

ANATOMY AND EMBRYOLOGY OF ANGIOSPERMS

Credits: Theory: 04; Practical: 02 (4h/week) Total No of Lectures: 60hrs

Course No.	Type of Course	Theory/ Practical	Credits	Instruction hour per week	Total No. of Lectures/ Hours / Semester	Duration of Exam	Formative Assessment Marks	Summative Assessment Marks	Total Marks
BOT-T-3.1	DSCC	Theory	04	04	60 hrs	3hrs	20	80	100
BOT-P-3	DSC	Practical	02	04	30 hrs	2hrs	10	40	50

Course Outcome:*On completion of this course, the students will be able to:*

- Observation of variations that exist in internal structure of various parts of a plant and as well as among different plant groups in support for the evolutionary concept.
- Skill development for the proper description of internal structure using botanical terms, their identification and further classification.
- Induction of the enthusiasm on internal structure of locally available plants.
- Understanding various levels of organization in a plant body with an outlook in the relationship between the structure and function through comparative studies.
- Observation and classification of the floral variations from the premises of college and house.
- Understanding the various reproductive methods sub-stages in the lifecycle of plants
- Observation and classification of the embryological variations in angiosperms.
- Enthusiasm to understand evolution based on the variations in reproduction among plants.

Dr. Suresh

Dr. M.S. Patil

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Dr. S. Sankar

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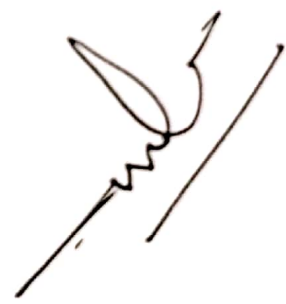
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THEORY CONTENTS

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Unit-1	TISSUE SYSTEMS IN PLANTS- 1	15
	Introduction, scope and in Plant Anatomy. Meristematic, Permanent and Secretory Tissues Meristematic: Types, and functions theories: Histogen and tunica corpus theory: Permanent Tissues: simple permanent, types, structure and functions Complex permanent Tissues: Types, structure and function Secretory Tissues: External and Internal secretory tissues and their role Epidermal Tissue System: Trichome, epidermal hair, stomata, types of stomata	
Unit -2	INTERNAL STRUCTURES OF ANGIOSPERMS	15
	Ground tissue system, Cortex, Pith, stele, types of vascular bundles Anatomy: Dicot Root, Stem, Leaf, Monocot: Root, Stem, Leaf, (typical examples) Secondary growth: Normal secondary growth concept, Secondary tissues: Cambium, Phellogen, Phellum, Phelloderm, Cork and Bark, Lenticels, and their role Anomalous Secondary growth: Concept, in Dictos: <i>Boerhaviaa</i>, <i>Bougainvillea</i>; Monocot: <i>Draceana</i>, and <i>Agave</i> Wood anatomy: Heart wood, sap wood, porous and non porous wood Dendrochronology: concept, importance	
Unit-3	EMBRYOLOGY	15
	Introduction, contribution of Indian embryologists (P. Maheshwari and BGL Swamy) Typical structure of flower: Reproductive whorls Microsporogenesis: Development of anther: wall layers, Microspore Mother cells, Pollen tetrads, pollinia. Concept of Male germ unit, Ubisch Bodies, Pollen Kit. Structure of male gametophyte and formation of male gamete. Palynology: General account, structure of pollen grain Megasporogenesis: Structure and development of Female gametophyte (ovules) and types. Structure of mature embryosac, types of embryosacs: monosporic (<i>Polygonum</i> type), biosporic (<i>Allium</i>) Tetrasporic: <i>Plumbago</i> A brief account of Morphogenesis and Differentiation	

Unit -4	POLLINATION AND FERTILIZATION	
	Definition, types: Self and Cross Pollination, Contrivances of Self and Cross pollination, Pollen-Pistil Interaction. Pollinating agents, significances of pollination. Fertilization: Brief account post pollination events: Germination and entry of pollen tube, double fertilization and triple fusion and its significance Endosperm: Development of Endosperm, types of endosperms: Nuclear, Cellular, Helobial Functions of Endosperm: Embryo: Embryogenesis in dicots, and monocots, Brief account of polyembryony, apomixes, parthenocarpy and significances Seed: Structure of dicot and monocot seed, endospermic and non-endospermic seed, mechanism of seed dispersal A brief account of Embryogenesis	15



LIST OF EXPERIMENT TO BE CONDUCTED

Maximum of 30

2 hours practical twice in week
hours

ANATOMY PRACTICALS:

1. Study of meristem (Permanent slides/ Photographs).
2. Study of Simple Tissues (Parenchyma, Collenchyma and Sclerenchyma) and Complex Tissues (xylem and phloem).
3. Maceration technique to study elements of xylem and phloem, and sclerifieds
4. Study of trichome and stomata (any three types) with the help of locally available plants
5. T.S dicot root, stem and Leaf (*Sunflower/Tridax*)
6. Anomalous structures: *Aristolochia*, *Boerhaavia* (dicot stem) *Dracaena* (monocot stem)

EMBRYOLOGY PRACTICALS:

7. Permanent slides: T.S of Anther
8. Pollen grains of Grass and *Hibiscus* and Pollinia of *Calotropis*
9. Pollen germination (hanging drop method)
10. **Permanent slides:** types of ovules.
11. Structure of mature embryo sac, types of embryo sacs: monosporic (*Polygonum* type), bisporic: (*Allium*) Tetrasporic: *Plumbago* (**Permanent slides**)
12. Mounting of embryo: endosperm: *Cucumis*, *Croton*
13. Study of pollen morphology of different flowers with respect to shape, colour, aperture etc.
14. Pollen germination of different pollen grains and calculate percentage of germination.
15. Calculate percentage of pollen germination
16. Study of placentation of different flowers.



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MODEL QUESTION PAPER FOR THEORY INTERNAL ASSESSMENT

Course -DSC 3T: ANATOMY AND EMBRYOLOGY OF ANGIOSPERMS

Time: 45 min

Max. Marks: 20

Instructions to candidates: 1. Answer all questions
2. Draw the diagrams wherever necessary

PART -A

Answer any FIVE of the following in two to three sentences

(01 x 05 = 05)

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.

PART -B

Answer any TWO of the following on brief

(04 x 05 = 05)

- 08.
- 09.

PART -C

Answer any FOUR of the following in detail

(01 x 10 = 10)

- 10.
- 11.

PRACTICAL INTERNAL ASSESSMENT

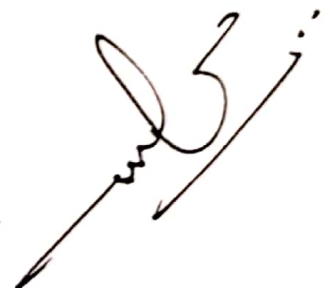
Max. Marks: 10

Time: 1 Hr

- I Prepare a temporary safranin stained T.S. of material 'A' and identify with reasons and draw labelled diagram. Leave the preparation for evaluation 06
- II. Mount the endosperm/embryo of 'B'. Sketch and label the parts leave forevaluation. 06
- III. Mount the given material 'C'. (Pollen grains, /pollenia.) Sketch and label 04
- IV. Macerate/Mount the specimen 'D' identify any two types of elements 04
(Cells with Labeled sketches and give reasons, types of stomata/trichomes.)

Total

0/2 = 10



MODEL QUESTION PAPER FOR PRACTICAL EXAMINATIONS

B.Sc.- III Semester Practical Examination
Sub-BOTANY

Course -DSC 3P: ANATOMY AND EMBRYOLOGY OF ANGIOSPERMS

Time:2 Hours

Max. Marks: 40

I. Prepare a temporary safranin stained T.S. of material 'A' and identify with reasons and draw labelled diagram. Leave the preparation for evaluation	06
II. Mount the endosperm/embryo of 'B'. Sketch and label the parts leave for evaluation.	06
III. Mount the given material 'C'. (Pollen grains, /pollenia.) Sketch and label	04
IV. Macerate/Mount the specimen 'D' identify any two types of elements (Cells with Labeled sketches and give reasons, types of stomata/trichomes.	06
V. Identify and comment on micro slides of 'E' & 'F', and G with reasons.	06
VI. Viva- Voce	04
VI. Records	05
VIII submissions Permanent Slides	03
Total	40

Instructions to the Examiner

- Q. I. A-Sunflower/Grass stem/*Boerhavia*, or *Bougainvillia* stem.
- Q. II. B-Mounting – Embryo in /Endosperm in *Cucumis*/*Croton*
- Q. III. C-locally available flower- pollen/*Pollinia*, mounting. (*Vinca*, *Hibiscus*, *Calotropis*.)
- Q. IV D-*Vinca* leaf or Any macerated material (Xylery elements)
- Q. V. E, F-embryology permanent slides and G anatomy slide.

- Note: 1. Examiner seek the performance of a student by observation and distribute the marks accordingly of marks for every experiment and writing part also
2. Viva –Voce must be conducted maximum of 2 minutes for each student

MODEL QUESTION PAPER FOR THEORY EXAMINATIONS

B.Sc.- III Semester Practical Examination
Sub-BOTANY

Course -DSC 3T: ANATOMY AND EMBRYOLOGY OF ANGIOSPERMS

Time: 03 Hours

Max. Marks: 80

Instructions to candidates: 1. Answer all questions
2. Draw the diagrams wherever necessary

PART -A

Answer any TEN of the following in two to three sentences

(02 x 10 = 20)

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.
- 9.
- 10.
- 11.
- 12.

PART -B

Answer any FOUR of the following on brief

(04 x 05 = 20)

- 13.
- 14.
- 15.
- 16.
- 17.
- 18.

PART -C

Answer any FOUR of the following in detail

(04 x 10 = 40)

- 19.
- 20.
- 21.
- 22.
- 23.
- 24.

Text and other Books for Reference:

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1. Bhojwani and Bhatnagar, Introduction to Embryology of Angiosperms-Oxford&IBH, Delhi
2. Bhojwani Sant Saran, 2014. Current Trends in the Embryology of Angiosperms, Woong-Young Soh, Springer Netherlands.
3. Coutler E.G. 1969. Plant Anatomy-Part I Cells and Tissues-Edward Arnold, London.
4. Dickison, W.C. (2000). Integrative Plant Anatomy, Harcourt Academic Press, USA
5. Eames A.J. -Morphology of Angiosperms-McGraw Hill, New York.
6. Esau, K. 1990. Plant Anatomy, Wiley Eastern Pvt Ltd New Delhi
7. Evert, R.F. (2006) Esau's Plant Anatomy: Meristem, Cells, and Tissues of the Plant Body: Their Structure, Function and Development. John Wiley and Sons, Inc
8. Fahn, A. 1992. Plant Anatomy, Pergamon Press, USA
9. Johri, B.M.L., 1984. Embryology of Angiosperms, Springer-Verlag, Netherlands.
10. Karp G., 1985. Cell Biology; Mc. Graw Hill Company
11. Maheshwari, P. 1950. An introduction to the embryology of angiosperms. New York: McGraw-Hill
12. Mauseth, J.D. (1988). Plant Anatomy, the Benjamin/Cummings Publisher, USA.
13. Nair P.K. Pollen Morphology of Angiosperms-Scholar Publishing House, Lucknow
14. Pandey S.N. 1997, Plant Anatomy and Embryology. A. Chadha, Vikas Publication House Pvt Ltd;
15. Pandey, B.P., 1997. Plant Anatomy, S. Chand and Co. New Delhi
16. Raghavan, V., 2000. Developmental Biology of Flowering plants, Springer, Netherlands.
17. Saxena M.R. -Palynology-A treatise-Oxford&I.B.H., New Delhi.
18. Shivanna, K.R., 2003. Pollen Biology and Biotechnology. Oxford and IBH Publishing Co. Pvt. Ltd. Delhi.
19. Vashishta, P.C., 1984. Plant Anatomy-Pradeep Publications-Jalandhar.
20. Vashishta, P.C. 1997. Plant Anatomy, Pradeep Publications.


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SEMESTER – III

DISCIPLINE SPECIFIC ELECTIVE (DSE-3.1)

Title of the paper: BIOFERTILIZERS

Credits: Theory: 02; (Contact classes: 2h/week) Total No of Lectures: 30hrs

Course No.	Type of Course	Theory/ Practical	Credits	Instruction hour per week	Total No. of Lectures/ Hours / Semester	Duration of Exam	Formative Assessment Marks	Summative Assessment Marks	Total Marks
BOT-T-3.1	DSC	Theory	02	02	30 hrs	1.30 hrs	10	40	150

Course Outcome

On completion of this course, the students will be able to:

- Understanding concept of fertilizers and various micro organisms associated with micro organisms
- Understand the different groups of organisms such as Blue Green Algae, Fungi and Ferns used as Bio-fertilizers
- Understand the procedure and various techniques involved for the production of fertilizers in large quantity
- Get familiarize the uses of fertilizers in agriculture fields and economic benefits


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CONTENTS

Unit-1	MICROBES AS BIOFERTILISER	12
	Definition and Concept of Bio-fertilizers Microbes used as Bio-fertilizers: <i>Rhizobium</i>, <i>Azotobacter</i>, <i>Azospirillum</i> Blue green Algae (Cyanobacteria) used as Bio-fertilizers: <i>Anabaena</i>, <i>Nostoc</i>, Classification, Isolation, Identification, and Mass production and application above examples	
Unit -2	FUNGI AND MYCHORRIZAE	12
	Definition and concept Mycorrhizae, Mycorrhizal Association with higher plants. VAM Fungi, colonization, isolation, inoculum, production, application VAM and its influence over the growth and yield of crop plants	
Unit-3	AZOLLA AS A BIOFERTILISER	06
	Azolla: Its occurrence, classification and structure. Mass production of <i>Azolla</i>. Field application of <i>Azolla</i>. <i>Azolla</i> as green manure	


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SEMESTER – III

DISCIPLINE SPECIFIC ELECTIVE (DSE-3.2)

Title of the paper: NURSARY AND GARDENING

Credits: Theory: 02; (Contact classes: 2h/week) Total No of Lectures: 30hrs

Course No.	Type of Course	Theory / Practical	Credits	Instruction hour per week	Total No. of Lectures/ Hours / Semester	Duration of Exam	Formative Assessment Marks	Summative Assessment Marks	Total Marks
BOT-T-3.1	DSc	Theory	02	02	30 hrs	1.30 hrs	10	40	50

CONTENTS

Unit-1	Nursery and its Management: -	12
	Introduction: Infrastructure of Nursery (poly house, shade house and Nursery equipment). Planning and seasonal management, planting, direct sowing and transplant seed, seed dormancy causes and method of breaking seed dormancy, seed storage and seed testing sowing/raising of seedlings and transplanting of seedlings	
Unit -2	Gardening and its management: -	12
	Introduction: Definition, Objectives and scope of terrace gardening, Kitchen gardening, role of Women in kitchen gardening	
Unit-3	Propagation of Nursery plants: -	06
	Aim and Objective of Propagation, types of Propagation: (Cutting, Budding, Grafting, Gooting and Layering). Material required for Propagation, manures, cocopits, Hormones. Implements used in Propagation	



REFERENCES

1. Bose, T.K., Maiti, R.G., Dhua, R.S. & Das, P. (1999) – Floriculture and Landscaping
2. Naya Prokash, Calcutta.
3. Randhawa, G.S. & Mukhopadhyay, A. (2004) – Floriculture in India – Allied Publishers.
4. Kumar, N. (2006) – Introduction to Horticulture – Rajalakshmi Publications, Nagercoil.
5. Chadha, K.L. (2009) – Handbook of Horticulture – ICAR, New Delhi.
6. Sheela, V.L. (2008) – Flowers for Trade: Vol. I & II – New India



SEMESTER – IV

CORE COURSE: BOTANY PAPER-4 (DSC:4)

Credits: Theory: 04; Practical: 02 (4h/week) Total No of Lectures: 60hrs

Title of The Course: ECOLOGY, BIODIVERSITY AND ITS CONSERVATION

Course No.	Type of Course	Theory/ Practical	Credits	Instruction hour per week	Total No. of Lectures/ Hours / Semester	Duration of Exam	Formative Assessment Marks	Summative Assessment Marks	Total Marks
BOT-T-4.1	DSCC	Theory	04	04	60 hrs	3hrs	20	80	100
BOT-P-3	DSC	Practical	02	04	30 hrs	2hrs	10	40	50

Course Outcome:

On completion of this course, the students will be able to:

- Student will be able to understand the nature and biotic and abiotic components and its importance
- Can differentiate different type of plants and their ecological importance
- Develop the skill of taking section of different plants of ecological adaptations
- Induction of the enthusiasm on internal structure of locally available Hydrophytes, xerophytes etc.
- Understanding various levels of organization in a plant body with an outlook in the relationship between the structure and function through comparative studies.
- Observation of vegetation of forests and understand the importance of forests
- Understanding the various reproductive method sub-stages in the life cycle of plants
- Understand origin of various food crops and distribution throughout the world
- Understand various environmental factors and change in the environment and find the reasons and come out with different innovative solutions

THEORY CONTENTS

Unit 1	PLANT ECOLOGY	Teaching Hours
	Definitions Principles of Ecology Scope and importance. Ecological factors: Climatic factors' Light, temperature, precipitation and humidity. Edaphic factors: Soil and its types, soil texture soil profile physico- chemical properties of soil - mineral particle, soil pH, soil aeration, organic matter, soil humus and soil microorganisms. Ecological groups of plants and their adaptations: Morphological and anatomical	15 hrs

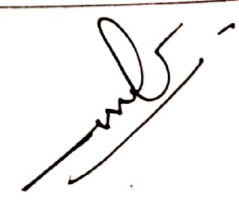
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	adaptations of hydrophytes, xerophytes, epiphytes and halophytes. Brief account of fencing plant their ecological importance	15 hrs
Unit II	ECOSYSTEM AND COMMUNITY ECOLOGY	
	Ecosystem Ecology: Introduction, types of ecosystems Forest ecosystem Ecosystem functions and processes: Food chain-grazing and detritus: Food web. Ecological pyramids -Pyramids of energy, biomass and number. Principles of Energy flow in ecosystem. Bio-geo chemical cycles: Gaseous cycles -carbon and nitrogen, Sedimentary cycle- Phosphorus. Ecological succession: Definition, types- primary and secondary. General stages of succession. Hydrosere and Xerosere. Community Ecology: Community and its characteristics – frequency, density, Abundance, cover and basal area, phenology, stratifications, life-forms. Concept of Ecotone and Ecotypes. Intra-specific and Inter-specific interactions with examples. Brief account of Phytosociology Ecological methods and techniques: Methods of sampling plant communities – transects and quadrates. Remote sensing as a tool for vegetation analysis	15 hrs
Unit III	PHYTOGEOGRAPHY AND ENVIRONMENTAL ISSUES	
	Phytogeography: Definition and concept Theory of continental drift, Vavilov's concept of Centre of origin of crop plant. Phytogeographical regions – concept, phytogeographical regions of India. Forest and types: Vegetation types of Karnataka with special reference to Kalyana Karnataka Region. An account of the vegetation of the Western Ghats. Pollution: Water pollution: Causes, effect, types; water quality indicators, water quality standards in India, control of water pollution (Waste water treatment). Water pollution disasters – National mission on clean Ganga, Minamata, Pacific gyre garbage patch, Exxon valdez oil spill. Soil pollution: Causes, effect, solid waste management, control measures of soil pollution.	

Unit IV	BIODIVERSITY AND ITS CONSERVATION	15 hrs
	Biodiversity: Definition, types of biodiversity - habitat diversity, species diversity and genetic diversity, Global and Indian species diversity. Values of Biodiversity – Economic and aesthetic value, Medicinal and timber yielding plants, NTFP. Concept of Biodiversity Hotspots, Biodiversity hotspots of India. Concept of endemism and endemic species. ICUN plant categories with special reference to Karnataka/ Western Ghats. Threats to biodiversity. Biodiversity Conservation- Indian forest conservation act, Biodiversity Bill (2002). Conservation methods – <i>In-situ</i> and <i>ex-situ</i> methods <i>In-situ</i> methods–Biosphere Reserves, National Parks, Sanctuaries, Sacred grooves. <i>Ex-situ</i> methods–Botanical gardens, Seed Bank, Gene banks, Pollen banks, Culture collections, Cryopreservation.	
	Total	60 hrs

LIST OF PRACTICALS to be CONDUCTED

PracNo.	Experiments
1	Determination of pH of different types of Soils,
2	Study of Ecological instruments – Wet and Dry thermometer, Altimeter, Hygrometer, Soil thermometer, Rain Gauge, Barometer, etc
3	Hydrophytes: Morphological and Anatomical adaptations in <i>Eichhornia</i> , <i>Hydrilla</i> ,
4	Xerophytes: Morphological and Anatomical adaptations in <i>Nerium</i> , <i>Aloe vera</i> .
5	Epiphytes: Morphological and Anatomical adaptations <i>Vanda</i> .
06	Halophytes: Morphology and anatomy of Pneumatophores.
7	Demonstration of different types of vegetation sampling methods – quadrats. Determination of Density and frequency abundance
8	Application of remote sensing to vegetation analysis using satellite imageries (NDVI and EVI)
9	Determination of Biological oxygen demand (BOD)
11	Demonstration of types soil, texture. Soil profile (Photographs)
13	Field visits to study different types of local vegetation/ecosystems and the report to be written in practical record book.



SUGGESTED REFERENCE BOOKS:

1. Sharma, P.D. 2018. Fundamentals of Ecology. Rastogi Publications.
2. Odum E.P. (1975): Ecology By Holt, Rinehart & Winston.
3. Oosting, H.G. (1978): Plants and Eco-system Wadworth Belmont.
4. Kochhar, P.L. (1975): Plant Ecology. (9th Edn.,) New Delhi, Bombay, Calcutta-226pp.,
5. Kumar, H.D. (1992): Modern Concepts of Ecology (7th Edn.,) Vikas Publishing Co., New Delhi.
6. Kumar H.D. (2000): Biodiversity & Sustainable Conservation. Oxford & IBH Publishing Co Ltd. New Delhi.
7. Newman, E.I. (2000): Applied Ecology, Blackwell Scientific Publisher, U.K.
8. Chapman, J.L. & M.J. Reiss (1992): Ecology (Principles & Applications). Cambridge University Press, U.K.
9. Malcolm L. Hunter Jr., James P. Gibbs, Viorel D. Popescu, 2020. Fundamentals of Conservation Biology, 4th Edition. Wiley-Blackwell.



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MODEL QUESTION PAPER FOR THEORY INTERNAL ASSESSMENT (IA)
 Course -DSC 4 T: ECOLOGY, BIODIVERSITY AND ITS CONSERVATION

Time: 45 min

Max. Marks: 20

Instructions to candidates: 1. Answer all questions

2. Draw the diagrams wherever necessary

PART -A

Answer any FIVE of the following in two to three sentences

(01 x 05 = 05)

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.

PART -B

Answer any ONE of the following on brief

(01 x 05 = 05)

- 08.
- 09.

PART -C

Answer any ONE of the following in detail

(01 x 10 = 10)

- 10.
- 11.

PRACTICAL INTERNAL ASSESSMENT

Time: 1 Hr

Max. Marks: 10

- I. Prepare a temporary safranin stained T.S. of material 'A' and identify with reasons and draw labelled diagram. Leave the preparation for evaluation 06
- II. Mount the endosperm/embryo of 'B'. Sketch and label the parts leave for evaluation. 06
- III. Mount the given material 'C'. (Pollen grains, /pollenia.) Sketch and label 04
- IV. Macerate/Mount the specimen 'D' identify any two types of elements (Cells with Labeled sketches and give reasons, types of stomata/trichomes. 04

Total

20/2 =

10

MODEL QUESTION PAPER FOR PRACTICAL EXAMINATIONS

B.Sc.- III Semester Practical Examination
Sub-BOTANY
Course -DSC 4P: ECOLOGY, BIODIVERSITY AND ITS CONSERVATION

Time: 2 Hours

Max. Marks: 40

- | | |
|--|----|
| I. Identify and assign given material "A" the plants to the respective plant group with neat labelled diagram by giving reasons (Morphological and Anatomical) | 06 |
| II. Determine the pH Soil sample 'B'. | 04 |
| III. Identify and comment on slides/material of 'C' 'D', E & F | 10 |
| IV. Identify and comment on ecological instruments G & H | 05 |
| V. Study the community by Quadrat Method working Frequency/Density/Abundance | 04 |
| VI. Viva- Voce | 03 |
| VI. Records | 05 |
| VIII submissions of field visit Report | 03 |

Total

40

Instructions to the Examiner

Q. I. A- Hydrophyte *Eichhornia*, *Hydrilla*, Xerophyte *Nerium*/*Aloe vera*. Epiphyte:

Q. II. B-Any Soil sample/Ash etc

Q. III. C- Slide: Epiphyte: *Vanda*, D: Halophyte" Pneumatophores E: NDVI/EVI (formula) F: type of soil

Q. IV G & H Ecological instruments (studied and available)

Q. V. Field visit report compulsory verify and allot the marks

- Note: 1. Examiner seek the performance of a student by observation and distribute the marks accordingly of marks for every experiment and writing part also**
- 2. Viva –Voce must be conducted maximum of 2 minutes for each student**



MODEL QUESTION PAPER FOR THEORY EXAMINATIONS

B.Sc.- III Semester Practical Examination
Sub-BOTANY

Course -DSC 3T: ANATOMY AND EMBRYOLOGY OF ANGIOSPERMS

Time: 03 Hours

Max. Marks: 80

Instructions to candidates: 1. Answer all questions
2. Draw the diagrams wherever necessary

PART -A

Answer any TEN of the following in two to three sentences

(02 x 10 = 20)

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.
- 9.
- 10.
- 11.
- 12.

PART -B

Answer any FOUR of the following on brief

(04 x 05 = 20)

- 13.
- 14.
- 15.
- 16.
- 17.
- 18.

PART -C

Answer any FOUR of the following in detail

(04 x 10 = 40)

- 19.
- 20.
- 21.
- 22.
- 23.
- 24.



B.Sc IV SE Botany DSE

Title of the paper: PLANTS IN EVERYDAY LIFE

Course outcome:

On completion of this course, the students will be able to

1. To make the students familiar with economic importance of diverse plants that offer resources to human life.
2. To make the students known about the plants used as-food, medicinal value and also plant source of different economic value.
3. To generate interest amongst the students on plants importance in day today life, conservation, ecosystem and sustainability.

CONTENTS

Unit-1	GROUPS OF PLANT	12
	Introduction to Plant World: Algae, Bryophyte, Pteridophyte, Gymnosperms and Flowering plants. Importance and Values of plant: Aesthetic value, Ecological and environmental values: <i>Psidium guajava</i> and <i>Annona squamosa</i> ; Avenue trees, Temple trees more oxygen liberating plants (<i>Bamboo</i> , <i>Ficus religiosa</i>).	
Unit -2	FOOD AND VEGETABLE PLANTS	12
	Brief Introduction to food plants: Millets: Pearl Millet (<i>Pennisetum glausum</i>) Foxtail Millet (<i>Setaria italica</i>), Finger Millet (<i>Eleusine coracana</i>), Barnyard Millet (<i>Echinochloa</i> spp.). Cereals: Jawara, Wheat, Rice, Bajra, Wild Edible Vegetables and fruits: Kirgasalepalya: (<i>Amaranthus spinosus</i>) Adisabski: (<i>Glossocardia bosvallea</i>) Kukkengida: (<i>Celosia argentea</i>), Karehi kai: (<i>Momordica cymbalaria</i>) and Fruits: Kavalikaayi: (<i>Carissa carandas</i>) Balloolkaayi (<i>Feronia</i> <i>elephantum</i> / <i>Limonia acidissima</i>) (Gunda Mekkekaayi (<i>Cucumis melo</i>))	

Unit-3	MEDICINAL PLANTS	12
	Introduction of medicinal plants, medicinal plants used in daily life: Ginger, Turmeric, Garlic, Cinnamon, Pepper, Mint, <i>Tinospora cordifolia</i> Scientific and religious value of plants: Tulsi, Neem, Banana Leaf, Piper betel, <i>Aleovera</i>, <i>Vincarosea</i>, X-mass tree. Medical plants and kitchen pharmacy: Concept and utilization, preparation of kashayas for acidity and cold and cold cough. Triphalachurna	

Text Books and References

1. Kochhar, S.L. (2012). Economic Botany in Tropics. MacMillan & Co. New Delhi.
2. Wickens, G.E. (2001). Economic Botany: Principles & Practices. The Netherlands: Kluwer Academic Publishers. Netherland.
3. Chrispeels, M.J. and Sadava, D.E. (1994) Plants, Genes and Agriculture. Jones & Bartlett - Publishers. Lincoln, United Kingdom

SEMESTER – IV

DISCIPLINE SPECIFIC ELECTIVE (DSE-3.1)

Title of the paper: MUSHROOM FARMING & PRACTICE

Credits: Theory: 02; (Contact classes: 2h/week) Total No of Lectures: 30hrs

Course Outcome

On completion of this course, the students will be able to:

- * Understanding Mushroom Biology – Gain knowledge of fungal biology, life cycle, and nutritional requirements of mushrooms.
- * Identification of Edible & Medicinal Mushrooms – Learn to differentiate between edible, medicinal, and poisonous species.
- * Spawn Production Techniques – Understand methods for high-quality spawn production and its role in cultivation.
- * Cultivation Practices – Gain practical experience in cultivating mushrooms such as oyster, button, and milky mushrooms.
- * Pest & Disease Management – Learn techniques to prevent and control common diseases and pests affecting mushroom farms.
- * Harvesting & Post-Harvest Handling – Understand proper harvesting methods, storage, and packaging to maintain quality and shelf life.
- * Entrepreneurial Skills – Develop the ability to set up small-scale or commercial mushroom farming units.
- * Value Addition & Marketing – Gain knowledge of processing (drying, pickling, powders) and marketing strategies for mushrooms.
- * Waste Management & Sustainability – Learn to utilize agricultural waste as substrates and recycle spent mushroom substrate.
- * Employment & Self-Employment Opportunities – Be prepared for career options in agribusiness, biotechnology, and food industries



CONTENTS

Unit-1	EDIBLE & NON EDIBLE MUSHROOMS	12
	Introduction, History & Scope of Mushroom, Structure of mushroom, Identification, Classification of edible & non edible mushrooms, Nutritional value of mushrooms, Medicinal value of Mushrooms.	
Unit -2	MUSHROOM FARMING	12
	Principles of mushroom farming, procedures of mushroom cultivation, Mushroom house, sterilization of substrate, spawn production, Culture media preparation, Production of pure culture, Mother spawn & multiplication of spawn, Mushroom bed preparation & harvesting, Methods of mushroom cultivation 1) Hanging bag method 2) Paddy straw method	
Unit-3	PROCESSING & MARKETING OF MUSHROOM	06
	Freezing, drying, canning, quality assurance & entrepreneurship, Value added products of mushrooms, Therapeutic value of mushrooms.	

REFERENCES:

1. Paul Stamets (2000) – Growing Gourmet and Medicinal Mushrooms – Ten Speed Press.
2. Chang, S.T. & Miles, P.G. (2004) – Mushrooms: Cultivation, Nutritional Value, Medicinal Effect, and Environmental Impact – CRC Press.
3. Tripathi, D.P. (2005) – Mushroom Cultivation – Oxford & IBH Publishing.
4. Verma, R.N., Vijay, B., Kamal, S. & Singh, S.K. (2005) – Handbook of Mushroom Cultivation, Processing and Products – International Book Distributing Co.
5. Pathak, V.N., Yadav, N. & Gaur, S.C. (1998) – Mushroom Production and Processing Technology – Agrobios (India).
6. Manjit Singh, B. Vijay & S. Kamal (2011) – Mushroom Cultivation, Processing and Products – Directorate of Mushroom Research (ICAR), Solan, India.
7. Sharma, V.P. & Satish Kumar (2017) – Advances in Mushroom Production – Today & Tomorrow



To.

The Registrar(Academic),

Bidar University,

BIDAR – 585401.

Sub: Regarding submission of B.Sc.III and IV Semester (SEP)
Botany Syllabus for the year 2025-26.

Ref: BUBBidar/ADM/BOS/2025-26/ Dated: 13-06-2025

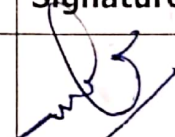
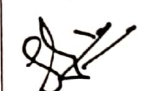
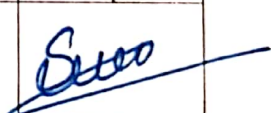
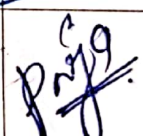
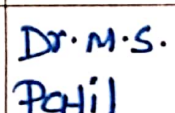
Sir,

With reference to the above cited subject, the meeting of the Board of Studies in Botany UG B.Sc.III and IV Semester held on 28-06-2025 to prepare the SEP Syllabus for the academic year 2025-26 onwards.

The contents of the syllabus was drafted after details discussion in the BOS meeting. The same was place in the final meeting of Board of Studies held on 09-07-2025 for approval and implementation from the academic year 2025-26 onwards. The syllabus copies enclosed.

Thanking you,

Yours faithfully,

Sl.No.	Name and Address	Designation	Signature
1	Dr. Rajasamasarsen Modi Associate Professor, Govt. First Grade College. Bidar	Chairman	
2	Prof. Sangramappa S. Dharmreddy Associate Professor, S.B.C.S. Arts, S.V. Commerce & Science College Humnabad	Member	
3	Dr. H. Suresh, Assistant Professor, S.S. Khuba College, Basavakalyan	Member	
4	Dr. Suryawanshi Pooja Assistant Professor, B.V. Bhoomaraddi College of Arts, Science and Commerce, Bidar	Member	
5	Dr. Shivanand Sakpal, Assistant Professor, C.B. College, Bhalki	Member	
6	Dr. M.S. Patil, Retired Botany Professor, Karnataka College, Bidar	External Member	 Dr. M.S. Patil

