Gene bank

		Practical	21. Demonstration of Ganong's respirometer 22. Study of chart quadrate
8	January	Theory	<p>Unit 3: Genetic Engineering</p> <p>3.1 Introduction</p> <p>3.2 Methods of gene transfer</p> <p>3.3 Reporter gene</p> <p>3.4 Transgenic plants</p> <p>5.5 Application of plant biotechnology</p> <p>Unit 3: Plant Tissue Culture</p> <p>3.1 Principles and Terminologies, Laboratory requirement, Culture media, Totipotency and cellular differentiation.</p> <p>3.2 Micro propagation</p> <p>3.3 Embryogenesis</p> <p>3.4 Soma clonal Variations</p> <p>Unit 4: Palaeobotany</p> <p>4.1 General account, GTS, Process of Fossilization, Types of Fossils.</p> <p>4.2 Study of following form of genera</p> <p>a) <i>Lyginopteris</i></p> <p>b) <i>Enigmocarpon</i></p> <p>4.3 Application of Palaeobotany.</p>
		Practical	23. Determination of DO 24. Titrimetric estimation of free CO ₂ 25. Analysis of Electric Conductivity, Temperature and PH of water samples


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TEACHER NAME: SHRI. S. M. SABALE

CLASS: B. SC. II

SEMESTER: III/IV

PAPER NO. III: EMBRYOLOGY OF ANGIOSPERMS

Sr. No.	Month	Theory/ Practical	Name of unit/ Topic/practical
1	November	Theory	PAPER: III Unit 2- Embryo and Endosperm Development 2.b. Polyembryony and Apomixis
		Practical	12) Maceration technique
2	December	Theory	2.4 Polyembryony 2.5 Apomixis
		Practical	25) Thin Layer Chromatography
3	January	Theory	
		Practical	22) Janus Green B technique of Mitochondria
4	February	Theory	
		Practical	18) Determination of rate of respiration
5	March	Theory	
		Practical	14) Biochemical tests 2) Study of Simple tissue
6	April	Practical	20) Catalase enzyme activity 21) Malate dehydrogenase activity
7	May		


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TEACHER NAME: SHRI. S. M. SABALE

CLASS: B. SC. III

SEMESTER: V/VI

PAPER NO. XI: CYTOLOGY AND RESEARCH TECHNIQUES

PAPER NO. XII: HORTICULTURE AND GARDENING

PAPER NO. XIII: BIOCHEMISTRY AND MOLECULAR BIOLOGY

Sr. No.	Month	Theory/ Practical	Name of unit/ Topic/practical
1	November	Theory	Paper XI – Cytology Unit 1- Cell as a unit of life 1.1 Intro 1.2 Cell cycle 1.3 Cell division Unit 2- Cell organelle 2.1 Nucleus 2.2 Mitochondria 2.3 Chloroplast 2.4 Ribosome Unit 3- Subcellular structures and cell membrane 3.1 ER, Golgi body, Lysosome 3.2 Peroxisomes and Glyoxisomes 3.4 Cell membrane 3.5 Cell membrane types
		Practical	9) Mounting of Floral Parts 10) Vavilovs centres of origin of cultivated plants 4) Study of different types of Stains 1) Prokaryotic cell and Eukaryotic cell 15) Herbal preparation
2	December	Theory	Paper XII- Horticulture and Gardening Unit 4- Lanscape Gardening 4.1 Defination, Scope, Objectives 4.2 Indoor Garden <ul style="list-style-type: none"> ▪ Indoor plants ▪ Bottle garden ▪ Dish Garden ▪ Hanging Basket ▪ Bonsai ▪ Vertical garden 4.3 Outdoor Garden <ul style="list-style-type: none"> ▪ Lawn

			<ul style="list-style-type: none"> ▪ Rockery ▪ Terrace garden ▪ Water garden ▪ Greenhouse ▪ Polyhouse <p>4.4 Important Aesthetic Gardens</p>
		Practical	<p>4) Cell structure of <i>Onion, Hydrilla, Spirogyra</i></p> <p>7) Dialysis</p> <p>8) DNA packaging in eukaryotes</p> <p>10) Beer and Lamberts law</p> <p>20) Phytochemical analysis</p>
3	January	Theory	
		Practical	<p>10) Isolation of plant genomic DNA</p> <p>13) Application of biofertilizers</p> <p>14) Organic manure</p> <p>15) Drug adulteration</p> <p>10) Study of hedge and edge plants</p> <p>11) Study of indoor plants</p>
4	February	Theory	
		Practical	
5	March	Theory	<p>Paper XIII – Biochemistry and Molecular Biology</p> <p>Unit 1 – Carbohydrates</p> <p>1.1 Intro and Classification</p> <p>1.2 Structure and Properties</p> <p>1.3 Isomerism</p> <p>1.4 Significance</p> <p>Unit 2 – Lipids</p> <p>2.1 Intro, structure, properties, classification</p> <p>2.2 Saturated and unsaturated fatty acids</p> <p>2.3 Significance</p>
		Practical	<p>14) Qualitative test for proteins</p> <p>15) Qualitative test for lipids</p> <p>16) Paper chromatography</p> <p>18) Thin layer chromatography</p> <p>11) Permanent cytological slides</p> <p>12) Qualitative test for sugar</p> <p>13) Qualitative test for starch and cellulose</p>
6	April	Theory	<p>Unit 3 – Proteins</p> <p>3.1 Intro, structure, properties, characteristics, classification of amino acids</p> <p>3.2 Biosynthesis of Proline</p> <p>3.3 Structure of proteins</p> <p>3.4 Transcription and Translation</p>

		Practical	17) Fatty acid value 19) Isoelectric point of protein 6) Study of meiosis 11) Calorimetric estimation of DNA 18) Mscroscopic study
7	May	Theory	Unit 4- Nucleic Acids 4.1 Intro, Composition and Structure 4.2 DNA Model 4.3 Replication in Eukaryotes 4.4 RNA 4.5 Gene Expression
		Practical	9) Study of ornamental plants 5) Study of mitosis



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TEACHER NAME: Shri.S.B.Patil

CLASS: B. SC. I

SEMESTER: I/II

PAPER NO. II: DSC-14A: CELL BIOLOGY AND ANALYTICAL TECHNIQUES

PAPER NO. I: DSC-14B: ARCHEGONIATE

Sr. No.	Month	Theory/ Practical	Name of unit/ Topic/practical
1	July	Theory	
		Practical	
2	August	Theory	I MICROBES 1) Discovery, General characteristics
		Practical	
3	September	Theory	
		Practical	
4	October	Theory	III) Types of viruses IV)Economic importance
		Practical	
5	November	Theory	PAPER-II: 1.1- Cell as a structural and functional unit of life. i) Introduction and definition ii) Cell as a biochemical entity
		Practical	
6	December	Theory	iii) structure and difference between prokaryotic and eukaryotic cell. iv) Plant cell wall.
		Practical	
7	January	Theory	PAPER IV 2.1-PTERIDOPHYTES i) general characters ii)Classification

		Practical	
8	February	Theory	iii) Ecological and economic importance iv) Morphology and anatomy and life cycle v) a) Selaginella b) Heterospory and seed habit
		Practical	
9	March	Theory	2.2-GYMNOSPERMS i) general characters ii) Classification
		Practical	
10	April	Theory	Gnetum
11	May	Theory	v) Connecting link between pteridophytes and Angiosperms


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Teaching Plan 2021-22



TEACHER NAME: Shri. S.B.Patil

CLASS: B. SC. II

SEMESTER: III/IV

PAPER NO. VII: PTERIDOPHYTES, GYMNOSPERMS, ANGIOSPERM AND ANATOMY

PAPER NO. VIII: CYTOGENETICS

Sr. No.	Month	Theory/ Practical	Name of unit/ Topic/practical
1	June	Theory	
		Practical	
2	July	Theory	
		Practical	
3	August	Theory	Unit 2a: Embryo and endosperm development 2.2: structure and development of embryo in dicotyledons.
		Practical	1) Study of shoot and root apex 2) Study of simple tissue
4	September	Theory	2.3: Development of endosperm, Types of endosperms
		Practical	3) Study of complex tissue 4) Study of dicot and monocot root 5) Study of dicot and monocot stem
5	October	Theory	
		Practical	6) Study of Normal secondary growth in dicot stem and root 7) Study of Anomalous secondary growth in <i>Bignonia</i> 8) Study of Anomalous secondary growth in <i>Dracaena</i>

6	November	Theory	2.3: mechanism of photosynthesis 2.4: Significance of photosynthesis
		Practical	10) Double stained preparation 11) Study of porous and non porous wood
7	December	Theory	PAPER: VII Unit 4: Anatomy 4.1 Primary Structure of monocot and dicot root stem and leaf.
		Practical	13) Study of Secretory tissue system 14) Study of Mechanical tissue system 15) Study of anatomical peculiarities
8	January	Theory	
		Practical	
9	February	Theory	PAPER: IV 2.1 Primary Structure of monocot and dicot root stem and leaf.
		Practical	16) Determination of rate of respiration 17) Breaking of seed dormancy
10	March	Theory	2.3 Study of Anomalous secondary growth in <i>Bignonia</i> And <i>Dracaena</i> 2.4 Periderm and Lenticel
		Practical	19) Fermentation 20) TLC
11	April		2.5 Epidermal tissue system 2.6 Secretory tissue system
12	May		2.7 Mechanical tissue system


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TEACHER NAME: Shri. S.B.Patil

CLASS: B. SC. III

SEMESTER: V/VI

PAPER NO. XV: PLANT BIOTECHNOLOGY AND PALAEOBOTANY

Sr. No.	Month	Theory/ Practical	Name of unit/ Topic/practical
1	October	Theory	PAPER-IX Unit 4: Palaeobotany 4.3 Study of following form of genera a) <i>Lyginopteris</i> b) <i>Enigmocarpon</i> 4.4 Application of Palaeobotany.
		Practical	1. Isolation of soil fungi 2. Study of different types of stains * 3. Methodes of control of seed born diseases
2	November	Theory	Unit:3 Chromosome structure and variation 3.1 Chromosome structure 3.2 Multiple allelism 3.3 Quantitative inheritance 3.4 Maternal inheritance 3.5 Alteration in genetic make up
		Practical	6 & 7 Plant diseases 8 & 9 Mushroom cultivation
3	December	Theory	4.1) Introduction, Definition and plant breeding 4.2) Aims and Objectives of plant breeding 4.3) Methodes of plant Breeding
		Practical	10 Goldan rice

4	January	Theory	
		Practical	11 Types of fossils 12 Lyginopteris 13 Enigmocarpon
5	February	Theory	2.6 PCR, DNA sequencing and concept of Gene bank
		Practical	20 Submission
6	March	Theory	Unit 4: Palaeobotany 4.1 General account, GTS, Process of Fossilization, Types of Fossils. 4.2 Study of following form of genera
		Practical	General checking
7	April	Theory	Unit 2: Recombinant DNA technology 2.1 Introduction and Principles 2.2 Enzyme involved in DNA technology 2.3 Cloning vectors 2.4 Southern and Northern Blotting techniques
		Practical	14. Demonstration of Ganong's respirometer 15. Study of chart quadrat
8	January	Theory	Unit 3: Genetic Engineering 5.5 Application of plant biotechnology
		Practical	16. Titrimetric estimation of free CO ₂

9	Feburary	Theory	Unit 3: Plant Tissue Culture 3.1 Principles and Terminologies, Laboratory requirement, Culture media, Totipotency and cellular differentiation. 3.2 Micro propagation
		Practical	17.Field visit
10	March	Theory	3.3 Embryogenesis 3.4 Soma clonal Variations


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TEACHER NAME: Prof. T.G. Patil

CLASS: B. SC. I

SEMESTER: I/II

PAPER NO. II: DSC-14A

Sr. No.	Month	Theory/ Practical	Name of unit/ Topic/practical
1	August	Theory	Unit 1 Algae I 1) General outline of plant kingdom (Cryptogams and phanerogams) II- (General characters of algae classification as per G.M.Smith 1955)
		Practical	1) Study of forms of Bacteria 2) Study of Nostoc.
2	September	Theory	III- Economic importance's IV- Life Cycle of following types
		Practical	3) Study of <i>Spirogyra</i> . 4) Study of <i>Mucor</i> .
3	October	Theory	
		Practical	5) Study of <i>Penicillium</i>
4	November	Theory	Unit – 2 Morphology and Anatomy. 2-b.) Life cycle of following type. Gnetopsida – <i>Gnetum</i> .
5	January	Practical	Study of <i>Gnetum</i> .
6	February	Practical	Unit 1 – Bryophytes 1-a) General Characters, Clash and Economic Importance. Unit – 2.1 Pteridophytes. 1-b.) General Characters, classification and life cycle of following types. a) Lycopsida – <i>Selaginella</i> , Hetrospory and seed habit

7	March	Unit – 2.2 Gymnosperms 2-I) General Characters, Clash as per spare-1965, up to classes Economic Importance of Gymnosperms.
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TEACHER NAME: Prof. T.G. Patil

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SEMESTER: III-IV

PAPER NO. V: DSC-C- 13.

Sr. No.	Month	Theory/ Practical	Name of unit/ Topic/practical
1	August	Theory	1.a. Organization of Flower. 1.1. Concept of flower as a modified shoot, structure of typical flower. 1.2. Structure of typical androecium, Structure of Tetrasporangiate anther and pollen grain.
2	September	Theory	1.a. Organization of Flower. 1.3. Structure of typical gynoecium, Structure of typical ovule, Types of Ovules.
3	October	Theory	1.b. Pollination and Fertilization. 1.4. Definition, Types mechanism in Anemophily (Zea mays) Entomophily (Calotropis) and Hydrophily (Vallisneria) 1.5. Microsporogenesis, Pollen germination & Male gametophyte.
4	November	Theory	1.b. Pollination and Fertilization. 1.6. Megasporogenesis, structure of embryo sac, monosporic (Polygonum) and Bisporic (Allium) Female gametophyte. 1.7. Fertilization- Double fertilization & triple fusion Significance of double fertilization.
5	January	Theory	Embryo and Endosperm Developments Poly Embryony & Apomixis. 2.a. Embryo & Endosperm Development. 2.1. Structure & development of embryo in Monocotyledons. 2.2. Structure & development of embryo in Dicotyledons. 2.3. Development of endosperm – Nuclear,

			Helobial & Cellular.
		Practical	1) Structure of Stomata & stomatal density. 2) Stomatal & Cuticular Transpiration by CO_2 paper. 3) Deficiency Symptoms P, K, Ca, Mg. 4) Estimation of Chlorophyll.
6	February	Theory	2-b. Polyembryony & Apomixis. 2.4. Polyembryony : Introduction. Types of polyembryony True Polyembryony Causes of polyembryony, Significance of polyembryony.
		Practical	5) Paper Chromatography. 6) Kranz leaf Anatomy in C_4 Plants.
7	March	Theory	Polyembryony and Apomixis 2.5. Apomixis : Introduction Causes of Apomixis & Types : Gametophytic and sporophytic, significance of apomixis.
		Practical	7) Estimation of TAN Value in CAM Plants. 8) Analysis of Vegetative Growth. 9) Effect of Different Conc. of Auxins (IAA) on seed germination.
8	April	Theory	1-a. Enzymes 1.1. Introduction 1.2. Classification & Nomenclature of enzymes. 1.3. Structure and Properties of Enzymes. 1.4. Mechanism of enzyme action – Lock & Key hypothesis and Induced fit hypothesis. 1.5. Factors affecting enzyme activity Temperature & PH. 1.6. Enzyme inhibition.
9.	May	Theory	1-b. Nitrogen Metabolism 1.7. Introduction. 1.8. Biological Nitrogen fixation Symbiotic and asymbiotic. 1.9. Mechanism of Nitrogen fixation. 1.10. Nitrate reduction. 1.11. Ammonia Assimilation. 1.12. Nif genes.

		Theory	2-a. Respiration 2.1. Introduction 2.2. Types of respiration. 2.3. Glycolysis. 2.4. Formation of Acetyl Co A. 2.5. TCA Cycle 2.6. ETS in mitochondria 2.7. Fermentation.
10	June	Theory	2-b. Seed dormancy and Germination 2.8. Concept of dormancy 2.9. Causes of dormancy 2.10. Methods of breaking of seed dormancy. 2.11. Seed germination Introduction and types 2.12. Factors affecting seed germination. 2.13. Biogeochemical Changes during seed germination.


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TEACHER NAME: Prof. T.G. Patil

CLASS: B. SC. III

SEMESTER: V/IV

PAPER NO. V: DSC-E- 26.

Sr. No.	Month	Theory/ Practical	Name of unit/ Topic/practical
1	August	Theory	Unit – 1 Microbiology. 1.1. Microorganisms in Biological world, Characteristic features of different. Groups : Phytoplasma and Actinomycetes. 1.2. Methods in microbiology : Staining for microbes : Bacteria, Sterilization methods, Culture Media, Pure Culture Techniques. 1.3. Recombination in Bacteria L Transformation and Transduction.
		Practical	1) Genetic Example on Linkage. 2) Genetic Examples on Crossing over.
2	September	Theory	Unit – 2 Industrial Microbiology. 2.1. Applications of microorganisms with reference to synthesis of Antibiotics (Penicillin) Organic Acids (Lactic Acid) Alcohol (Ethyl Alcohol) 2.2. Biopesticides – Concept, Types & Significance.
		Practical	3) Genetic Examples on Polygene inheritance. 4) Determination of Chromosome count in PMCS in (Allium / Cynoetis) 5) Detection of meiotic anomalies in chromosomes in Rheo. 6) Preparation of Karyotypes – Ideograms by using photographs.
3	October	Theory	Unit – 3 Plant Pathology 3.1. Classification of plant diseases on the basis of pathogens & symptoms. 3.2. Transmission of Pathogen – Air borne, seed borne, and soil borne. 3.3. Prevention & Control : Physical, Chemical

	November		and Biological Control, Role of Quarantine. 3.4. Study of Plant Diseases – i) Grassy shoot of sugarcane (Phytoplasma) ii) Citrus canker (Bacterial) iii) Yellow vein Mosaic of Bhendi (Viral) iv) White Rust of Crucifers and Tikka Disease of Ground nut (Fungal)
		Practical	7) Methods of Emasculation. 8) Breeding techniques in - a) Malvaceae b) Fabaceae c) Poaceae. 9) Mounting of Floral parts.
4	January	Theory	Unit – 4 Mushroom Technology 4.1. History Types of mushrooms, Edible (Non poisonous) & in edible. (Poisonous) 4.2. Cultivation Technology :- Pure Culture : Medium, Sterilization, Preparation of Spawn, Multiplication, Mushroom bed Preparation, factors affecting the mushroom bed preparation and composting technology in mushroom production.
		Practical	13) Study of Botanical Name, Morphology, parts used & Economic Importance of Clove & Black pepper. 14) Study of Botanical Name, Morphology,
	February March		Parts used & Economic Importance of Groundnut. 15) Study of Botanical Name, Morphology, Parts used & Economic Importance of Groundnut. 16) Measures of central tendency of given data. 17) Study of frequency distribution & its graphical representation.
	April		3. Storage : Short Term (Referigeration) Long

			<p>Term Storage (Canning, Pickles, Papads. Drying in salt solutions.</p> <p>4.4. Values of mushroom Nutrition : Proteins, amino acids, mineral elements nutrition – Carbohydrates, Crude fiber content – Vitamins.</p>
	May		<p>10) Study of world map to show Vavilov's centres of origin of Cultivated plants.</p> <p>11) Study of Botanical Name, Morphology Parts used and Economic importance of wheat.</p> <p>12) Study of Botanical Name, morphology parts used and Economic importance of Gram & Soyabean.</p>


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TEACHER NAME: DR. B. T. JADHAV

CLASS: B. SC. I

SEMESTER: I/II

PAPER NO. I: DSC-13A: MICROBES, ALGAE AND BIOFERTILIZERS

PAPER NO. II: DSC-14A: CELL BIOLOGY AND ANALYTICAL TECHNIQUES

PAPER NO. I: DSC-14B: ARCHEGONIATE

Sr. No.	Month	Theory/ Practical	Name of unit/ Topic/practical
1	July	Theory	
		Practical	
2	August	Theory	I MICROBES 1.1- VIRUSES 1) Discovery, General characteristics
		Practical	
3	September	Theory	II) Structures of viruses
		Practical	
4	October	Theory	III) Types of viruses IV) Economic importance
		Practical	
5	November	Theory	PAPER-II: 1.1- Cell as a structural and functional unit of life. i) Introduction and definition ii) Cell as a biochemical entity
		Practical	
6	December	Theory	iii) structure and difference between prokaryotic and eukaryotic cell. iv) Plant cell wall.
		Practical	
7	January	Theory	PAPER IV 2.1-PTERIDOPHYTES i) general characters

			ii)Classification
		Practical	
8	February	Theory	iii) Ecological and economic importance iv) Morphology and anatomy and life cycle v) a) Selaginella b) Heterospory and seed habitat
		Practical	
9	March	Theory	2.2-GYMNOSPERMS i) general characters ii)Classification iii) Ecological and economic importance iv) Morphology and anatomy and life cycle
		Practical	
10	April	Theory	Gnetum
11	May	Theory	v) Connecting link between pteridophytes and Angiosperms


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TEACHER NAME: DR. B. T. JADHAV

CLASS: B. SC. II

SEMESTER: III/IV

PAPER NO. V: DCS C13: EMBRYOLOGY OF ANGIOSPERMS


PAPER NO. VI: DCS C14: PLANT PHYSIOLOGY

PAPER NO. VII: PTERIDOPHYTES, GYMNOSPERMS, ANGIOSPERM AND ANATOMY

PAPER NO. VIII: CYTOGENETICS

Sr. No.	Month	Theory/ Practical	Name of unit/ Topic/practical
1	June	Theory	
		Practical	
2	July	Theory	
		Practical	
3	August	Theory	Unit 2a: Embryo and endosperm development 2.1: structure and development of embryo in monocotyledons. 2.2: structure and development of embryo in dicotyledons.
		Practical	1) Study of shoot and root apex 2) Study of simple tissue
4	September	Theory	2.3: Development of endosperm, Types of endosperms
		Practical	3) Study of complex tissue 4) Study of dicot and monocot root 5) Study of dicot and monocot stem,
5	October	Theory	2.a: PHOTOSYNTHESIS 2.1: Introduction 2.3: photosynthetic pigments
		Practical	6) Study of Normal secondary growth in dicot stem and root

			7) Study of Anomalous secondary growth in <i>Bignonia</i> 8) Study of Anomalous secondary growth in <i>Dracaena</i> 9) Study of Periderm and Lenticel
6	November	Theory	2.3: mechanism of photosynthesis 2.4: Significance of photosynthesis PAPER: VII Unit 4: Anatomy 4.1 Primary Structure of monocot and dicot root stem and leaf.
		Practical	10) Double stained preparation 11) Study of porous and non porous wood 12) Maceration technique 13) Study of Epidermal tissue system Secretory tissue system
7	December	Theory	
		Practical	14) Study of Secretory tissue system 15) Study of Mechanical tissue system 16) Study of anatomical peculiarities 17) Study of excretory product
8	January	Theory	
		Practical	
9	February	Theory	PAPER: IV 2.a: Anatomy 2.1 Primary Structure of monocot and dicot root stem and leaf.
		Practical	18) Determination of rate of respiration 19) Breaking of seed dormancy 20) Study of effect of pH on enzyme 21) Study of effect temp. on enzyme
10	March	Theory	2.2 Normal secondary growth in dicot stem and root. 2.3 Study of Anomalous secondary growth in <i>Bignonia</i> And <i>Dracaena</i> 2.4 Periderm and Lenticel
		Practical	22) Janus green B 23) Fermentation


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TEACHER NAME: SHRI. S. M. SABALE

CLASS: B. SC. I

SEMESTER: I/II

PAPER NO. II: DSC-14A: CELL BIOLOGY AND ANALYTICAL TECHNIQUES

PAPER NO. I: DSC-14B: ARCHEGONIATE

Sr. No.	Month	Theory/ Practical	Name of unit/ Topic/practical
1	September	Theory	Paper II Unit I- Cell Biology 1.2 Cell organelle
		Practical	
2	October	Theory	Paper II Unit I- Cell Biology 1.2 Cell Membrane
		Practical	
3	November	Theory	Paper II Unit I- Cell Biology 1.2 Cell Division – Mitosis
		Practical	
4	December	Theory	Paper II Unit I- Cell Biology 1.2 Cell Division – Meiosis
		Practical	
5	January	Theory	Paper III Unit II- Phytopathology & Mushroom Cultivation 2.1 Phytopathology – Intro, Characters, Viral Disease
		Practical	
6	February	Theory	Paper III Unit II- Phytopathology & Mushroom Cultivation 2.1 Phytopathology – Bacterial and Fungal Disease
		Practical	22) Study of different stages of mitosis
7	March	Theory	Paper III Unit II- Phytopathology & Mushroom Cultivation 2.1 Phytopathology – Mycoplasma Disease
		Practical	23) Study of different stages of meiosis
8	April	Theory	Paper III Unit II- Phytopathology & Mushroom Cultivation

			2.2 Mushroom Cultivation –Intro and History
9	May	Theory	Paper III Unit II- Phytopathology & Mushroom Cultivation 2.2 Mushroom Cultivation – Cultivation, Commercial importance


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TEACHER NAME: SHRI. S. M. SABALE

CLASS: B. SC. II

SEMESTER: III/IV

PAPER NO. VIII: PLANT METABOLISM

Sr. No.	Month	Theory/ Practical	Name of unit/ Topic/practical
1	September	Theory	
		Practical	21) Paper Chromatography
2	October	Theory	
		Practical	22) Janus Green B technique
3	November	Theory	
		Practical	12) Maceration technique
4	December	Theory	
		Practical	25) Thin Layer Chromatography
5	January	Theory	
		Practical	
6	February	Theory	PAPER: VIII 1.a: Enzymes – 1.1 Introduction 1.2 Classification and Nomenclature 1.3 Structure and Properties of Enzyme 1.4 Mechanism
		Practical	18) Determination of rate of respiration
7	March	Theory	1.5 Factors affecting on Enzyme 1.6 Enzyme Inhibition 1.b: Nitrogen Metabolism 1.7 Introduction 1.8 Nitrogen Fixation 1.9 Nitrate Reduction
		Practical	14) Biochemical tests
8	April		1.10 Ammonia Assimilation 1.11 Nif genes 2.a: Respiration 2.1 Introduction 2.2 Types 2.3 Glycolysis
9	May		2.4 Acetyl CoA 2.5 TCA cycl 2.6 ETS 2.7 Fermentation



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TEACHER NAME: SHRI. S. M. SABALE

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SEMESTER: V/VI

PAPER NO. X: MICROBIOLOGY

PAPER NO. XI: CYTOLOGY AND RESEARCH TECHNIQUES

PAPER NO. XII: HORTICULTURE AND GARDENING

PAPER NO. XIII: BIOCHEMISTRY AND MOLECULAR BIOLOGY

PAPER NO. XVI: BIOFERTILIZERS AND HERBAL TECHNOLOGY

Sr. No.	Month	Theory/ Practical	Name of unit/ Topic/practical
1	October	Theory	Paper XI – Cytology Unit 1- Cell as a unit of life 1.1 Intro 1.2 Cell cycle 1.3 Cell division Unit 2- Cell organelle 2.1 Nucleus 2.2 Mitochondria 2.3 Chloroplast 2.4 Ribosome Unit 3- Subcellular structures and cell membrane 3.1 ER, Golgi body, Lysosome 3.2 Peroxisomes and Glyoxisomes 3.4 Cell membrane 3.5 Cell membrane types
		Practical	9) Mounting of Floral Parts 10) Vavilovs centres of origin of cultivated plants 4) Study of different types of Stains 1) Prokaryotic cell and Eukaryotic cell 15) Herbal preparation
2	November	Theory	Paper XII- Horticulture and Gardening Unit 4- Landscape Gardening 4.1 Definition, Scope, Objectives 4.2 Indoor Garden ▪ Indoor plants ▪ Bottle garden ▪ Dish Garden ▪ Hanging Basket ▪ Bonsai ▪ Vertical garden 4.3 Outdoor Garden


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			<ul style="list-style-type: none"> ▪ Lawn ▪ Rockery ▪ Terrace garden ▪ Water garden ▪ Greenhouse ▪ Polyhouse <p>4.4 Important Aesthetic Gardens</p>
		Practical	<p>4) Cell structure of <i>Onion, Hydrilla, Spirogyra</i></p> <p>7) Dialysis</p> <p>8) DNA packaging in eukaryotes</p> <p>10) Beer and Lamberts law</p> <p>20) Phytochemical analysis</p>
3	December	Theory	<p>Paper X – Microbiology</p> <p>Unit 1 – Microbiology</p> <p>1.1 Microorganisms</p> <p>1.2 Methods in Microbiology</p> <p>1.3 Recombination in Bacteria</p> <p>Unit 2 – Industrial Microbiology</p> <p>2.1 Application and Synthesis</p> <p>2.2 Biopesticides</p>
		Practical	<p>10) Isolation of plant genomic DNA</p> <p>13) Application of biofertilizers</p> <p>14) Organic manure</p> <p>15) Drug adulteration</p>
4	January	Theory	<p>Paper XVI – Herbal Drug Technology</p> <p>Unit 4 – Pharmacognosy</p> <p>4.1 Intro</p> <p>4.2 Medicinal uses</p>
		Practical	<p>11) Calorimetric estimation of DNA</p> <p>18) Mscroscopic study</p> <p>8) Garden implements</p> <p>9) Study of ornamental plants</p> <p>5) Study of mitosis</p>
5	February	Theory	<p>4.3 Adulteration of Drugs</p> <p>4.4 Plant Antioxidants</p>
		Practical	<p>10) Study of hedge and edge plants</p> <p>11) Study of indoor plants</p> <p>12) Qualitative test for sugar</p> <p>13) Qualitative test for starch and cellulose</p> <p>6) Study of meiosis</p>
6	March	Theory	
		Practical	<p>14) Qualitative test for proteins</p> <p>15) Qualitative test for lipids</p> <p>16) Paper chromatography</p> <p>18) Thin layer chromatography</p> <p>11) Permanent cytological slides</p>

7	April	Theory	Paper XII – Biochemistry and Molecular Biology Unit 4- Nucleic Acids 4.1 Intro, Composition and Structure 4.2 DNA Model 4.3 Replication in Eukaryotes
		Practical	17) Fatty acid value 19) Isoelectric point of protein
8	May	Theory	4.4 RNA 4.5 Gene Expression



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TEACHER NAME: Shri.S.B.Patil

CLASS: B. SC. I

SEMESTER: I/II

PAPER NO. II: DSC-14A: CELL BIOLOGY AND ANALYTICAL TECHNIQUES

PAPER NO. I: DSC-14B: ARCHEGONIATE

Sr. No.	Month	Theory/ Practical	Name of unit/ Topic/practical
1	July	Theory	
		Practical	
2	August	Theory	I MICROBES 1) Discovery, General characteristics
		Practical	
3	September	Theory	
		Practical	
4	October	Theory	III) Types of viruses IV) Economic importance
		Practical	
5	November	Theory	PAPER-II: 1.1- Cell as a structural and functional unit of life. i) Introduction and definition ii) Cell as a biochemical entity
		Practical	
6	December	Theory	iii) structure and difference between prokaryotic and eukaryotic cell. iv) Plant cell wall.
		Practical	
7	January	Theory	PAPER IV 2.1-PTERIDOPHYTES i) general characters ii) Classification

		Practical	
8	February	Theory	iii) Ecological and economic importance iv) Morphology and anatomy and life cycle v) a) Selaginella b) Heterospory and seed habit
		Practical	
9	March	Theory	2.2-GYMNOSPERMS i) general characters ii) Classification
		Practical	
10	April	Theory	Gnetum
11	May	Theory	v) Connecting link between pteridophytes and Angiosperms


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PAPER NO. VII: PTERIDOPHYTES, GYMNOSPERMS, ANGIOSPERM AND ANATOMY

PAPER NO. VIII: CYTOGENETICS

Sr. No.	Month	Theory/ Practical	Name of unit/ Topic/practical
1	June	Theory	
		Practical	
2	July	Theory	
		Practical	
3	August	Theory	Unit 2a: Embryo and endosperm development 2.2: structure and development of embryo in dicotyledons.
		Practical	1) Study of shoot and root apex 2) Study of simple tissue
4	September	Theory	2.3: Development of endosperm, Types of endosperms
		Practical	3) Study of complex tissue 4) Study of dicot and monocot root 5) Study of dicot and monocot stem.
5	October	Theory	
		Practical	6) Study of Normal secondary growth in dicot stem and root 7) Study of Anomalous secondary growth in <i>Bignonia</i> 8) Study of Anomalous secondary growth in <i>Dracaena</i>

6	November	Theory	2.3: mechanism of photosynthesis 2.4: Significance of photosynthesis PAPER: VII Unit 4: Anatomy 4.1 Primary Structure of monocot and dicot root stem and leaf.
		Practical	10) Double stained preparation 11) Study of porous and non porous wood
7	December	Theory	
		Practical	13) Study of Secretory tissue system 14) Study of Mechanical tissue system 15) Study of anatomical peculiarities
8	January	Theory	
		Practical	
9	February	Theory	PAPER: IV 2.1 Primary Structure of monocot and dicot root stem and leaf.
		Practical	16) Determination of rate of respiration 17) Breaking of seed dormancy
10	March	Theory	2.3 Study of Anomalous secondary growth in <i>Bignonia</i> And <i>Dracaena</i> 2.4 Periderm and Lenticel
		Practical	19) Fermentation 20) TLC
11	April		2.5 Epidermal tissue system 2.6 Secretory tissue system
12	May		2.7 Mechanical tissue system


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TEACHER NAME: Shri. S.B.Patil

CLASS: B. SC. III

SEMESTER: V/VI

PAPER NO. XV: PLANT BIOTECHNOLOGY AND PALAEOBOTANY

Sr. No.	Month	Theory/ Practical	Name of unit/ Topic/practical
1	October	Theory	PAPER-IX Unit 4: Palaeobotany 4.3 Study of following form of genera a) <i>Lyginopteris</i> b) <i>Enigmocarpon</i> 4.4 Application of Palaeobotany.
		Practical	1. Isolation of soil fungi 2. Study of different types of stains 3. Methodes of control of seed born diseases
2	November	Theory	Unit:3 Chromosome structure and variation 3.1 Chromosome structure 3.2 Multiple allelism 3.3 Quantitative inheritance 3.4 Maternal inheritance 3.5 Alteration in genetic make up
		Practical	6 & 7 Plant diseases 8 & 9 Mushroom cultivation
3	December	Theory	4.1) Introduction, Definition and plant breeding 4.2) Aims and Objectives of plant breeding 4.3) Methodes of plant Breeding
		Practical	

			10 Goldan rice
4	January	Theory	
		Practical	11 Types of fossils 12 Lyginopteris 13 Enigmocarpon
5	February	Theory	2 2.6 PCR, DNA sequencing and concept of Gene bank
		Practical	20 Submission
6	March	Theory	Unit 4: Palaeobotany 4.1 General account, GTS, Process of Fossilization, Types of Fossils. 4.2 Study of following form of genera
		Practical	Gernal checking
7	April	Theory	Unit 2: Recombinant DNA technology 2.1 Introduction and Principles 2.2 Enzyme involved in DNA technology 2.3 Cloning vectors 2.4 Southern and Northern Blotting techniques
		Practical	14. Demonstration of Ganong's respirometer 15. Study of chart quadrate
8	January	Theory	Unit 3: Genetic Engineering 5.5 Application of plant biotechnology
		Practical	16. Titrimetric estimation of free CO ₂

9	February	Theory	Unit 3: Plant Tissue Culture 3.1 Principles and Terminologies, Laboratory requirement, Culture media, Totipotency and cellular differentiation. 3.2 Micro propagation 3.3 Embryogenesis 3.4 Soma clonal Variations
		Practical	17.Field visit
10	March	Theory	-



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TEACHER NAME: Shri. T.G. Patil

CLASS: B. SC. I

SEMESTER: I/II

PAPER NO. II: DSC-14A

Sr. No.	Month	Theory/ Practical	Name of unit/ Topic/practical
1	August	Theory	Unit 1 Algae I 1) General outline of plant kingdom (Cryptogams and phanerogams) II- (General characters of algae classification as per G.M.Smith 1955)
		Practical	1) Study of forms of Bacteria 2) Study of Nostoc.
2	September	Theory	III- Economic importance's IV- Life Cycle of following types
		Practical	3) Study of <i>Spirogyra</i> . 4) Study of <i>Mucor</i> .
3	October	Theory	
		Practical	5) Study of <i>Penicillium</i>
4	November	Theory	Unit – 2 Morphology and Anatomy. 2-b.) Life cycle of following type. <i>Gnetopsida – Gnetum</i> .
5	January	Practical	Study of <i>Gnetum</i> .
6	February	Practical	Unit 1 – Bryophytes 1-a) General Characters, Clash and Economic Importance. Unit – 2.1 Pteridophytes. 1-b.) General Characters, classification and life cycle of following types. a) <i>Lycopsida – Selaginella</i> . Hetrospory and seed habit

7	March		Unit – 2.2 Gymnosperms 2-1) General Characters, Clash as per spare-1965, up to classes Economic Importance of Gymnosperms.
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TEACHER NAME: Shri.T.G.Patil

CLASS: B. SC. II

SEMESTER: III/IV

PAPER NO. V: DSC-13

PAPER NO.VII : DSC.D.13

Sr. No.	Month	Theory/ Practical	Name of unit/ Topic/practical
1	July	Theory	2.a. Structure and development of plant body. 2.1- Anatomy Introduction to internal organization of plant body.
		Practical	
2	August	Theory	2.2- Organization of shoot apex apical cell theory. 2.3-Organization of root apex quiescent center concept.
		Practical	1. Study of meristem (RAM & SAM)
3	September	Theory	2.6-Primary structure of root stem and leaf (Dicot & Monocot)
		Practical	Primary structure of root stem and leaf (Dicot & Monocot)
4	October	Theory	1.Preparation of double stained permanent slide.
		Practical	
5	November	Theory	Maceration technique
		Practical	
6	December	Theory	2.a. Origin of cultivated plant. 2.1. Concept of content of origin their important with reference to vavilovs work.
		Practical	1. Preparation of Nachni satva. 2. Medicinal plant Neemnada Bay leaf.(Tamalpatra)
7	January	Theory	2.3. Botanical name,origin,morphology.,plant part used and economic importance of a) Millets- Finger millet

			b) Spices-Clove c) Condiments- Clove d) Beverages-Coffee e) Oil yielding –Soyabean f) Medicinal -Neem
		Practical	1. Beverages-Coffee 2. Oil yielding –Soyabean 3. Preparation of Heena dye and Aloe gel
8	February	Theory	g) Dyes-Heena h) Cosmetics-Aloe i) Timber-Teak j) Fiber- Cotton
		Practical	1. Timber-Teak & Rubber fig
9	March	Theory	
		Practical	1. Fiber yielding plant –Cotton 2. Demonstration of fermentation
10	April	Practical	1. Grafting –Whip 2. Potting & Repotting 3. Bonsai 4. Garden implements
11	May	Practical	1. Practical Repetition



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CLASS: B. SC. III

SEMESTER: V/IV

PAPER NO. V: DSC-E- 26.

Sr. No.	Month	Theory/ Practical	Name of unit/ Topic/practical
1	August	Theory	Unit – 1 Microbiology. 1.1. Microorganisms in Biological world, Characteristic features of different. Groups : Phytoplasma and Actinomycetes. 1.2. Methods in microbiology : Staining for microbes : Bacteria, Sterilization methods, Culture Media, Pure Culture Techniques. 1.3. Recombination in Bacteria L Transformation and Transduction.
		Practical	1) Genetic Example on Linkage. 2) Genetic Examples on Crossing over.
2	September	Theory	Unit – 2 Industrial Microbiology. 2.1. Applications of microorganisms with reference to synthesis of Antibiotics (Penicillin) Organic Acids (Lactic Acid) Alcohol (Ethyl Alcohol) 2.2. Biopesticides – Concept, Types & Significance.
		Practical	3) Genetic Examples on Polygene inheritance. 4) Determination of Chromosome count in PMCS in (Allium / Cynoetis) 5) Detection of meiotic anomalies in chromosomes in Rheo. 6) Preparation of Karyotypes – Ideograms by using photographs.
3	October	Theory	Unit – 3 Plant Pathology 3.1. Classification of plant diseases on the basis of pathogens & symptoms. 3.2. Transmission of Pathogen – Air borne, seed borne, and soil borne.

	November		<p>3.3. Prevention & Control : Physical, Chemical and Biological Control, Role of Quarantine.</p> <p>3.4. Study of Plant Diseases –</p> <p>i) Grassy shoot of sugarcane (Phytoplasma)</p> <p>ii) Citrus canker (Bacterial)</p> <p>iii) Yellow vein Mosaic of Bhendi (Viral)</p> <p>iv) White Rust of Crucifers and Tikka Disease of Ground nut (Fungal)</p>
		Practical	<p>7) Methods of Emasculation.</p> <p>8) Breeding techniques in - a) Malvaceae b) Fabaceae c) Poaceae.</p> <p>9) Mounting of Floral parts.</p>
4	January	Theory	<p>Unit – 4 Mushroom Technology</p> <p>4.1. History Types of mushrooms, Edible (Non poisonous) & in edible. (Poisonous)</p> <p>4.2. Cultivation Technology :-</p> <p>Pure Culture : Medium, Sterilization, Preparation of Spawn, Multiplication, Mushroom bed Preparation, factors affecting the mushroom bed preparation and composting technology in mushroom production.</p>
		Practical	<p>13) Study of Botanical Name, Morphology, parts used & Economic Importance of Clove & Black pepper.</p> <p>14) Study of Botanical Name, Morphology,</p>
	February		<p>Parts used & Economic Importance of Groundnut.</p>
	March		<p>15) Study of Botanical Name, Morphology, Parts used & Economic Importance of Groundnut.</p> <p>16) Measures of central tendency of given data.</p> <p>17) Study of frequency distribution & its graphical representation.</p>

	April		<p>3. Storage : Short Term (Referigeration) Long Term Storage (Canning, Pickles, Papads. Drying in salt solutions.</p> <p>4.4. Values of mushroom.Nutrition : Proteins, amino acids, mineral elements nutrition – Carbohydrates, Crude fiber content – Vitamins.</p>
	May		<p>10) Study of world map to show Vavilov's centres of origin of Cultivated plants.</p> <p>11) Study of Botanical Name, Morphology Parts used and Economic importance of wheat.</p> <p>12) Study of Botanical Name, morphology parts used and Economic importance of Gram & Soyabean.</p>



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TEACHER NAME: DR. B. T. JADHAV

SEMESTER: I/II

CLASS: B. SC. I

PAPER NO. I: DSC-13A: MICROBES, ALGAE AND BIOFERTILIZERS

PAPER NO. II: DSC-14A: CELL BIOLOGY AND ANALYTICAL TECHNIQUES

PAPER NO. I: DSC-14B: ARCHEGONIATE

Sr. No.	Month	Theory/ Practical	Name of unit/ Topic/practical
1	July	Theory	
		Practical	
2	August	Theory	I MICROBES 1.1- VIRUSES 1) Discovery, General characteristics
		Practical	
3	September	Theory	II) Structures of viruses
		Practical	
4	October	Theory	III) Types of viruses IV) Economic importance
		Practical	

		Practical	
5	November	Theory	PAPER-II: 1.1- Cell as a structural and functional unit of life. i) Introduction and definition ii) Cell as a biochemical entity
		Practical	
6	December	Theory	iii) structure and difference between prokaryotic and eukaryotic cell. iv) Plant cell wall.
		Practical	
7	January	Theory	PAPER IV 2.1-PTERIDOPHYTES i) general characters ii)Classification
		Practical	
8	February	Theory	iii) Ecological and economic importance iv) Morphology and anatomy and life cycle v) a) Selaginella b) Heterospory and seed habitat
		Practical	
9	March	Theory	2.2-GYMNOSPERMS i) general characters ii)Classification iii) Ecological and economic importance iv) Morphology and anatomy and life cycle

		Practical	
10	April	Theory	Gnetum
11	May	Theory	v) Connecting link between pteridophytes and Angiosperms


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TEACHER NAME: DR. B. T. JADHAV

CLASS: B. SC. II

SEMESTER: III/IV

PAPER NO. VI: DCS C14: GENETICS AND MOLECULAR BIOLOGY

PAPER NO. VII: DCS C13: PLANT ECOLOGY AND ECONOMIC BOTANY

Sr. No.	Month	Theory/ Practical	Name of unit/ Topic/practical
1	June	Theory	
		Practical	
2	July	Theory	
		Practical	
3	August	Theory	Unit 1: Mendelism 1.1) Introduction, Definition and basic terminologies 1.2) Principles of inheritance 1.3) Gene interaction
		Practical	7) Study of shoot and root apex 8) Study of simple tissue
4	September	Theory	1.4 Linkage and recombination Definition, linkage group, types, phases, significance 1.5 Recombination, Definition, types, mechanism,

			significance
		Practical	8) Study of complex tissue 9) Study of dicot and monocot root 10) Study of dicot and monocot stem
5	October	Theory	1.6 Chromosome structure and variation 1.7 Chromosome structure 1.8 Alteration in genetic make-up-Structural variations
		Practical	11) Double stain
6	November	Theory	1.8-Numerical variations PAPER: VII
		Practical	12) Maceration technique 13) Study of Mendals law 14) Genetic examples- Linkage 15) Genetic examples- Crossing over 16) & 17) Karyotype study
7	December	Theory	Paper-VII 1.Plant ecology 1a.Introduction to plant ecology 1.1 Basic concept, levels of organization 1.2 concepts and types of ecosystem 1.3Trophic organization
		Practical	19) Nuclie acid as a genetic material 20) determination of amino acid sequence

			21) Preperation of nuclear stain
8	January	Theory	1.4-Phytogeography 1.5-Soil
		Practical	22) Isolation of plant genomic DNA 23) Estimation of DNA 24) Estimation of RNA
9	February	Theory	1.6-Water
		Practical	25) Submission of herbarium
10	March	Theory	1.6-Water
		Practical	
11	April		
12	May		


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TEACHER NAME: DR. B. T. JADHAV

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SEMESTER: V/VI

PAPER NO. IX: GENETICS AND PLANT BREEDING

PAPER NO. XVI: BIOSTATISTICS

PAPER NO. XV: PLANT BIOTECHNOLOGY AND PALAEOBOTANY

Sr. No.	Month	Theory/ Practical	Name of unit/ Topic/practical
1	October	Theory	PAPER-IX Unit 1: Mendelism 1.1) Introduction, Definition and basic terminologies 1.2) Principles of inheritance 1.3) Gene interaction Unit 4: Palaeobotany 4.1 General account, GTS, Process of Fossilization, Types of Fossils. 4.2 GTS 4.3 Study of following form of genera a) <i>Lyginopteris</i> b) <i>Enigmocarpon</i> 4.4 Application of Palaeobotany.
		Practical	1. Preparation of cultural media 2. Methods of inoculation 3. Isolation of soil fungi 4. Study of different types of stains 5. Methodes of control of seed born diseases
2	November	Theory	Unit:2 Linkage and recombination 2.1Defination, linkage group,types, phases ,significance

			<p>2.2 Recombination, Definition, types, mechanism, significance</p> <p>Unit:3 Chromosome structure and variation</p> <p>3.1 Chromosome structure</p> <p>3.2 Multiple allelism</p> <p>3.3 Quantitative inheritance</p> <p>3.4 Maternal inheritance</p> <p>3.5 Alteration in genetic make up</p>
		Practical	<p>6 & 7 Plant diseases</p> <p>8 & 9 Mushroom cultivation</p> <p>10 Isolation of DNA</p> <p>11 Estimation of DNA</p> <p>12 Plant tissue culture</p>
3	December	Theory	<p>Unit:4 Plant Breeding</p> <p>4.1) Introduction, Definition and plant breeding</p> <p>4.2) Aims and Objectives of plant breeding</p> <p>4.3) Methodes of plant Breeding</p>
		Practical	<p>13 in vitro culture</p> <p>14 Inoculation of ex plant</p> <p>15 Isolation of protoplast</p> <p>16 Goldan rice</p>

4	January	Theory	PAPER:XV- PLANT BIOTECHNOLOGY AND PALAEOBOTANY Unit 2: Recombinant DNA technology 2.1 Introduction and Principles 2.2 Enzyme involved in DNA technology 2.3 Cloning vectors 2.4 Southern and Northern Blotting techniques
		Practical	17 Types of fossils 18 Lyginopteris 19 Enigmocarpon
5	February	Theory	2.5 DNA fingerprinting, Molecular DNA markers 2.6 PCR, DNA sequencing and concept of Gene bank
		Practical	20 Submission
6	March	Theory	Unit 4: Palaeobotany 4.1 General account, GTS, Process of Fossilization, Types of Fossils. 4.2 Study of following form of genera a) <i>Lyginopteris</i> b) <i>Enigmocarpon</i> 4.3 Application of Palaeobotany.
		Practical	Gernal checking
7	April	Theory	PAPER NO. XVI Unit 1: Nucleic Acid 1.1 Introduction, composition and Structure. 1.2 DNA replication 1.3 gene expression Unit 2: Recombinant DNA technology 2.1 Introduction and Principles

			<p>2.2 Enzyme involved in DNA technology</p> <p>2.3 Cloning vectors</p> <p>2.4 Southern and Northern Blotting techniques</p> <p>2.5 DNA fingerprinting, Molecular DNA markers</p> <p>2.6 PCR, DNA sequencing and concept of Gene bank</p>
		Practical	<p>21. Demonstration of Ganong's respirometer</p> <p>22. Study of chart quadrat</p>
8	January	Theory	<p>Unit 3: Genetic Engineering</p> <p>3.1 Introduction</p> <p>3.2 Methods of gene transfer</p> <p>3.3 Reporter gene</p> <p>3.4 Transgenic plants</p> <p>3.5 Application of plant biotechnology</p>
		Practical	<p>23. Determination of DO</p> <p>24. Titrimetric estimation of free CO₂</p>
9	February	Theory	<p>Unit 3: Plant Tissue Culture</p> <p>3.1 Principles and Terminologies, Laboratory requirement, Culture media, Totipotency and cellular differentiation.</p> <p>3.2 Micro propagation</p> <p>3.3 Embryogenesis</p>

			<p>3.4 Soma clonal Variations</p> <p>Unit 4: Palaeobotany</p> <p>4.1 General account, GTS, Process of Fossilization, Types of Fossils.</p> <p>4.2 Study of following form of genera</p> <p>a) <i>Lyginopteris</i></p> <p>b) <i>Enigmocarpon</i></p> <p>4.3 Application of Palaeobotany.</p>
		Practical	<p>25. Analysis of Electric Conductivity, Temperature and PH of water samples</p> <p>26. Field visit</p>
10	March	Theory	-



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TEACHER NAME: SHRI. S. M. SABALE

CLASS: B. SC. I

SEMESTER: I/II

PAPER NO. I: DSC – 13A: MICROBES, ALGAE AND BIOFERTILIZERS

PAPER NO. II: DSC-14A: CELL BIOLOGY AND ANALYTICAL TECHNIQUES

PAPER NO. IV: DSC-14B: ARCHEGONIATE

Sr. No.	Month	Theory/ Practical	Name of unit/ Topic/practical
1	July	Theory	Paper II Unit I- Cell Biology 1.2 Cell Membrane
		Practical	3) Forms of Bacteria
2	August	Theory	Paper I Unit I- Microbes 1.1- Viruses i) Discovery and General character ii) Structure of viruses – DNA viruses
		Practical	4) Gram staining technique of Bacteria
3	September	Theory	Paper I Unit I- Microbes 1.1- Viruses iii) Structure of viruses- RNA viruses iv) Economic importance
		Practical	2) Electron micrographs – T-phage
4	October	Theory	Paper I Unit I- Microbes 1.2 – Bacteria i) Discovery, General Characters ii) Cell structure iii) Forms of Bacteria iv) Nutrition
		Practical	22) Study of different stages of mitosis
5	November	Theory	Paper I Unit I- Microbes 1.2 – Bacteria v) Reproduction vi) Economic importance

6	December	Theory	Paper III Unit II- Phytopathology & Mushroom Cultivation 2.1 Phytopathology – i) Intro, Characters, ii) Viral Disease
		Practical	23) Study of different stages of meiosis
7	January	Theory	Paper III Unit II- Phytopathology & Mushroom Cultivation 2.1 Phytopathology iii) Bacterial disease iv) Fungal Disease
		Practical	Study of Plant disease
8	February	Theory	Paper III Unit II- Phytopathology & Mushroom Cultivation 2.1 Phytopathology v) Mycoplasma Disease
9	March	Theory	Paper III Unit II- Phytopathology & Mushroom Cultivation 2.2 Mushroom Cultivation i) Intro and History
10	April	Theory	Paper III Unit II- Phytopathology & Mushroom Cultivation 2.2 Mushroom Cultivation ii) Cultivation, Commercial importance


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TEACHER NAME: SHRI. S. M. SABALE

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PAPER NO. VI: GENETICS AND MOLECULAR BIOLOGY

PAPER NO. VIII: PLANT PHYSIOLOGY, NURSERY AND GARDENING TECHNIQUES

Sr. No.	Month	Theory/ Practical	Name of unit/ Topic/practical
1	July	Theory	Paper VI Unit II- Molecular Biology 2.1 Nucleic acids: Carriers of Genetic Information i) Nucleic acids – DNA & RNA ii) DNA structure: Watson and Crick model
2	August	Theory	Paper VI Unit II- Molecular Biology 2.1 Nucleic acids: Carriers of Genetic Information ii) Forms of DNA : A, B, Z iii) RNA structure iv) Types of RNA: mRNA, tRNA, rRNA
3	September	Theory	Paper VI Unit II- Molecular Biology 2.1 Nucleic acids: Carriers of Genetic Information v) Significance of Nucleic acids vi) DNA as genetic material vii) Griffiths experiment
		Practical	Practical I 4) Plant families a) Leguminosae b) Bignoniaceae
4	October	Theory	Paper VI Unit II- Molecular Biology 2.2 DNA Replication i) Concept of central dogma of molecular biology ii) DNA Replication iii) Enzymes involved in DNA Replication
		Practical	Practical I 22) Isolation of plant genomic DNA 23) Estimation of DNA

5	November	Theory	Paper VI Unit II- Molecular Biology 2.2 DNA Replication iv) Concept of genetic code
6	December	Theory	Paper VIII Unit I- Plant Physiology 1.1 Fundamentals of plant physiology and photosynthesis i) Introduction to Plant physiology ii) Photosynthesis- Intro and significance
		Practical	Practical I 24) Estimation of RNA
7	January	Theory	Paper VIII Unit I- Plant Physiology 1.1 Fundamentals of plant physiology and photosynthesis iii) Photosynthetic pigments and photosystems
		Practical	Practical I 5) Plant families c) Euphorbiaceae d) Amaryllidaceae
8	February	Theory	Paper VIII Unit I- Plant Physiology 1.1 Fundamentals of plant physiology and photosynthesis iv) Mechanism of photosynthesis a) Light reaction b) Dark reaction
		Practical	Practical II 1) Phytogeographical regions of India 17) Ganongs respirometer
9	March		Paper VIII Unit I- Plant Physiology 1.2 Respiration v) Respiration: Intro and significance vi) Types: Aerobic and Anaerobic
10	April		Paper VIII Unit I- Plant Physiology 1.2 Respiration vii) Mechanism of aerobic respiration a) Glycolysis b) Formation of Acetyl-CoA c) TCA/ Krebs cycle d) ETS


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SEMESTER: V/VI

PAPER NO. XI: CYTOLOGY AND RESEARCH TECHNIQUES

PAPER NO. XIII: BIOCHEMISTRY AND MOLECULAR BIOLOGY

Sr. No.	Month	Theory/ Practical	Name of unit/ Topic/practical
1	July	Theory	Paper XI – Cytology Unit 1- Cell as a unit of life 1.1 Intro 1.2 Cell cycle
		Practical	
2	August	Theory	1.3 Cell division Unit 2- Cell organelle 2.1 Nucleus 2.2 Mitochondria 2.3 Chloroplast 2.4 Ribosome
		Practical	4) Cell structure of <i>Onion, Hydrilla, Spirogyra</i> 7) Dialysis 8) DNA packaging in eukaryotes 10) Beer and Lamberts law 20) Phytochemical analysis
3	September	Theory	Unit 3- Subcellular structures and cell membrane 3.1 ER, Golgi body, Lysosome 3.2 Peroxisomes and Glyoxisomes 3.4 Cell membrane 3.5 Cell membrane types
		Practical	10) Isolation of plant genomic DNA 13) Application of biofertilizers 14) Organic manure 15) Drug adulteration
4	October	Theory	Unit 4- Research techniques in biology 4.1 Microscopy 4.2 Colorimetry 4.3 IPR 4.5 Patents
		Practical	11) Calorimetric estimation of DNA

			18) Mscroscopic study 8) Garden implements 9) Study of ornamental plants 5) Study of mitosis
5	November	Theory	Paper XIII – Biochemistry and Molecular Biology Unit 1- Carbohydrates 1.1 Introduction and classification
		Practical	10) Study of hedge and edge plants 11) Study of indoor plants
6	December	Theory	1.2 Structure and properties of carbohydrates 1.3 Isomerism 1.4 Significance
		Practical	14) Qualitative test for proteins 15) Qualitative test for lipids 16) Paper chromatography 18) Thin layer chromatography 11) Permanent cytological slides
7	January	Theory	Unit 2- Lipids 2.1 Intro, structure and properties 2.2 Saturated and unsaturated fatty acids 2.3 Significance of lipids
		Practical	17) Fatty acid value 19) Isoelectric point of protein 9) Mounting of Floral Parts 10) Vavilovs centres of origin of cultivated plants 4) Study of different types of Stains 1) Prokaryotic cell and Eukaryotic cell 15) Herbal preparation
8	February	Theory	Unit 3- Proteins 3.1 Intro, structure, properties, classification of amino acid 3.2 Biosynthesis of proline 3.3 General structure of protein 3.4 Transcription and translation
		Practical	12) Qualitative test for sugar 13) Qualitative test for starch and cellulose 6) Study of meiosis
9	March	Theory	Unit 4- Nucleic Acids 4.1 Intro, Composition and Structure 4.2 DNA Model 4.3 Replication in Eukaryotes
10	April	Theory	4.4 RNA 4.5 Gene Expression


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Teaching Plan 2023-24



TEACHER NAME: Shri.S.B.Patil

CLASS: B. SC. I

SEMESTER: I/II

PAPER NO. I: DSC-13B: Mycology, Phytopathology and Mushroom cultivation

PAPER NO. II: DSC-14B: Archegoniate (Bryophytes, Pteridophytes & Gymnosperms)

Sr. No.	Month	Theory/ Practical	Name of unit/ Topic/practical
1	June	Theory	Analytical techniques
		Practical	1. Study of forms of bacteria 2. Study of <i>Nostoc</i> 3. Study of <i>Spirogyra</i>
2	July	Theory	1. Principles of Microscopy 2. Light Microscopy
		Practical	4. Study of <i>Penicillium</i> 5. Study of <i>Riccia</i>
3	August	Theory	3. Fluorescence Microscopy 4. Electron Microscopy
		Practical	9. Study of <i>Pteris</i> 10. Study of <i>Gnetum</i> 11. Study of Metrological Instruments 12. Study of WHC of soils
4	September	Theory	Chromatography 1. Principles and application of Chromatography
		Practical	13. Determination of soil and water P ^{II} 14. Study of Morphological and anatomical adaptation in hydrophytes

5	October	Theory	2. Paper Chromatography -Ascending 3.Thin layer Chromatography (TLC)
		Practical	15. Study of Morphological and anatomical adaptation in xerophytes 16. Study of Morphological and anatomical adaptation in epiphytes
6	November	Theory	1.a Introduction, Definition and scope of ecology Edaphic factor: Soil and Water
		Practical	
7	December	Theory	1.2. Bryophytes 1.General character 2. classification as per G.M. Smith (1955) upto classes
		Practical	17.Selaginella
8	January	Theory	3.Ecological and economical importance
		Practical	18.Mucor


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TEACHER NAME: Shri. S.B. Patil

CLASS: B. SC. II

SEMESTER: III/IV

Paper No. VI: DSC- C14: PLANT SYSTEMATIC AND ANATOMY

Sr. No.	Month	Theory/ Practical	Name of unit/ Topic/practical
1	July	Theory	UNIT I. PLANT SYSTEMATICS 1. Plant systematics
		Practical	1. Study of shoot and root apex 2. Study of Simple tissue
2	August	Theory	Introduction to systematics. Functions of Taxonomy: Plant Identification, Classification, Nomenclature. 1.2 Principle and Rules of ICN 1.3 Morphology of flowering plants: Root: Definition, Types and Modifications (Conical, Fusiform, Napiform, Prop. Pneumatophore)
		Practical	4. Study of Primary Structure of monocot and dicot root 5. Study of Primary Structure of monocot and dicot stem 6. Study of Normal secondary growth in dicot stem
3	September	Theory	b. Stem: Definition and Modifications (Phylloclade, Rhizome, Corm, Tuber) c. Leaf: Definition and (Simple and Compound, Phyllotaxy) d. Flower: Definition, Typical flower and Types (Actinomorphic, Zygomorphic) e. Inflorescence: Definition and Types f. Fruits: Definition and types 1.4 Bentham and Hooker's Classification (outline up to subclasses mentioning the numbers of series, orders). Merits and demerits. 1.5 Herbaria: Introduction and functions, examples with salient features: a. 'CAL'
		Practical	7. Study of Anomalous secondary growth in <i>Bignonia</i> 8. Study of Anomalous secondary growth in <i>Dracaena</i> .

4	October	Theory	b. 'K' (Virtual herbarium) 1.6 Botanic gardens: Introduction and functions, example with salient features: Lead
		Practical	10. Double stained permanent micropreparation 11. Study of anatomy of porous and non-porous wood
5	November	Theory	Botanic Garden (SUK) 2.1 Anatomy: Introduction to internal 2a. Structure and development of plant body organization of plant body 2.2 Organization of shoot apex: Apical cell
		Practical	14. Study of Secretary Tissue System 15. Study of Mechanical Tissue System
6	December	Theory	2.3 Organization of root apex: Quiescent centre concept 2.4 Types of tissues: a. Meristematic tissue types based on position (Apical, intercalary and lateral)
		Practical	18. Determination of rate of Respiration 19. Breaking of seed dormancy 20. Study of effect of P^{II} on catalase enzyme activity
7	January	Theory	b. Permanent tissue types [Simple tissue: Parenchyma, Collenchyma. Sclerenchyma and Complex tissue: Xylem, Phloem]
		Practical	24. Study of biofertilizers 25. Separation of amino acids by TLC.
8	February	Theory	2.6. Primary structure of root, stem and leaf (Dicot and Monocot)


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TEACHER NAME: S.B. Patil


CLASS: B. SC. III

SEMESTER: V/VI

Paper-XII DSE-E28 .Horticulture and Gardening

Sr. No.	Month	Theory/ Practical	Name of unit/ Topic/practical
1	July	Theory	1.1: Introduction and importance of horticulture 1.2: Divisions of Horticulture - Pomology, Olericulture, Floriculture, Landscape gardening,
		Practical	
2	August	Theory	Unit 2 Horticultural Produce and Management of Pest and diseases 2.1: Floriculture: a) Cultivation of important cut flowers and management of important pests and diseases: Rose, Gerbera, Marigold. b) Flower arrangements, Packing and Marketing of cut flowers. 2.2: Fruit preservation technology: a) Physical - Drying, freezing, heat, b) Chemical - sugar, salt, chen I preservatives.
		Practical	
3	September	Theory	Unit 3 Nursery: 3.1: Definition, objective and scope, Infrastructure for nursery 3.2: Propagation Practices: Sexual and Asexual a) Sexual: Seed: Sowing of seed, Transplanting of seedling, Advantages and Disadvantages. b) Vegetative: i) Cutting - Definition, Stem cutting (Hard wood stem and soft wood stem), Use of PGR's for rooting
		Practical	Grafting - Definition,

			Whip grafting Approach grafting
4	October	Theory	ii) Layering-Definition, Simple layering. Air layering iii) Grafting - Definition, Whip grafting, Approach grafting iv) Budding: Definition, T-budding, Patch budding
		Practical	T-budding, Patch budding
5	November	Theory	
		Practical	Patch budding
6		Theory	c) By specialized vegetative structure- Bulbs, Corms, Tubers, Rhizomes
		Practical	
7	December	Theory	Landscape Gardening: Definition, scope and objectives
		Practical	Indoor Garden - Indoor plants, bottle garden, dish garden, hanging basket
8	January	Theory	Outdoor Garden - Lawns, Preparation of lawn, lawn types, Rockery, Terrace garden, Water garden, green house and polyhouse
		Practical	Bonsai Vertical Garden
February			Important aesthetic Gardens of India: i) Mughal garden, Delhi ii) Brindavan garden, Mysore.


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