



॥ विद्या विनयेन शोभते ॥

Janardan Bhagat Shikshan Prasarak Sanstha's
CHANGU KANA THAKUR

**ARTS, COMMERCE AND SCIENCE COLLEGE, NEW PANVEL
(AUTONOMOUS)**

Re-accredited 'A+' Grade by NAAC (3rd Cycle - CGPA 3.61)
'College with Potential for Excellence' Status Awarded by UGC
'Best College Award' by University of Mumbai

Vidya Vinayen Shobhate



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UGC
'Best College Award' by University of Mumbai**

**Revised Syllabus under
National Education Policy 2020**

**Program: F.Y.B.Sc.
Skill Enhancement Course (SEC)
(Plant Preservation Techniques)**

**Choice Based Credit System (60:40)
w.e.f. Academic Year 2023-24**



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Details of the course:

Sr. No.	Heading	Particulars
1	Title of Course	Plant Preservation Techniques-I
2	Eligibility for Admission	12 th of all recognised Boards
3	Passing marks	35%
4	Ordinances/Regulations (if any)	-
5	No. of Semesters	2
6	Level	U.G.
7	Pattern	Semester
8	Status	New
9	To be implemented from Academic year	2023-2024

Preamble:

Syllabus for Skill Enhancement Course on 'Plant Preservation Techniques' has been prepared to enable learners of first year to acquire skills required to prepare museum specimen and herbaria of various plant materials as well as prepare permanent slides. Plant preservation techniques are central to the study of Plant Science and learners equipped with the necessary skill sets for the same can utilize these to become self-employed or obtain gainful employment in Plant Sciences based industries



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Course Objectives

1. To explain the basic principles of Herbarium and dry preservation
2. To describe the significance and designing of Botanical gardens, different steps involved in dry preservation of plant materials
3. To differentiate between the different methods of dry preservation, and herbaria
4. To classify the herbaria on the basis of taxonomy and morphological features
5. To explain the basic principles of wet and dry preservation and making permanent slides
6. To describe the different steps involved in wet preservation of plant materials and preparation of permanent slides
7. To differentiate between different types of preservatives
8. To classify the museum specimen and permanent slides on the basis of taxonomy and morphological or anatomical features
9. To collect suitable plant material for preservation and herbaria
10. To prepare herbarium sheets
11. To prepare museum specimen, and permanent slide



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7. Differentiate between different types of preservatives
8. Classify the museum specimen and permanent slides on the basis of taxonomy and morphological or anatomical features
9. Collect suitable plant material for preservation and herbaria
10. Prepare herbarium sheets
11. Prepare museum specimen and permanent slides



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Scheme of Examination for Each Semester:

For Skill Enhancement Course (SEC): Plant Preservation Techniques

The performance of the learners shall be evaluated into two components. The allocation of marks are as shown below:

A) Practical Examinations (PE)/Field Work (FW)/Test Based on Tutorials: 40 % 20 Marks

Journal/Lab book/workbook, Viva Voce	05 Marks
Practical/Laboratory Work/field work/Test based on tutorials	15 Marks

B) Semester End Examination (SEE): 60 %

30 Marks

- Duration: The examination shall be of 1 hour's duration.

Question Paper Pattern

Theory question paper pattern

1. There shall be two/three questions each of 15/10 marks.
2. All questions shall be compulsory with internal options.
3. Question may be subdivided into sub-questions a, b, c... and the allocation of marks depends on the weightage of the unit.



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Semester-I

1. Skill Enhancement Course: Plant Preservation Techniques-I

Semester I		L	CR
USC1PPT1		15	1
Dry Preservation and Botanical Gardens			
1.	Herbarium Preparation: Field equipment and articles for herbarium preparation, Method of herbarium preparation: Collection, Pressing, Drying and Poisoning, Mounting and Stitching, Labelling, Filing and Storing.		
2.	Botanical Gardens: History, Role of Botanical Gardens in conservation of biodiversity, Designing a Botanical Garden, Significance of Botanical Garden		
3.	Preservation by Heat Treatment: Natural drying and Hot-air/High Temperature treatment.		

Semester I		L	CR
USEC1PPT		30	1
1.	Collection of plant material for dry preservation by heat treatment		
2.	Dry preservation of fruits/ cones seeds etc, Labelling and arrangement of preserved material		
3.	Herbarium making: Material necessary for making herbariums		
4.	Herbarium making: Collection of plant material (field visit) (3 practicals)		
5.	Herbarium making: technique of correct handling of specimen, arrangement of plant specimen properly for drying and pressing, use of plant press		
6.	Herbarium making: Placement of dried and pressed plant specimen on herbarium sheets, Stitching, pasting, proper labelling on herbarium,		
7.	Herbarium making: Arrangement of herbarium sheets, After care of herbarium sheets.		
8.	Visit to herbarium (3 practicals)		
9.	Visit to Botanical Garden (3 practicals)		



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Semester-II

1. Skill Enhancement Course: Plant Preservation Techniques-II

Semester II		L	CR
USC2PPT2		15	1
Wet Preservation and Permanent Slides		5	
1.	Requirements for wet preservation: Instruments and articles, Containers, Preservatives		
2.	Procedure: Collection, Killing, Identification, Preservation, Labelling, After-care.		
3..	Sectioning of Plant Material: Hand cut sections, Use of Microtome, Procedure of preparation of permanent slides: Embedding material in paraffin wax, preparation of blocks, fixing of sections on to the slides, staining of sections, placement of coverslips, labelling and proper storing of permanent slides		

Semester II		L	CR
USC2PPTP		30	1
1.	Wet Preservation: Preparation of different types of chemical preservatives		
2.	Wet Preservation: Collection of plant specimen for preservation (field visit, 3 practicals)		
3.	Wet Preservation: Selection of suitable containers for collection of specimens, preparation of labels, correct labelling, sealing museum specimen.		
4.	Wet Preservation: Preparation of museum specimen.		
5.	Wet Preservation: Arrangement of Museum specimen as per morphological features or taxonomic classification		
6.	Preparation of permanent slides: Sectioning of specimen (Hand cut sections)		
7.	Preparation of permanent slides: Staining of (Hand cut sections)		
8.	Preparation of permanent slides: Sectioning of specimen, Embedding material in paraffin wax,		
9.	Preparation of permanent slides: Sectioning of specimen, preparation of blocks, use of microtome		
10	Preparation of permanent slides: fixing of sections on to the slides,		
11	Preparation of permanent slides: staining of sections, placement of coverslips		
12	Preparation of permanent slides: Labelling and organization of permanent slides		
13.	Observation of permanent slides using microscope		



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Semester I and Semester II

References:

1. Collection, preparation & preservation of plant specimens - 2nd edition - Bedford & James 1995

https://www.researchgate.net/publication/305769704_Guidlines_for_development_of_museum_and_herbaria

2. Fluid Preservation: A Comprehensive Reference by John E. Simmons

A Handbook of Field and Herbarium Methods Sudhanshu Kumar Jain, R. R. Rao by Scholarly Publications, 1977

3. Herbarium Technique by Payel Paul, Sayantan Dhar, Dr. Monoranjan Chowdhury by Orange Books Publication

<https://www.studocu.com/in/document/farookcollege/botany/permanent-slide-preparation/30659754>

Glime, J. M. and Wagner, D. H. 2017. Laboratory Techniques: Slide Preparation and Stains. Chapt. 2-2a. In: Glime, J. M. Bryophyte 2-2a-1 Ecology. Volume 3. Methods. Ebook sponsored by Michigan Technological University and the International Association of Bryologists



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**Revised Syllabus under
National Education Policy 2020**

**Program: F.Y.B.A/B.Com.
Open Elective Course (OE)
(Plants in Health Care and Cosmetics)**

**Choice Based Credit System (60:40)
w.e.f. Academic Year 2023-24**



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Sr. No.	Heading	Particulars
1	Title of Course	Plant Preservation Techniques
2	Eligibility for Admission	12 th of all recognised Boards
3	Passing marks	35%
4	Ordinances/Regulations (if any)	-
5	No. of Semesters	2
6	Level	U.G.
7	Pattern	Semester
8	Status	New
9	To be implemented from Academic year	2023-2024

Preamble:

Syllabus for Plants in Health Care and Cosmetics has been prepared to incorporate various applications of Plant Sciences in human health care and cosmetics. The syllabus has been designed so as to make it more contextual, relevant and commensurate with the learning capabilities of the learners of first year B.Sc.

Human health is of paramount importance to the development and progress of human society in general and our nation in particular. Study of Plant sciences is vital for advances in medicine, and for the discovery of novel phytochemical based therapeutic approaches for improved health care in the current scenario as well as in future. Role of plants in human cosmetology is well known and has historical significance in addition to being relevant in the contemporary times.

The well- organized curriculum including units on Medicinal Botany, Nutraceuticals and Herbals as well as Herbal cosmetics shall develop interest in the minds of the learners and inspire them to pursue higher studies in Plant Sciences. The curriculum would expose the learners to the entrepreneurial potential of plant sciences so as to become self-employed or obtain gainful employment in Plant Sciences based industries.



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Course Objectives

1. To describe types of phytoconstituents, medicinal and cosmetic uses of plants from Grandma's pouch.
2. To explain concept and current scope of Nutraceuticals, Herbals and Dietary Supplements
3. To identify various plants in Grandma's pouch, and plants used as nutraceuticals
4. To differentiate between the different types of phytochemicals, nutraceuticals and dietary supplements
5. To describe common plants used in preparation of cosmetics for face, body and hair. (Chandan, Manjistha, Turmeric, Saffron, Aloe, Reetha, Shikakai, Hibiscus, Brahmi, Bhringraj), structure of human skin.
6. To explain tridosh concept of Ayurveda, prakriti nidaan
7. To identify various plants used in the preparation of herbal cosmetics and for aromatherapy
8. To differentiate between the different types of prakriti as per Ayurved, herbal cosmetics



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Scheme of Examination for Each Semester:

For Open Elective Courses (OE)

The performance of the learners shall be evaluated into two components. The allocation of marks is as shown below:

A) Continuous Internal Assessment (CIA): 40 %

20 Marks

Sr. No.	Particular	Marks
01	One project / case study / Test based on Practical skills/test based on tutorials (Workbook)/ Open book test/ Field work based on curriculum to be assessed by the teacher concerned	20 Marks

B) Semester End Examination (SEE): 60 %

30 Marks

- Duration: The examination shall be of 1 hour's duration.

Question Paper Pattern

Theory question paper pattern

1. There shall be two/three questions each of 15/10 marks.
2. All questions shall be compulsory with internal options.
3. Question may be subdivided into sub-questions a, b, c... and the allocation of marks depends on the weightage of the unit.



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Semester-I

1. Open Elective-Plants in Health Care and Cosmetics-I

Plants in Health care and Cosmetics-I		L	CR
UOE1PHC1		60	4
Unit I	Medicinal Botany		
1.	Phytoconstituents: Classification, properties, general methods of extraction, plant sources and uses of: alkaloids, tannins, glycosides, essential oils, gums and resins.		
2.	Grandma's pouch: Study of Tulsi, Neem, Aloe, Adulsa, Turmeric and Ginger with reference to botanical source, phyto-constituents, cosmetic and medicinal uses.		
Unit II	Nutraceuticals, Herbals and Dietary Supplements	15	
1.	Concept and Current Scope of Nutraceuticals, Herbals and Dietary Supplements		
2.	Study of the following with reference to production, consumption nutritional and health benefits: Spirulina, Chlorella, Vanillin, Garcinia, Kale		



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Semester-II

1. Open Elective-Plants in Health Care and Cosmetics-II

Plants in Health care and Cosmetics		L	CR
UOE2PHC2		60	4
Unit I	Aromatherapy and Herbal medicines		
1.	Aromatherapy: Concept, scope and applications, Common plants used for Aromatherapy (<i>Jasminium</i> , Rose, Lemon grass, Vetiver, Citrus, Lavender, Eucalyptus, Chandan)		
2.	Herbal Medicines: Herbal medicines used in the treatment of common ailments - cold, cough, jaundice, acidity, constipation, diarrhoea, indigestion, cuts and wounds.		
Unit II	Herbal Cosmetics	15	
1.	Origin, History and Development of Herbal Cosmetics, structure of human skin		
2.	Common plants used in preparation of cosmetics for face, body and hair. (Chandan, Manjistha, Turmeric, Saffron, Aloe, Reetha, Shikakai, Hibiscus, Brahmi, Bhringraj)		



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Semester I and Semester II

References:

1. Plant Physiology, by Lincoln Taiz and Eduardo Zeiger, Sinauer Associates
2. Experimental Biochemistry by Beedu Shashidhar Rao and Vijay Deshpande, IK International Pvt. Ltd.
3. Biochemistry by U. Satyanarayan, Books and Allied P. Ltd.
4. Pharmacognosy by Kokate, Purohit and Gokhale, Nirali Prakashan
5. Practical Pharmacognosy by Khandelwal, Nirali Prakashan
6. Shah and Qadry's Pharmacognosy by J. S. Qadry, B. S. Shah Prakashan
7. Handbook of Ayurvedic Medicinal Plants by L. D. Kapoor, Herbal Reference Library
8. Encyclopedia of Medicinal Plants-1 and 2 by Roger Pamplo, Education and Health Library
9. Indian Medicinal Plants by Khar C.P., Springer Publication.
10. Medicinal Natural products-A Biosynthetic approach, John Wiley Sons.
11. Ayurveda Ahar/Diet by P.H.Kulkarni, Shri Satguru Prakashan
12. Ayurveda Unravalled by Dahanukar and Thatte National Book Trust India
13. Guide to Essential Oils and Aromatherapy by James David Rockefeller



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**Revised Syllabus under
National Education Policy 2020**

**Program: F.Y.B.A/B.Com.
Open Elective Course (OE)
(Plants in Human Nutrition)**

**Choice Based Credit System (60:40)
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Details of the course:

Sr. No.	Heading	Particulars
1	Title of Course	Plants in Human Nutrition
2	Eligibility for Admission	12 th of all recognised Boards
3	Passing marks	35
4	Ordinances/Regulations (if any)	-
5	No. of Semesters	2
6	Level	U.G.
7	Pattern	Semester
8	Status	New
9	To be implemented from Academic year	2023-2024

Preamble:

Syllabus for Plants in Human Nutrition has been prepared to incorporate all the basic concepts in human nutrition and the inextricable role of plants in the same so as to make it more contextual, relevant and commensurate with the learning capabilities of the learners of first year Graduation.

Human nutrition is key to the development and progress of human society in general and out nation in particular. Study of Plant sciences is vital for advances in medicine, agriculture and environmental conservation in the current scenario as well as in future.

The well- organized curriculum including basic as well as advanced concepts in human nutrition and the role of plants in the same shall develop interest in the minds of the learners and inspire them to pursue higher studies in Plant Sciences. The curriculum would expose the learners to the entrepreneurial potential of plant sciences so as to become self-employed or obtain gainful employment in Plant Sciences based industries.



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Course Objectives

1. To describe the significance of proteins, carbohydrates, fats, vitamins, minerals and fibre in human diet.
2. To explain the functions of proteins, carbohydrates, fats, vitamins, minerals and fibre in human diet and the plant sources from which they are obtained.
3. To differentiate between essential and non-essential amino acids, and types of proximate principles
4. To compare the different deficiency symptoms of various nutrients.
5. To describe the significance of balanced diet, non-conventional food, healthy lifestyle to avoid lifestyle diseases.
6. To explain the concept of malnutrition, fast and junk foods, empty calories, loss of nutritive value through food processing and anti-nutritional factors
7. To differentiate between anti and non-nutritional factors, deficiency symptoms of various nutrients
8. To compare the different non-conventional and conventional food sources, malnutrition in urban and rural context



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4. Compare the different deficiency symptoms of various nutrients.
5. Describe the significance of balanced diet, non-conventional food, and healthy lifestyle to avoid lifestyle diseases.
6. Explain the concept of malnutrition, fast and junk foods, empty calories, loss of nutritive value through food processing and anti-nutritional factors.
7. Differentiate between anti and non-nutritional factors, deficiency symptoms of various nutrients.
8. Compare the different non-conventional and conventional food sources, malnutrition in urban and rural context.



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For Open Elective Courses (OE)

The performance of the learners shall be evaluated into two components. The allocation of marks is as shown below:

A) Continuous Internal Assessment (CIA): 40 %

20 Marks

Sr. No.	Particular	Marks
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30 Marks

- Duration: The examination shall be of 1 hour's duration.

Question Paper Pattern

Theory question paper pattern

4. There shall be two/three questions each of 15/10 marks.
5. All questions shall be compulsory with internal options.
6. Question may be subdivided into sub-questions a, b, c... and the allocation of marks depends on the weightage of the unit.



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Semester-I

2. Open Elective- Plants in Human Nutrition-I

Plants in Human Nutrition-I		L	CR
UOE1PHN1		60	4
Unit I	Proximate Principles: Proteins, Carbohydrates and Fats	15	
1.	Proteins: Essential and non-essential amino acids, Functions of proteins, Plant sources, Biological value, Protein efficiency ratio, Protein requirement		
2.	Carbohydrates: Types of carbohydrates, functions of carbohydrates, glycaemic index, plant sources. Carbohydrate requirement.		
3.	Fats: Types of fats, functions of fats, requirement of fats, plant sources of fats and oils		
Unit II	Fibre, Vitamins and Minerals	15	
1.	Fibres: Types of fibres, sources, significance, requirement and effects of consumption of diet low in fibre.		
2.	Vitamins: Water and fat soluble vitamins, plant sources, functions in metabolism, requirement and deficiency symptoms and diseases.		
3.	Minerals: Macro-minerals and trace minerals, plant sources, functions in metabolism, deficiency symptoms and diseases		



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Semester-II

3. Open Elective- Plants in Human Nutrition-II

Plants in Human Nutrition-II		L	CR
UOE2PHN2		60	4
Unit I	Non-conventional food sources, Anti and Non-nutritional factors	15	
1.	Non-conventional food sources: Algae, Fungi (Mushrooms and Yeast)		
2.	Anti-nutritional factors and non-nutritional factors		
3.	Food processing and loss of nutritional value		
Unit II	Malnutrition	15	
1.	Concept of balanced diet, Malnutrition: Implications and significance in present times (rural and urban context)		
2.	PEM, diseases due to deficiency of protein, vitamins and minerals		
3.	Fast foods, junk foods, empty calories, metabolic disorders and lifestyle diseases.		



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References:

1. Experimental Biochemistry by Beedu Shashidhar Rao and Vijay Deshpande, IK International Pvt. Ltd.
2. Biochemistry by U. Satyanarayan, Books and Allied P. Ltd.
3. Food Science by Srilakshmi, New Age International
4. Food Quality Assurance by Alli Inteaz, New Delhi CRC Press.
5. Food Analysis by Nielsen, S Suzane, Springer Publication.
6. Food Additives by Branen, A Larry, Davidson P. New Delhi CRC Press.
7. Elementary Food Science by Vieira, Ernest R, New Delhi, Chapman and Hall CRS Press.
8. Textbook Of Human Nutrition, Bamji Oxford & IBH Publishing Company Pvt. Limited
9. Advanced Nutrition and Human Metabolism by Sareen S. Gropper; Jack L. Smith; Timothy Carr.
10. Methods in Food Analysis, Edited By Rui M. S. da Cruz , Igor Khmelinskii Margarida Vieira by CRC Press
11. Fundamentals of Food, Nutrition and Diet Therapy by Sumati R. Mudambi, M.V. Rajgopal, New Age International P. Ltd. Publishers
12. Nutritive Value of Indian Foods by Gopalan, Ramasastry and Balasubramanian, Nat. Institute of Nutrition , Hyderabad
13. Human Nutrition and Diet by M Swaminathan, Bangalore Printing and Publishing Co.



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Vidya Vinayen Shobhate



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**Revised Syllabus under
National Education Policy 2020**

**Program: F.Y.B.Sc.
Minor Elective (ME)**

(Botany-I -Plant Diversity and Structure)

**Choice Based Credit System (60:40)
w.e.f. Academic Year 2023-24**



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Details of the course:

Sr. No.	Heading	Particulars
1	Title of Course	Botany-I -Plant Diversity and Structure
2	Eligibility for Admission	12 th of all recognised Boards
3	Passing marks	35%
4	Ordinances/Regulations (if any)	
5	No. of Semesters	2
6	Level	U.G.
7	Pattern	Semester
8	Status	New
9	To be implemented from Academic year	2023-2024

Preamble:

Revised syllabus for 'Minor Elective' Botany-I (Plant Diversity and Structure) has been prepared to enhance the existing syllabus so as to make it more contextual, relevant and commensurate with the learning capabilities of the learners of first year Graduation.

Plant Sciences today are an amalgamation of traditional Botany and various applied aspects such as modern concepts in Phytochemistry, Molecular biology, Plant biotechnology, Environmental studies etc.

The well- organized curriculum including basic concepts in plant diversity and structure shall develop interest in the minds of the learners and inspire them to pursue higher studies in Botany.



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Course Objectives

1. To describe structure and functions of plant cell organelles
2. To explain Ecological significance and Economic importance of Algae, Fungi, Bryophytes
3. To identify various types of plant types, plant cell organelles and plant tissues
4. To differentiate between the different plant groups namely Algae and Bryophytes, as well as Fungi, simple and complex tissues

Course Outcomes

1. Describe structure and functions of plant cell organelles
2. Explain Ecological significance and Economic importance of Algae, Fungi, Bryophytes
3. Identify various types of plant types, plant cell organelles and plant tissues
4. Differentiate between the different plant groups namely Algae and Bryophyta, as well as Fungi, simple and complex tissues.



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Scheme of Examination for Each Semester:

For Minor Elective (ME): Botany-I (Plant Diversity and Structure)

The performance of the learners shall be evaluated into two components. The allocation of marks are as shown below:

A) Practical Examinations (PE)/Field Work (FW)/Test Based on Tutorials: 40 % 20 Marks

Journal/Lab book/workbook, Viva Voce	05 Marks
Practical/Laboratory Work/field work/Test based on tutorials	15 Marks

B) Semester End Examination (SEE): 60 %

30 Marks

- Duration: The examination shall be of 1 hour's duration.

Question Paper Pattern

Theory question paper pattern

4. There shall be two/three questions each of 15/10 marks.
5. All questions shall be compulsory with internal options.
6. Question may be subdivided into sub-questions a, b, c... and the allocation of marks depends on the weightage of the unit.



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Semester-II

Minor Course: Botany-I (Plant Diversity and Structure)

Plant Diversity and Structure		L	CR
USC2BO1M		15	1
Unit -I	Plant Diversity and Plant Structure		
1.	Distinguishing features, Ecological significance and Economic importance of Algae, Fungi and Bryophytes.		
2.	Plant Cell biology: Structure of eukaryotic plant cell and functions of various plant cell organelles, Plant Anatomy: Simple tissues; Parenchyma, Collenchyma and Sclerenchyma. Complex tissues; Xylem and Phloem. Organization and functions of different types of plant tissues		



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Semester II

Botany-I -Plant Diversity and Structure		L	CR
USC2BOP		30	1
1.	Identification of Algae from fresh/ preserved material : <i>Nostoc</i> , <i>Spirogyra</i> , <i>Sargassum</i> , <i>Gelidium</i> , Diatoms		
2.	Identification of Fungi from fresh/ preserved material : <i>Rhizopus</i> , <i>Aspergillus</i> , <i>Agaricus</i> ,		
3	Identification of Bryophytes from fresh/ preserved material : <i>Riccia</i> , <i>Anthoceros</i> , <i>Funaria</i>		
4	Economic importance of Algae: Phytoremediation and Food: <i>Nostoc</i> , <i>Spirulina</i> , Biofuel: <i>Ulva</i> , Algin: <i>Laminaria</i> , Agar: <i>Gelidium</i> , Diatomite: Diatoms		
5	Economic importance of Fungi: Food: <i>Agaricus</i> , <i>Pleurotus</i> , <i>Yeast</i> , Plant Pathogens: Any Plant pathogenic fungus, Recycling of nutrients: Any saprophytic fungus.		
6	Ecological Significance of Algae, Fungi and Bryophytes: Lichens, Mycorrhizae, Symbiotic association of <i>Nostoc</i> and <i>Anthoceros</i> .		
7	Study of cell inclusions: Starch grains (Potato and Rice),		
8	Study of cell inclusions: Aleurone layer (Maize),		
9	Study of cell inclusions: Cystolith (<i>Ficus</i>); Raphides (<i>Pistia/ Colocasia</i> petiole); Sphaeraphides (<i>Opuntia</i>).		
10	Identification of cell organelles in a plant cell with the help of photomicrograph (Chloroplast, Mitochondria, Endoplasmic reticulum, Nucleus)		
11	Study of Simple tissue: Parenchyma		
12	Study of Simple tissue: Collenchyma		
13	Study of Simple tissue: Sclerenchyma		
14	Study of Complex tissue: Xylem		
15	Study of Complex tissue: Phloem		



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References:

Unit I: Plant Diversity

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2. Cryptogamic Botany Volume I and II by G M Smith McGraw Hill.
3. Botany for Degree Students, Algae by B.R.Vasishtha S. Chand Publications
4. Botany for Degree Students, Bryophyta by B.R.Vasishtha S. Chand Publications
5. Botany for Degree Students, Fungi by B.R. Vasishtha S. Chand Publications
6. Introductory Mycology, Alexopoulos, Mims, Wiley Eastern Publication, latest edition

Unit II: Plant Structure and Function

1. Cell Biology by De Robertis, Wolters, Kluver
2. Cell Biology by Channarayappa, Universities Press
3. Plant Anatomy by B. P. Pandey, S. Chand Publications
4. Plant Anatomy and Embryology by S.N. Pandey and Chadha, Vikas Publications, latest Edition.