



Shri Sangameshwar Education Society's
Sangameshwar College, Solapur [Autonomous]
 (Affiliated to Punyashlok Ahilyadevi Holkar Solapur University, Solapur)
 Kannada Linguistic Minority Institute
NAAC Accredited with 'A' Grade (III Cycle CGPA 3.39)

Academic Council 3(3.3)
10th August, 2021

UG Science Programme: B.Sc.-II: To be implemented from A.Y. 2021-2022

System: Choice Based Credit System (CBCS) with SGPA and CGPA

B.O.S. in BOTANY

Syllabus for: Discipline Specific Core Courses (DSC-C and DSC-D)

Structure and Examination for: Discipline Specific Core Courses (DSC-1C and DSC-1D)

Table-3

Semester	Course		Teaching Scheme/week			
			Course Code	Hours	Lectures	Credits
III	DSC-1C	Theory Paper-V: PLANT ANATOMY	2131311	4.8	6	4
		Theory Paper-VI: PLANT METABOLISM	2131312			
		Practical-II: Botany Practical	2131424	6.4	8	4
	SEC-1	Theory Paper-I: Gr. B: Soil Health Management	2131320	4.8	6	2
IV	AECC-C	ENVIRONMENTAL STUDIES	2131315	3.2	4	4
	DSC-1D	Theory Paper-VII: PLANT PHYSIOLOGY	2131411	4.8	6	4
		Theory Paper-VIII: EMBRYOLOGY OF ANGIOSPERMS				
		Practical-III: Botany Practical	2131424	6.4	8	4
	SEC-2	Theory Paper-II: Gr. B: Soil Health Management	2131429	4.8	6	2

Table-4

Semester	Course		EXAMINATION			Credits
			Marks			
			CA	SEE	Total	
III	DSC-1C	Theory Paper-V: PLANT ANATOMY	15	35	50	2

		Theory Paper-VI: PLANT METABOLISM	15	35	50	2
	SEC-1	Theory Paper-I: Gr. B: Soil Health Management	15	35	50	2
IV	AECC-C	ENVIRONMENTAL STUDIES	15	35	50	4
	DSC-1D	Theory Paper-VII:	15	35	50	2
		Theory Paper-VII: PLANT PHYSIOLOGY	15	35	50	2
	SEC-2	Theory Paper-VIII: EMBRYOLOGY OF ANGIOSPERMS	15	35	50	2
DSC-1C & DSC-1D	Practical-II and III: Botany Practical	60	140	200	8	

CA: Continuous Assessment SE: Semester End

Note:-

The above structure (Table-3 and Table-4) is for Sem-III and Sem-IV of the undergraduate B.Sc.-II programmes* under science faculty.

***B.Sc.-II** Select any three DSC form the four core courses opted at B.Sc.- I.

DSC: Discipline Specific Core Course AECC: Ability Enhancement Compulsory Course

SEC: Skill Enhancement Course

Passing in each course is compulsory including Environment Studies course.

SGPA/CGPA and Total Marks will be calculated excluding AECC course.

Passing in each course is compulsory. SGPA/CGPA and Total Marks will be calculated excluding AECC course.

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Syllabus for: Discipline Specific Core Courses (DSC-C and DSC-D)

SEM-III

DSC-C Theory-I BOTANY-V (2131311) Title: PLANT ANATOMY (Credit:2 & Marks:50)		Hours 36
Unit 1	Meristematic tissue 1.1 Introduction, Characteristics and Classification of meristems based on position 1.2 Classification of meristem based on origin, position and plain of division. 1.3 Theories of structural development a)Apical cell theory b) Histogen theory c) Tunica Corpus theory.	8
Unit 2	Permanent tissue: 2.1 Simple and complex tissue	9

	<p>2.2 Structure and function of simple tissues a) Parenchyma . b) Collenchyma c) Sclerenchyma</p> <p>2.3 structure and function of Complex tissue a) Xylem b) Phloem</p> <p>2.4 Types of Vascular bundles</p>	
Unit 3	<p>Primary structure of plant body.</p> <p>3.1 Primary structure of Monocotyledon and Dicotyledon root. 3.2 Primary structure of Monocotyledon and Dicotyledon stem.</p>	5
Unit 4	<p>Secondary structure of plant body.</p> <p>4.1 Normal secondary growth in Dicotyledon root and stem 4.2 Anamalous secondary growth in Bignonia (Dicot.) and Dracaena stem. 4.3 Vascular cambium – structure and function 4.4 Periderm and Lenticel, Tylosis, Wood types.</p>	8
Unit 5	<p>Tissue system .</p> <p>5.1 : Epidermal tissue system 5.2: Secretary tissue system 5.3: Mechanical tissue system</p>	6
<p>Course Outcome:</p> <ul style="list-style-type: none"> ● Students will able to understand the tissue system of plants ● Students will able to analyze the difference between primary structure of monocotyledon root and dicotyledon root. ● Students will able to analyze the difference between primary structure of monocotyledon stem and dicotyledon stem. ● Detail understanding about secondary structure of plants. 		

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<p>DSC-C Theory-II I BOTANY-VI (2131312)</p> <p>Title: PLANT METABOLISM</p> <p>(Credit:2 & Marks:50)</p>		<p>Hours 36</p>
Unit 1	<p>Enzymes</p> <p>1.1 Introduction. 1.2 Classification of enzymes. 1.3 Mechanism of enzyme action.</p>	8

	1.4 Properties of enzymes.	
Unit 2	Nitrogen metabolism 2.1 Introduction, 2.2 Nitrogen cycle 2.3 Biological nitrogen fixation – Definition, types and organisms involved, 2.3 Mechanism of biological nitrogen fixation. 2.4 Significance of biological nitrogen fixation	6
Unit 3	Plant growth regulators 3.1 Introduction ,Discovery 3.2 Types of growth regulators a. PGR - auxins, gibberellins, cytokinins (Physiological role of growth regulators) b. Growth inhibitors – ABA, Ethylene (Physiological role of growth regulators)	8
Unit 4	Mineral nutrition 4.1 Introduction, 4.2 Macronutrients, Role of macronutrients (N, P, K) 4.3 Macronutrients, Role of Micro nutrients (Fe, Mn.)	5
Unit 5	Carbohydrate metabolism 5.1 Introduction and Broad classification; 5.2 Monosaccharides - Properties and examples (Triose , Tetrose, Pentose and Hexose) 5.3 Oligosaccharides - Properties and examples (Sucrose , Maltose and Lactose) 5.4 Polysaccharides - Properties and examples (Starch and Cellulose)	9
	Course Outcome: <ul style="list-style-type: none"> ● Knowledge of enzymes and nitrogen metabolism will help the students to know the various metabolic activities of plants. ● Interest about plant growth mechanism will increase in students mind. ● Role of micronutrients and macronutrients to the plant growth will help the students to accelerate the economic plant production. 	

DSC-D Theory-I BOTANY-VII (2131411)		Hours 36
Title: PLANT PHYSIOLOGY (Credit:2 & Marks:50)		
Unit 1	Plant response to light and temperature 1.1 Photoperiodism – Definition, Classification (SDP, LDP, Day neutral plants); 1.2 Phytochrome Definition, Role of phytochrome (red and far red light responses on photo morphogenesis); 1.3 Vernalization: Definition, Mechanism, Significance.	8
Unit 2	Translocation in phloem 2.1 Definition of Symplastic transport and apoplastic transport, Phloem loading and unloading. 2.2 Mechanism of translocation in phloem – Mass flow hypothesis 2.3 Source and sink relationship : During vegetative and reproductive phase.	7
Unit 3	Photosynthesis 3.1 Introduction. 3.2 Photosynthetic Apparatus 3.3 Photosynthetic Pigments (Chl a, b, xanthophylls, carotene); 3.4 Light reaction – Cyclic and non cyclic 3.5 Dark reaction – C3, C4, CAM Pathway	8
Unit 4	Respiration 4.1 Introduction 4.2 Structure of Mitochondrion 4.3 Types – Arobic - Glycolysis, Linkage stage and TCA Cycle ETS	5
Unit 5	Organic fertilizer 5.1 Introduction: 5.2 Types of Organic fertilizer 5.3 FYM 5.4 Vermicompost Procedure, Significance and Limitations	8
	Course Outcome: <ul style="list-style-type: none"> ● Students will understand the photo effect on plant mechanism. ● Knowledge about photosynthesis and respiration will help to save the environment. ● Detail understanding of role of organic fertilizer will develop interest in organic farming. 	
Academic Council 3(3.3) 10th August, 2021 DSC-D Theory-II BOTANY-VIII (2131412) Title: EMBRYOLOGY OF ANGIOSPERMS		Hours 36

(Credit:2 & Marks:50)		
Unit 1	<p>Structural organization of flower</p> <p>1.1. Concept of flower as a modified Shoot. 1.2 Structure of typical flower. 1.3 Structure of typical Androceium, Structure of tetrasporangiate anther and pollen grain. 1.4 Structure of typical Gynoecium: Structure of a typical ovule, Types of ovules.</p>	9
Unit 2	<p>Pollination and fertilization</p> <p>2.1 Definition, self and cross Pollination 2. 2 Mechanism in Anemophily (<i>Zea mays</i>), Entomophily (<i>Calotropis</i>) and Hydrophily (<i>Vallisneria</i>) 2.3 Microsporogenesis, and development off male gametophyte 2.4 Megasporogenesis and development of female gametophyte: Monosporic (<i>Polygonum</i>) and Bisporic (<i>Allium</i>) 2.5 Fertilization: Entry of pollen tube, double fertilization and triple fusion. Significance of double fertilization</p>	9
Unit 3	<p>Embryo and Endosperm Development.</p> <p>3.1 Structure and development of embryo in Monocotyledons. 3.2 Structure and development of embryo in Dicotyledons. 3.3 Development of endosperm,. 3.4 Types of endosperm- Nuclear, Helobial and Cellular.</p>	9
Unit 4	<p>Seed and fruit dispersal</p> <p>4.1 Agents of Seed and fruit dispersal 4.2 Mechanism of seed and fruit dispersal.</p>	4
Unit 5	<p>Polyembryony and Apomixis</p> <p>5.1 Polyembryony Introduction and significance 5.2 Apomixis Introduction and significance</p>	5
	<p>Course Outcome:</p> <ul style="list-style-type: none"> ● Students will understand the role and mechanism of flower in plant production ● Understanding of developmental stages of embryo and endosperm will help the students to produce quality food production as well as quality seed production. ● Knowledge of embryology will help the students to maintain the plant health. 	

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Practical-II BOTANY PRACTICAL-II AND III (2131424) (Credit:2, Hours:30 & Marks:100)	
1	Study of shoot and root apex by permanent slides.
2	Study of simple tissues.
3	Study of complex tissues.
4	Study of primary structure of dicot and monocot root
5	Study of primary structure of dicot and monocot stem
6	Study of anomalous secondary growth in <i>Bignonia</i> .
7	Study of anomalous secondary growth in <i>Dracaena</i> .
8	Study of double stained micro preparation in <i>Bignonia and Dracaena</i> stem.
9	Study of double stained preparation of anomalous secondary growth in <i>Dracaena</i> .
10	Study of anatomy of porous (ring porous & diffused porous) and non porous wood.
11	Maceration technique.
12	Study of Epidermal tissue system.
13	Study of Secretary Tissue system.
14	Study of Mechanical tissue system.
15	Study of role and deficiency symptoms of N, P, K,
16	Study of role and deficiency symptoms of Fe, Mn.
17	Estimation of Chlorophylls by Colourometric / Spectrophotometric method.
18	Separation of photosynthetic pigments by ascending paper chromatography.
19	Study of Kranz leaf anatomy in C4 plants.
20	Estimation of TAN value in CAM plants.
21	Study of evolution of oxygen during photosynthesis.
22	Study of effect of light intensity on photosynthesis.
23	Detection of Phosphate, Potassium and Iron in the plant tissue by biochemical tests.
24	Determination of sugar percentage by hand refractometer.
25	Botanical Excursion Report.

Practical-III BOTANY PRACTICAL-II AND III (2131424) (Credit:2, Hours:30 & Marks:100)	
1	Study of typical flower and its parts (floral whorls with their functions).
2	Study of young / mature anther by permanent slide.
3	Study of germination of pollen grains.
4	Detection of pollen fertility by staining technique.
5	Study of types of ovules (by permanent slide or photograph).
6	Study of dicotyledon and monocotyledon embryo (by permanent slide or photograph).
7	Dissection of embryo
8	Study of endosperm from developing seeds (<i>Grevillia</i> / <i>Cucumis</i>).
9	Dispersal of seeds.
10	Dispersal of Fruits.
11	Study of self pollinated plants
12	Study of cross pollinated plants
13	Study of pollination mechanism (<i>Maize</i> , <i>Calotropis</i>)
14	Determination of rate of respiration during seed germination by Ganong's respirometer.
15	Effect of different concentrations of Auxins (IAA) on seed germination (any suitable dicot seeds).
16	Effect of different concentrations of Gibberellic acid (GA) on seed germination (any suitable monocot seeds).
17	Effect of different concentrations of Ethylene on fruit ripening
18	Breaking of seed dormancy by mechanical and chemical scarification.
19	Study of effect of pH on Catalase enzyme activity.
20	Study of effect of temperature on Malate dehydrogenase enzyme activity.
21	Janus green B staining technique for mitochondria.
22	Demonstration of fermentation.
23	Study of biofertilizers.
24	Study of organic fertilizer
25	Horticulture Term Paper / Field Visit Report / Project Report

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BOS in Botany**

