

Scheme of Examination for B.Sc. Medical

In the Subject of Botany

B.P.S.M.Vishwavidyalya, Khanpur Kalan

B.Sc. I

Semester -I									
S.No.	Paper		Paper Code	Marks		Total Marks	Periods In hours	Credits	Exam Duration
				Internal	External				
1.	Paper-I	Diversity of microbes and cryptogams	BOT-101A	10	40	50	3	3	3hrs
2.	Paper-II	Cell Biology	BOT-101B	10	40	50	3	3	3hrs
3.	Paper-III	Practicals Based on Theory	BOP-101	10	40	50	4	2	4hrs
Total -						150	Total -		8

Scheme of Examination for B.Sc. Medical

In the Subject of Botany


B.P.S.M.Vishwavidyalya, Khanpur Kalan

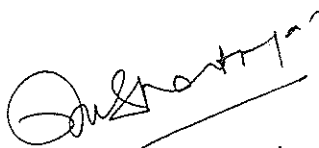
B.Sc. I

Semester -II									
S.No.	Paper		Paper Code	Marks		Total Marks	Periods In hours	Credits	Exam Duration
				Internal	External				
1.	Paper-1	Diversity of Archegoniatas (Bryophytes & Pteridophytes)	BOT-102A	10	40	50	3	3	3hrs
2.	Paper-II	Genetics	BOT-102B	10	40	50	3	3	3hrs
3.	Paper-III	Practicals Based on Theory	BOP-102	10	40	50	4	2	4hrs
Total -						150	Total -		8

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Scheme of Examination for B.Sc. Medical

In the Subject of Botany

B.P.S.M.Vishwavidyalya, Khanpur Kalan

B.Sc. II

Semester -III										
S.No.	Paper		Paper Code	Marks		Total Marks	Periods In hours	Credits	Exa Dur	
				Internal	External					
1.	Paper-1	Diversity and Systematics of Seed Plants - I	BOT-201A	10	40	50	3	3	3hr	
2.	Paper-II	Plant Anatomy	BOT-201B	10	40	50	3	3	3hr	
3.	Paper-III	Practicals Based on Theory	BOP-201	10	40	50	4	2	4hr	
Total -						150	Total -		8	-

Scheme of Examination for B.Sc. Medical

In the Subject of Botany

B.P.S.M.Vishwavidyalya, Khanpur Kalan

B.Sc. II

Semester -IV										
S.No.	Paper		Paper Code	Marks		Total Marks	Periods In hours	Credits	Exa Dur	
				Internal	External					
1.	Paper-1	Diversity and Systematics of Seed Plants -II	BOT-202A	10	40	50	3	3	3hr	
2.	Paper-II	Reproduction and Embryology in Flowering Plants	BOT-202B	10	40	50	3	3	3hr	
3.	Paper-III	Practicals Based on Theory	BOP-202	10	40	50	4	4	4hr	
Total -						150	Total -		8	-

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Scheme of Examination for B.Sc. Medical

In the Subject of Botany

B.P.S.M.Vishwavidyalya, Khanpur Kalan

B.Sc. III

Semester -V									
S.No.	Paper		Paper Code	Marks		Total Marks	Periods In hours	Credits	Exam Duration
				Internal	External				
1.	Paper-1	Plant Physiology	BOT-301A	10	40	50	3	3	3hrs
2.	Paper-II	Plant Biochemistry and Plant Biotechnology	BOT-301B	10	40	50	3	3	3hrs
3.	Paper-III	Practicals Based on Theory	BOP-301	10	40	50	4	2	4hrs
Total - 150							Total - 8		

Scheme of Examination for B.Sc. Medical

In the Subject of Botany

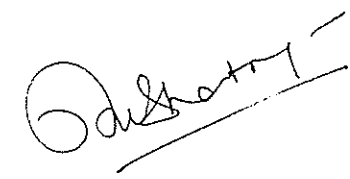
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B.Sc. III

Semester -VI									
S.No.	Paper		Paper Code	Marks		Total Marks	Periods In hours	Credits	Exam Duration
				Internal	External				
1.	Paper-1	Plant Ecology	BOT-302A	10	40	50	3	3	3hrs
2.	Paper-II	Economic Botany	BOT-302B	10	40	50	3	3	3hrs
3.	Paper-III	Practicals Based on Theory	BOP-302	10	40	50	4	2	4hrs
Total - 150							Total - 8		

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Syllabus of B.Sc. (Medical)
W.e.f. July 2015
(1st Semester)
BOTANY

Paper Code: BOT-101A

Diversity of Microbes and Cryptogams (Algae & Fungi)

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3 - - -

Total Credits: 02
Total Marks: 50

External Marks: 40
Internal Marks: 10

Note- Attempt five questions in all, selecting one question from each unit. Question Number 1 is compulsory (short answer type). Nine questions are to be set in total Spread over the entire syllabus. All questions carry equal marks.

Unit- I

- Bacteria- Structure, Nutrition Multiplication, and Economic Importance of bacteria, General account of Cyanobacteria.
Algae - General Characters, Classification and economic importance.

Unit- II

- Algae- Important features and Life History of Chlorophyceae- *Volvox*, *Oedogonium*, *Chara*, Xanthophyceae- *Vaucheria*, Pheophyceae-*Ectocarpus*. Rhodophyceae- *Polysiphonia*.

Unit- III

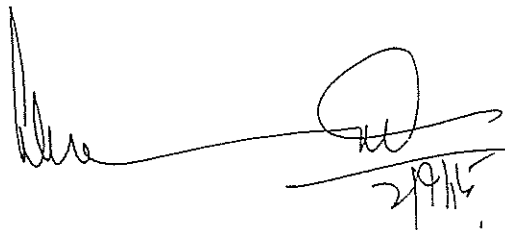
- Viruses - General account of Virus including structure of TMV and Bacteriophage.
Fungi- General Characters, Classification (up to classes) and economic importance.

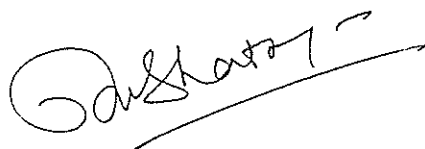
Unit- IV

- Fungi- Important Features and Life History of Mastigomycotina- (*Phytophthora*), Zygomycotina (*Mucor*), Ascomycotina (*Penicillium*) Basidiomycotina (*Puccinia*, *Agaricus*), Deuteromycotina (*Collectotrichum*).
Brief account of Lichens.

~~Collectotrichum~~ Collectotrichum

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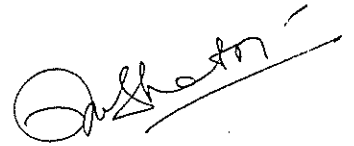
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Suggested Readings:-

- Biswas S. B., Biswas Amita 1984. An Introduction to Viruses. Vikas Publishing House PVT LTD.
Smith, G.M. 1971. Cryptogamic Botany Vol. I. Algae & Fungi. Tata Mc Graw Hill Publishing Co., New Delhi.
Sharma, O.P. 1992. Text Book of Thallophytes, McGraw Hill Publishing Co.
Sharma, P.D. 1991 The Fungi. Rastogi & Co Meerut.
Clifton, A. 1958. Introduction to the Bacterial. Mcgraw Hill & Co. New York.
Alexopoulos, C.J., C.W. M. Mims, 1996. Introductory Mycology, 4th ed., John Wiley and Sons Inc.
Dube, H.C. 1990. An Intoduction to Fungi, Vikas Publishing House PVT. LTD. Delhi.

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Syllabus of B.Sc. (Medical)
w.e.f. July 2012
(1st Semester)
BOTANY

Paper Code: BOT- 101B

Cell Biology

L - T - P

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Total Credits: 02

Total Marks: 50

External Marks: 40

Internal Marks: 10

Note- Attempt five questions in all, selecting two questions from each unit. Question number 1 is compulsory (short answer type). Nine questions are to be set, spread over the entire syllabus. All questions carry equal marks.

Unit- I

Basic cell structure, composition and cell division:-Prokaryotic & Eukaryotic cell system, Cell division: Amitosis, Mitosis & Meiosis.

Unit - II

Cell Envelopes and Bio molecules:-Structure and functions of cell wall and plasma membrane. General account of carbohydrates.

Unit- III

Cell Organelles:- Ultrastructure and function of nucleus, Golgi apparatus, Endoplasmic reticulum, Chloroplast, Mitochondria.


Unit- IV

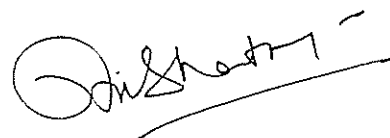
Cell Organelles and Bio molecules: - Ultrastructure and functions of Lysosomes, Peroxysomes, Ribosomes, and Vacuoles. General account of proteins and lipids.

Suggested Reading :-

- Alberts, B.Bary, D. Lewis, J. Raff, M., Roberts, K. and Watson, I.D. 1999. Molecular Biology of Cell. Garland Publishing Co., Inc, New York. US.
- Gupta, P.K. 1999. A Text Book of Cell and Molecular Biology. Rastogi Publication, Meerut, India.
- Kleinsmith L.J. and Kish, V.M. 1995. Principles of Cell and Molecular Biology (2nd Edition). Harper Collins College Publisher, New York, USA.
- Lodish, H., Berk, A Zipursky, S.L. Matsudaira, P., Baltimore, D. and Darnell, J.2000. Molecular Biology, W.H. Freeman and Co., New York., USA.
- Powar, C.B. 1983. Cell Biology.(3rd Edition). Himalaya Publishing House.
- Lehninger, A.L., Nelson, D.K. and Cox, M.M. 1993. Principles of Biochemistry, CBS Publishers and Distributors, New Delhi.

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Syllabus of B.Sc. (Medical)

w.e.f. July 2012

(1st Semester)

BOTANY

Practical

Paper Code: BOP-101

L - T - P

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Total Credits: 02

Total Marks: 50

External Marks: 40

Internal Marks: 10

List of Practical's:-

1. Preparation of temporary slides of various members of Algae and Fungi (as per Syllabus) to study vegetative and reproductive structure.
2. Identification of Permanent Slides of algae, fungi and lichens.
3. Slide preparation & Mitosis from Onion root tips & identification of various mitotic stages & Meiosis from onion flower buds and identification of major stages.
4. Survey of the area for the collection of the Algae, diseased plants and fungi.
5. Preparation of Survey/ Collection Report.
6. Viva-Voce and Practical Record.

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Syllabus of B.Sc. (Medical)
W.e.f. July 2015
(2nd Semester)
BOTANY

Paper Code: BOT-102A

Diversity of Cryptogams (Bryophytes & Pteridophytes)

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Total Credits: 02

Total Marks: 50

External Marks: 40

Internal Marks: 10

Note- Attempt five questions in all, selecting one question from each unit. Question Number 1 is compulsory (short answer type). Nine questions are to be set in total Spread over the entire syllabus. All questions carry equal marks.

Unit- I

Bryophyta:- Amphibians of Plant kingdom, displaying alternation of generations, General characters, Economic importance, Alternation of generation and classification (up to classes), Structure and Reproduction of *Marchantia* (Hepaticopsida)

Unit- II

Structure and Reproduction of *Anthoceros* (Anthoceropaida), *Funaria* (Bryopsida.). General account of bryophyte evolution in Bryophytes

Unit-III

Pteridophyta:- The First vascular Plant, General characters, Economic importance, Alternation of generation and classification (up to classes). Structure and Reproduction of *Rhynia* (Psilopsida), *Laginella* (Lycopsida)

Unit-IV

Structure and Reproduction of *Equisetum* (Sphenopsida), *Pteris*. (Pteropsida). Evolution of stellar stem.

Suggested Readings:-

- Chatterjee, N.S. (1972) An introduction to Embryophyta Vol. Bryophyta Central Book Ltd Allahabad.
Gardner, E.V. 1982. Structure and Life of Bryophytes B.I. Publishers.
Rastbach, G.M. 1971. Cryptogamic Botany. Vol. 11. Bryophytes and Pteridophytes. Tata Mc Graw Hill Publishing Co., New Delhi.
Sinha O.P. 1990. Text Book of Pteridophyta, Mcmillan, India Ltd.
Sinha, P. 1980, Bryophyta Atma Ram & Sons Delhi.
Sinha, K.R., 1982. The Morphology of Gymnosperms. B.I.

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Syllabus of B.Sc. (Medical)

w.e.f. July 2015
(2nd Semester)
BOTANY

Paper Code: BOT-102B

Genetics

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Total Credits: 02
Total Marks: 50

External Marks: 40
Internal Marks: 10

Note- Attempt five questions in all, selecting one question from each unit. Question Number 1 is compulsory (short answer type). Nine questions are to be set in total Spread over the entire syllabus. All questions carry equal marks.

Unit -I

Chromosome Organisation: - Morphology, Centromere and Telomere, Giant Chromosomes, Sex Chromosome, Karyotype.

DNA the Genetic Material: - DNA Structure, Replication, DNA-protein interaction; the Nucleosome models; Genetic Code.

Unit- II

Genetic Inheritance: - Mendelism; Laws of segregation and independent assortment; Linkage analysis; Allelic and non allelic interaction; Crossing over.

Unit -III

Genetic Variations:- Variation in structure , Deletion, Duplication, Translocations, Inversions, Variations in Chromosome number, Aneuploidy, Polyploidy .Mutation, Spontaneous and induced, Transposable genetic elements, DNA damage and repair.

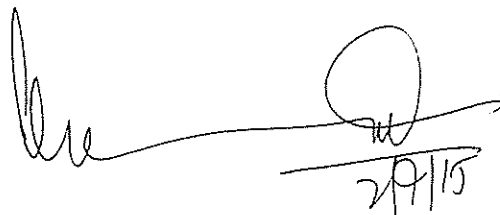
Unit-IV

Extra nuclear Genome:- Presence and function of mitochondrial and Plastid DNA, Plasmids.

Gene Expression: - Structure of gene and transfer of Genetic information (Translation and Protein synthesis & rRNA, tRNA, mRNA, Protein I D, 2D&3D structure), Regulation of gene expressions in prokaryotes (Operon Concept).

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Suggested Readings:-

Snustad, D.P. and Simmons, M.J, 2000. Principles of Genetics John wiley and Sons Inc USA.
Russel, P.J. 1998. Genetics. The Benjamin/ Cummings Publishing Co Inc , USA.
Stent, G.S. 1986. Molecular Genetics, OBS Publications.
Brown, T.A. 1999. Genome. John wiley and sons (Asia) PVT Ltd.
Purohit, S.S. 2006. Gene, Genetics and Genetic Engineering. Agrobios India.
Joshi, P. 2004 Genetic Engineering and its Applications (2nd Ed). Agrobios, India.
Babcock, E.B. 2004. Genetics and Plant Breeding Agrobios, India.
Lodish, H., Berk, A., Zipursky, S.L., Matudaria, P., Baltimore, D. and Darnell, J., 2000. Cell and Molecular Biology, W.H. Freeman and Co., Newyork, U.S.A.
Gupta, P.K. 1999. A Text Book of Cell and Molecular Biology. Rastogi Publication Meerut India.

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Syllabus of B.Sc. (Medical)

w.e.f. July 2015

(2nd Semester)

BOTANY

practical

Paper Code: BOP-102

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Total Credits: 02

Total Marks: 50


External Marks: 40

Internal Marks: 10

List of Practical's:-

1. Study of Specimens from bryophytes (as per syllabus).
2. Study of Specimens from Pteridophytes (as per syllabus).
3. Identification of permanent slides of bryophytes and pteridophytes (As per theory Syllabus).
4. Experiments on Monohybrid and Dihybrid ratio.
5. Gene interactions and modified Dihybrid ratio.
6. Chi- Square analysis.
7. Study of giant chromosomes (Polytene, lampbrush) and karyotype by slides or models.
8. Field Tour of an area rich in diversity of bryophytes and pteridophytes (Hill Station) and Preparation of Herbarium and Survey Report.
9. Practical Record and Viva-voce.

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Syllabus of B.Sc. (Medical)

w.e.f. July 2015

(3rd Semester)

BOTANY

Diversity & Systematics of Seed Plants-I

Paper Code: BOT-201A

L - T - P

3 - - -

Total Credits: 02

Total Marks: 50

External Marks: 40

Internal Marks: 10

Paper I (Theory) - Diversity & Systematics of Seed Plants-I
BOT-201

Note- Attempt five questions in all, selecting one question from each unit. Question Number 1 is compulsory (short answer type). Nine questions are to be set in total Spread over the entire syllabus. All questions carry equal marks.

Unit-I

Characteristics of seed plants; evolution of seed habit. Seed plants with (angiosperms) & without (gymnosperms) fruits. Evolution & diversity of gymnosperms, general features of gymnosperms.

Unit- II

Distribution and economic importance of Gymnosperms. Classification of gymnosperms, fossilization process & fossil gymnosperms.

Unit-III

Fossil gymnosperms:-*Lyginopteris*, *Glossopteris*, *Williamsonia*, *Medullosa*, *Cycadeoidea* (*Bennettites*), *Cordaites*.

Morphology of vegetative & reproductive parts:- Anatomy of root, stem & leaf reproduction and life cycle of *Cycas*.

Unit-IV

Morphology of vegetative & reproductive parts: - Anatomy of root, stem & leaf reproduction and life cycle of:-

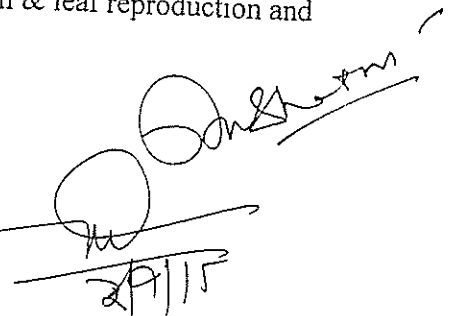
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Suggested Readings:-

- Bhatnagar, S.P. and Moirtra, A., 1996. Gymnosperms, New age International Limited, New Delhi.
- Gifford, P.H. and Heywood, V.H., 1963. Morphology and Evolution of Vascular Plants, W.H Freeman & Company, New York.
- Sporne, K.R., 1965 . The morphology of Gymnosperms, Hutchinson & Co.,(Publishers) Ltd., London.
- Stewart, W.M., 1983. Paleobotany and The Evolution of Plants, Cambridge University Press, Cambridge.
- Bierhorst, D.W. (1971). Morphology of Vascular Plants. MacMillian Company Ltd. New York.
- Sporne K.R., 1982. The Morophology of Gymnosperms . B.I. Publishers .

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Syllabus of B.Sc. (Medical)

w.e.f. July 2015

(3rd Semester)

BOTANY

Plants Anatomy

Paper Code: BOT-201B

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Total Credits: 02

Total Marks: 50

External Marks: 40

Internal Marks: 10

Note- Attempt five questions in all, selecting one question from each unit. Question Number 1 is compulsory (short answer type). Nine questions are to be set in total Spread over the entire syllabus. All questions carry equal marks.

Unit-I

Diversity in plant forms in annuals, biennials and perennials, Body parts of Flowering plant and Modular growth.

Tissues: Types of tissues in flowering plants. Cambium & its functions.

Unit -II

The Shoot System : The shoot apical meristem & its histological organization; Vascularisation of Primary shoot in monocotyledons and dicotyledons ; ~~Formation of internodes, Branching pattern, Monopodial & Sympodial growth.~~
Canopy architecture; Secondary growth/ formation of secondary xylem and phloem, Secondary growth in extraxylary region/ Periderm. A general account of wood structure and its characteristics. Anomalous Secondary growth in *Boerhaavia*, *Mirabilis* and *Dracaena*.

Unit-III

The Shoot System: Formation of internodes, Branching pattern, Monopodial & Sympodial growth. Canopy architecture.

Leaf- Origin development, arrangement & diversity in size & shape, internal structure in relation to photosynthesis & water loss. Adaptations to water stress; Senescence and abscission.

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Unit- IV

The Root System- the root apical meristem; differentiation of Primary & Secondary tissues and their roles; Types of root system. Structural modifications for storage, support, respiration, propagation and perennation, root nodules.

Vegetative propagation and its economic aspects.

Suggested Readings:-

- Cutter, E.G., 1969 . Part I, Cells and Tissues, Edward Arnold, London.
Cutter, E.G., 1971. Plant Anatomy: Experiment and Interpretation, Part II, Organs, Edward Arnold, London.
Esau, K., 1977. Anatomy of Seed Plants, (2nd Edition), John Wiley & Sons, New York.
Eames, A.J. and Mac Daniels L.H. 1947. An introduction to Plant Anatomy. Mc. Graw Hill Book Co. New York.
Esau, K. (1985). Plant Anatomy, Wiley-Eastern, New Delhi .
Fahn, A., 1974. Plant Anatomy, (2nd Edition) , Pergamon Press, Oxford.
Hartmann, H.T., and Kestler, D.E., 1976. Plant Propagation: Principles and Practices, (3rd Edition), Prentice Hall of India Pvt. Ltd., New Delhi.
Mauserth, J.D., 1988. Plant Anatomy, The Benjamin/Cumming Publishing Company Inc., Menlo Park, California, U.S.A.
Bier horst, D.W. (1971) Morphology of Vascular Plants. MacMillian Company Ltd. New York.

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Syllabus of B.Sc. (Medical)
w.e.f. July 2015
(3rd Semester)
BOTANY
Practical

Paper Code: BOP-201

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Total Credits: 02
Total Marks: 50

External Marks: 40
Internal Marks: 10

Diversity of seed plants & plant anatomy:-

1. Identification and classification of the specimens from gymnosperms and angiosperms with a note on features for identification. (As per theory syllabus)
2. Permanent and double stained slide preparations of gymnosperms and angiosperms. (As per syllabus)
3. Identification of permanent slides (gymnosperms and angiosperms) giving reasons. (As per theory syllabus)
4. Collection of wild angiosperms from the surrounding areas and gymnosperms from hilly areas and preparation of a field report (Rare plants should not be collected).
5. Note book, Viva-voce.

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Syllabus of B.Sc. (Medical)
w.e.f. July 2015
(4th Semester)
BOTANY

Paper Code: BOT-202A

Diversity & Systematic of Seed Plant-II

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Total Credits: 02
Total Marks: 50

External Marks: 40
Internal Marks: 10

Paper I (Theory) - Diversity & Systematic of Seed Plant-II

Note- Attempt five questions in all, selecting one question from each unit. Question Number 1 is compulsory (short answer type). Nine questions are to be set in total Spread over the entire syllabus. All questions carry equal marks.

Unit-I

Taxonomy and Systematic:- Aims & fundamental components of taxonomy (identification, classification, Nomenclature, description and Phylogeny), taxonomic literature. Role of chemotaxonomy, cytotoxicity and taxometrics in relation to taxonomy.

Unit- II

Botanical Nomenclature- Principles and rules, Principle of priority, Type concept, taxonomic ranks Keys of identification of plants- Herbarium, Botanical gardens, Dichotomous keys.

Unit-III

Classification of Angiosperms: - Salient features of the system proposed by Bentham & Hooker and Engler & Prantle, Origin of angiosperms and relationship of major groups. Diversity of flowering plants as illustrated by members of the families. Ranunculaceae, Brassicaceae, Malvaceae

(outline only) ~~1/3/19~~ ~~Principle and basis only~~
~~Taxonomy, Angiosperm Phylogeny Group (APG system)~~

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Unit- IV

Euphorbiaceae, Rutaceae, Fabaceae, Apiaceae, Asclepiadaceae, Lamiaceae, Solanaceae, Asteraceae, Liliaceae and Poaceae.

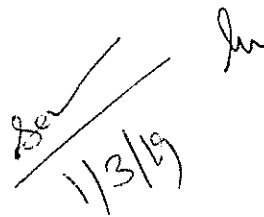
Suggested Readings:-

- Sivarajan, V.V. (1985). Introduction to Principles of Plant Taxonomy .Oxford & IBH Publ. Co., New Delhi .
- Mathur, R.C. and Chauhan, S.V.S. (1989) . Systematic Botany, Agra Book Store, Agra.
- Davis, P.H. and Heywood, V.H., 1963 . Principles of Angiosperm Taxonomy, Oliver and Boyd, London.
- Heywood, V.H. and Moore, D.M. (eds.), 1984. Current Concepts in Plant Taxonomy, Academic Press , London.
- Jeffrey, C., 1982. An introduction to Plant Taxonomy, Cambridge University Press London.
- Jones, S.B., Jr. and Luchsinger A.F., 1986. Plant Systematics (2nd Edition), McGrawHill Book co., New York .
- Maheshwari, J.K., 1963. Flora of Delhi, CSIR, New Delhi.
- Radford, A.E., 1986. Fundamentals of Plant Systematics, Harper and Row, New York.
- Stace, C.A., 1989. Plant Taxonomy and Biosystematics (2nd Edition), Edward Arnold, London.
- Willis, K.J. and Mc Elwaine , J.C. (2002) . The evolution of plant, Oxford University Press.
- Singh , G. (2004). Plant systematics- Theory and Practice (2nd ed.) Oxford of IBH Publishing Co. Pvt. Ltd New Delhi.

Gurcharan Singh . Plant Taxonomy

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Syllabus of B.Sc. (Medical)

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W.e.f. July 2015
(4th Semester)

BOTANY

Paper Code: BOT-202B

Reproduction & Embryology of Flowering Plants

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Total Credits: 02
Total Marks: 50

External Marks: 40
Internal Marks: 10

Note- Attempt five questions in all, selecting one question from each unit. Question Number 1 is compulsory (short answer type). Nine questions are to be set in total Spread over the entire syllabus. All questions carry equal marks.

Unit -I

lower

A modified shoot; structure & functions of various floral parts, types of Inflorescence. Structure of Microsporangium and dehiscence mechanism, Microsporogenesis, Pollen grains and its structure, Pollination (Types and Agencies)

Unit- II

Microgametogenesis

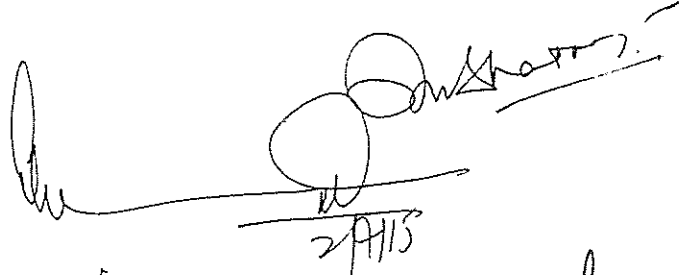
Pollen germination, Development of male Gametophyte; Pollen-Pistil interaction; Self - Incompatibility.

Unit-III

Megasporogenesis and Megagametogenesis

Structure of Mega sporangium (Ovule); Types of ovule; megasporogenesis ; Development of female gametophyte & its Types (Mono, Bi & tetrasporic); Double fertilization; Endosperm Types and its biological importance.

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Unit- IV

Embryogenesis in Dicot and monocot; Polyembryony
Seed & Fruit-Formation of seed; seed structure; types of seed; germination; ecological; adaptations, dispersal strategies. Formation of fruit & types of fruit.

Suggested Readings:

- Bhojwani, S.S. and Bhatnagar S.P. (1985) . The Embryology of Angiosperms. Vani Educational Books , New Delhi.
- Bhojwani , S.S. and Bhatnagar, S.P., 2000. The Embryology of Angiosperms, 4th Revised and Enlarged Edition, Vikas Publishing House, Delhi.
- Fageri, K., and Van Der Pijl, 1979 The Principles of Pollination Ecology, Pergamon Press, Oxford.
- Proctor, M. and Yeo, P., 1973 The Pollination of Flowers, William Collins Sons London.
- Raven, P.H., Evert, R.F. and Eichhorn, S.E., 1999. Biology of Plants, 5th Edition , W.H., Freeman and Co., Worth Publishers, New York.
- Thoms, P., 2000. Trees: Their Natural History, Cambridge University Press, Cambridge.
- Mukundan, U. 1997. Botany A New Approach . Agrobios , India.
- Purohit, S.S. 2002. Flowering Physiological, Biochemical and Molecular Aspects. Agrobios, India.
- Good, R. 2006. Flowering Plants and their evolution . Agrobios, India.
- Shivanna, K.R., Johris, B.M. 1985. Angiosperm Pollens. Narosa.
- Dey , S.C. 2005. Fruits growing in Pots Agrobios , India.
- Vanangamudi, K. 2006. Advances in Seed Science and Technology: Forest Tree Seed Production (Vol.4). Agrobios, India.

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Syllabus of B.Sc. (Medical)
w.e.f. July 2015
(4th Semester)
BOTANY
Practical

Paper Code: BOP-202


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Total Credits: 02
Total Marks: 50

External Marks: 40
Internal Marks: 10

1. Describe and compare the given flowers a & b in semi technical language giving V.S. of flower, T.S. of ovary & floral diagrams with floral formulae. Identify & assign them to their respective families giving reasons.
2. Morphological note on the specimens from Angiosperms
3. Identification of slides (from Angiosperms), & development & embryology) giving reasons.
4. Embryo study by dissecting out the globular/heart shaped embryo from the given plant material.
5. Study of pollen grains by dissecting out the anthers of the given plant material.
6. Note Book (collection & collection report).
7. Viva-voce.

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Syllabus of B.Sc. (Medical)
(5th Semester)
BOTANY
Plant Physiology

Paper Code: BOT-301A

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Total Credits: 02
Total Marks: 50

External Marks: 40
Internal Marks: 10

Note- Attempt five questions in all, selecting one question from each unit. Question Number 1 is compulsory (short answer type). Nine questions are to be set in total Spread over the entire syllabus. All questions carry equal marks.

Unit - I

Plant Water Relations:-

Importance of water to plant life, physical properties of water, diffusion, osmosis, imbibitions and plasmolysis. Absorption and transport of water, transpiration - types, Physiology of stomata, factors effecting transpiration, importance of transpiration.

Unit- II

Mineral nutrition:-

Essential macro and microelement and their role; mineral uptake, deficiency and toxicity symptoms.

Transport of organic substances:-

Mechanism of phloem transport, source-sink relation, factors affecting translocation.

Unit-III

Photosynthesis:- Significance, Historical aspects, photosynthetic pigments, absorption and action spectra, enhancement effect, Concept of two photo systems, Z- Scheme, Photophosphorylation, Calvin cycle, C-4 pathway, CAM plants Photorespiration. The concept of photoperiodism, physiology of flowering, florigen concept, physiology of senescence, fruit ripening.

Unit- IV

Respiration; ATP as biological energy currency, aerobic and anaerobic respiration, ^{K &} kreb cycle, electron transport mechanism (chemi-osmotic theory), redox potential, oxidative phosphorylation, pentose phosphate pathway
Seed dormancy, Seed germination, Factors of their regulation, plant movements.

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Suggested Readings:-

Hopkins, W.G. (1999), Introduction to Plant Physiology. John Wiley and Sons, New York.
Krishnamoorthy, H.N. (1993) Physiology of Plant Growth and Development, Atma Ram & Sons: Delhi .
Kumar, H.D. and Singh, H.N. (1993) . Plant Metabolism (22nd edition), Affiliated East-West Press Pvt. Ltd., New Delhi.
Noggle, G.Ray and Fritz, George, J. (1976) Introductory Plant Physiology. Prentice Hall of India Pvt. Ltd., New Delhi.
Salisbury, Frank, B. and Ross, Clean, (1974). Plant Physiology Prentice Hall of India Pvt, Ltd.. New Delhi.
Wilking, M.B. (editer) (1969). Physiology of Plant Growth and Development, Tata McGraw Hill, India.
Galston, A.W. 1989. Life Processes in Plants , Scientific American Library. Springer Verlag, New York.

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Syllabus of B.Sc. (Medical)

w.e.f. July 2012

(5th Semester)

BOTANY

Paper Code: BOT-301B

Bio-Chemistry and Biotechnology

L - T - P

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Total Credits: 02

Total Marks: 50

External Marks: 40

Internal Marks: 10

Note- Attempt five questions in all, selecting one question from each unit. Question Number 1 is compulsory (short answer type). Nine questions are to be set in total Spread over the entire syllabus. All questions carry equal marks.

Unit- I

Basics of Enzymes:-Discovery and nomenclature; characteristics of enzymes; concept of holoenzyme, apoenzyme, coenzyme and co factor, regulation of enzyme activity; mechanism of action.

Unit- II

Growth & development -Definitions, phases of growth and development, kinetics of growth.
Growth hormones- History and discovery of plant growth regulators, auxins, gibberellins, cytokinins and abscisic acid, ethylene biosynthesis and mechanism of action of PGRS

Unit-III

Lipid Metabolism- structure and function of lipids, fatty acid biosynthesis; beta-oxidation; saturated and unsaturated fatty acids; storage and mobilization of fatty acids.

Nitrogen Metabolism- Biology of nitrogen fixation; importance of nitrate reductase and its regulation; ammonium-assimilation.

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Unit- IV

Genetic engineering and biotechnology-

Tools and techniques of recombinant DNA technology; cloning vectors; genomic and cDNA library. Transposable elements- techniques of gene mapping and chromosome walking.

Plant tissue culture-

Aspects of plant tissue culture, cellular totipotency, differentiation and morphogenesis; biology of *Agrobacterium*.

Transgenic plants; vectors for gene delivery and marker genes.

Suggested Readings:-

Lehninger, A.L. Nelson, D.V. and Cox M.M. (1993). Principles of Biochemistry.

C.B.S. Publishers and distributors, New Delhi.

Lea, P.J. and Leegood, R.C. 1999. Plant biochemistry and Molecular Biology, John Wiley and Sons, Chichester, England,

Vasil, I.K. and Thorpe, T.A. 1994. Plant Cell and Tissue Culture, Kluwer Academic Publishers, The Netherlands.

Bhojwani S.S. 1990, Plant tissue culture: Applications and Limitations. Elsevier Amsterdam, Oxford.

Bhojwani S.S. and Rajdan M.K. 1983. Plants tissue culture Theory and practice, Elsevier Amsterdam Oxford.

Trehan, Keshav 1994, Biotechnology, Wiley, Eastern New Delhi.

Ranjan, R. 2006. Transgenic Plants Agrobios, India.

Purohit, S.S. 2006. The Gene. Agrobios India.

Joshi, P. 2004. Genetic Engineering and its Application (2nd Edition). Agrobios India.

Trivedi, P.C. 2005. Advances in Biotechnology. Agrobios India.

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Syllabus of B.Sc. (Medical)

w.e.f. July 2012

(5th Semester)

BOTANY

Practical

Paper Code: BOP-301

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Total Credits: 02

Total Marks: 50

External Marks: 40

Internal Marks: 10

Physiological Experiments and Biochemistry:-

1. Study of plasmolysis and deplasmolysis. Study of osmotic pressure of cell sap and DPD by plasmolytic method.
2. Demonstration of imbibition by plaster of Paris method, study of osmotic phenomenon by potato osmoscope.
3. To measure stomatal frequency and stomatal index by using epidermal peels of leaf.
4. Comparison of stomatal and cuticular transpiration by four leaf /cobalt chloride method.
5. Demonstration of transpiration by Ganongs potometer/ farmers potometer.
6. Separation of plant pigments by paper chromatography/thin layer chromatography.
7. Effect of kind of light intensity and conc. of CO₂ on oxygen evolution during photosynthesis using Wilmot's bubbler.
8. Demonstration of aerobic and anaerobic respiration.
9. Evolution of heat during respiration.
10. Biochemical tests of Carbohydrates/Proteins/Lipids.
11. Demonstration of phenomena of fermentation.
12. Experiment on plant movements and growth.
13. Determination of peroxidase activity.
14. To demonstrate amylase activity on starch

Experiments of Biotechnology:-

15. Media preparation, sterilization techniques, demonstration of isolation of tissue/cell and culturing & sub culturing of cell /tissue/organ.
16. To prepare the slants and petriplates for plant tissue culture.
17. Demonstration of anther culture, Protoplast isolation and culture using suitable models/charts/ photographs etc.
18. Demonstration of DNA model.
19. Brief introduction to the components and working of the instruments (Oven autoclave, incubator, Centrifuge, Laminar air flow chamber and spectrophotometer)

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Syllabus of B.Sc. (Medical)
w.e.f. July 2015
(6th Semester)
BOTANY

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M-18

Paper Code: BOT-302A

Plant Ecology

- T - P
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Total Credits: 02
Total Marks: 50

External Marks: 40
Internal Marks: 10

Note- Attempt five questions in all, selecting one question from each unit. Question Number 1 is compulsory (short answer type). Nine questions are to be set in total Spread over the entire syllabus. All questions carry equal marks.

Unit- I

Introduction to Ecology: Definition scope and importance, level of organization
Environment: - Introduction; Environmental Factors-Climatic, edaphic factors, Biotic factors, Biogeography.

Unit-II

Biological Adaptations:-Morphological, Anatomical and Physiological responses of plants to water (Hydrophytes & Xerophytes), temperature & salinity.
Population Ecology: - Growth curves, Species interactions, Ecotypes, Ecological indicators.

Unit III

Community Ecology:-Community characteristics, frequency, density, cover, life and growth forms, Ecological succession.
Phytogeography: - Biogeographical regions of India, Vegetation types of India; Forest and Grassland. Invasive species (weeds).

Unit-IV

ecosystem :- Structure, abiotic & biotic components, food chain food web, ecological pyramids, Ecological energetics, energy flow, biogeochemical cycles of carbon, nitrogen, phosphorus and water.
Environmental Pollution:-Types of pollution, pollutants, acid rain and its effects, effects of pollution on plants
Global change:-Green house effect and green house gases, depletion of ozone layer, and ^{climatic change} global warming, carbon trading

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Suggested Readings:-

Odum, E.P. 1983. Basic Ecology, Saunders, Philadelphia.
Kormondy, E.J. 1996. Concepts of Ecology, Prentice-Hall of India Pvt. Ltd. New Delhi.
Sharma, P.D. (1993) Ecology and Environment. Rastogi Publications, Meerut.
Tyler Miller, Jr. C. 1990. Living in the Environment. Wadworth Publishing Company, Belmont, California.
Khopkar, S.M. 1993. Environmental Pollution Analysis Wiley Eastern Ltd. New Delhi.
Misra, R. 1968. Ecology Workbook, Oxford and IBH Publishing Co. New Delhi.
Drummond, J.M.F. 2004. Ecology and Plant Diversities. Agrobios India.
Purohit, S.S. 2004. Environmental Pollution Causes, Effects and Control. Agrobios India.
Deo, P.P.2006. Plant Ecology . Egrobios India.

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Syllabus of B.Sc. (Medical)
w.e.f. July 2015
(6th Semester)
BOTANY

Paper Code: BOT-302A

Economic Botany

T - P

Total Credits: 02
Total Marks: 50

External Marks: 40
Internal Marks: 10

Note- Attempt five questions in all, selecting one question from each unit. Question Number 1 is compulsory (short answer type). Nine questions are to be set in total Spread over the entire syllabus. All questions carry equal marks.

Unit-I

Food Plants :- Rice, Wheat, Maize, Potato, Sugarcane, their origin and distribution, growing regions, botanical description, uses, Evolution, improved varieties.
Fibers: - Cotton & Jute, Origin and Distribution, Botanical description, Cultivation, uses, processing, improved varieties.

Unit-II

Vegetable oils:- Groundnut mustard and coconut, origin and distribution cultivation, Botanical description, uses & pests, improved varieties.
Timber Yielding Plants: - Teak, Sal, Shisham, Chir, Bamboos, Distribution, Botanical description, cultivation, uses, Seasoning of wood, Characteristics of wood.

Unit-III

Spices: - General Account of Ginger, Turmeric, Coriander, Clove.
Drugs and Medicinal Plants: - General Account of Sarpagandha, Neem, Belladonna, Cannabis and Opium.

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Unit-IV

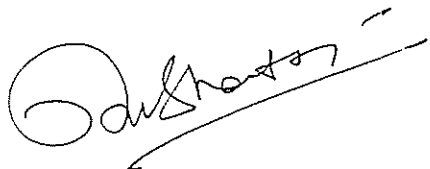
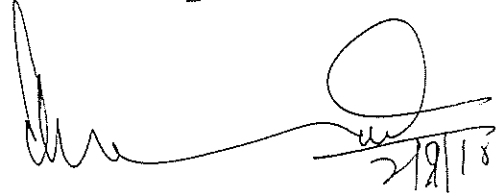
Beverages: - Tea & Coffee, Origin and Distribution, Cultivation, Botanical description, Uses, Preparation techniques.

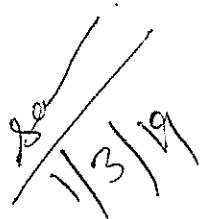
Rubber: - Origin and distribution, Cultivation, Botanical description, Uses, Processing of rubber.

Suggested Readings:-

- Kochhar, S.L. 1998. Economic Botany in Tropics, 2nd Edition . Macmillan India Ltd New Delhi.
Sambamurthy, A.V.S.S. and Subramnyan, N.S. 1989. A Textbook Economic Botany. Wiley Eastern Ltd. , New Delhi.
Sharma , O.P. 1996. Hill's Economic Botany . Tata McGraw Hill Co. Ltd., New Delhi.
Simpson, B.B. and Conner-Oghorzaly, M. 1986. Economic Botany-Plants in Our World . McGraw Hill , New York.
Trivedi, P.C. 2006. Medicinal Plants : Ethnobotanical Approach. Agrobios India.
Singh, V.P. 2006. An Introduction to Modern Economic Botany. Agrobios India.

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Syllabus of B.Sc. (Medical)

w.e.f. July 2015

(6th Semester)

BOTANY

Practical

Paper Code: BOP-302

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Total Credits: 02

Total Marks: 50

External Marks: 40

Internal Marks: 10

1. Determination of pH of soil and water samples.
2. Study of community structure by quadrat and line transect methods.
3. Determination of abundance and frequency, density and abundance and IVI of species by quadrat method.
4. Morphological and anatomical features of hydrophytes, xerophytes, halophytes and parasites in relation to their habit and habitat.
5. Preparation of a report on local visit to an industry and agricultural farm to identify the source and types of pollutants.
6. Identification and classification of the various food articles, fibers, oils, timber articles, spices, medicinal plants, rubber plant with reference to their morphology, economic importance and plant part used.
7. Collection | Project report.
8. Viva- Voce.

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