



UNIVERSITY OF JAMMU
NOTIFICATION
(11/July/ ADP/19)

It is hereby notified for the information of all concerned that the Vice-Chancellor, in anticipation of the approval of the competent authority, has been pleased to authorize adoption of the revised Syllabi and Courses of Study in the subject of Botany for Part I of Three Year B.Sc. (General) Course for the examinations to be held in the years as under alongwith %age of change:-

For the Examinations
to be held in the year

%age of change

2012, 2013 and 2014

Paper-A- Less than 20%

Paper-B- Less than 20%

The alternative question papers are required to be set as per the regulations given below:-

- i). If the change in the syllabi and courses of study is less than 25%, no alternative question papers be set.
- ii). if the change is 25% and above but below 50%, alternative question papers be set for one year.
- iii). If the change is 50% and above or whole scheme is changed, alternative question papers be set for two years.

Sd/-
REGISTRAR

F.Acd./25/11/ 4390-4434
Dated: 01-08-2011

Copy for information and necessary action to:

1. Special Secretary to Vice-Chancellor, University of Jammu;
2. Sr.P.A. to Registrar/Controller of Examinations;
3. Dean, Faculty of Life Sciences;
4. Convener, Board of Studies in Botany;
5. Members of the Board of Studies concerned;
6. Principals of the concerned Colleges;
7. C.A. to Controller of Examinations;
8. Deputy/ Asstt. Registrar (Conf./Exams. U/G /Inf./Pub./Admission/DDE);
9. S.O (Confidential); and
10. Content Manager, University Website.

Asst. Registrar (Academics)

DEPARTMENT OF BOTANY
UNIVERSITY OF JAMMU

SYLLABI AND COURSES OF STUDY IN BOTANY FOR B.Sc. PART-I
EXAMINATIONS TO BE HELD IN THE YEARS 2012, 2013 & 2014

There shall be two theory papers and one practical paper of 50 marks each. Each theory paper shall be of three hours duration and the practical paper shall be of four hours duration. 20% of the marks shall be reserved for internal assessment in each theory paper and 50% in practical paper. Each theory paper will be set for 40 marks and practical paper for 25 marks. In case of regular students, internal assessment received from the colleges will be added to the marks obtained by them in the University examination. In case of private candidates, marks obtained by them in the University examination shall be increased proportionately in accordance with the Statutes/Regulations.

Paper-A Diversity of Microbes and Cryptogams

Maximum marks: External examination	=	40
Internal Assessment	=	10
Minimum pass marks: External examination	=	14
Internal Assessment	=	04
Duration of exam	=	3.00 hrs.

Unit-I -Microbes and Microbiology

- 1.1 General account of plant viruses (TMV), transmission and control; viroids; prions.
- 1.2 Bacteria-Ultrastructure, nutrition and reproduction, general account of Mycoplasma and Cyanobacteria.
- 1.3 Genetic recombination in bacteria (transformation, transduction and conjugation).
- 1.4 Economic importance of bacteria and plant viruses.

Unit-II Algae

- 2.1 General characteristics and classification of algae (Parker, 1982) up to class level.
- 2.2 Important features of Prochlorophyceae, Chlorophyceae and Xanthophyceae; life histories of *Volvox*, *Oedogonium*, *Coleochaete*, *Chara* and *Vaucheria*.
- 2.3 Important features of Phaeophyceae and Rhodophyceae; Life histories of *Ectocarpus* and *Polysiphonia*.
- 2.4 Economic importance of algae - algae as food and feed; algae as indicators of pollution; algal blooms and toxins; algae in pharmaceutical industry.

Unit-III Fungi

- 3.1 General characteristics and classification of fungi (Ainsworth 1971), Economic importance of fungi, General account of Lichens.

- 3.2 Important features of Mastigomycotina; Life histories of *Pythium* and *Allomyces*.
- 3.3 Important characteristics of Zygomycotina and Ascomycotina; Life histories of *Mucor*, *Eurotium* and *Morchella*.
- 3.4 Important characteristics of Basidiomycotina and Deuteromycotina; Life histories of *Puccinia*, *Agaricus*, *Colletotrichum* and *Cercospora*.

Unit-IV Bryophytes

- 4.1 Bryophytes as the earliest land dwellers; general characteristics, classification (Smith, 1955) and alternation of generations in Bryophytes.
- 4.2 Structure and reproduction in Hepaticae with reference to *Marchantia*.
- 4.3 Structure and reproduction in Anthocerotae and Musci with reference to *Anthoceros* and *Funaria*.
- 4.4 Evolution of sporophyte in bryophytes; importance of bryophytes in preventing soil erosion; management of forest floors; monitoring and controlling pollution; geobotanical prospecting; in horticulture and as source of antibiotics.

Unit-V Pteridophytes

- 5.1 General characteristics, classification (Sporne, 1975) and origin of pteridophytes (the first vascular plants); stelar system and alternation of generations in pteridophytes.
- 5.2 Important characteristics of Psilopsida and Lycopsida; Structure and reproduction in *Pilotum*, *Rhynia*, *Lycopodium* & *Selaginella*.
- 5.3 Important characteristics of Sphenopsida; structure and reproduction in *Equisetum*.
- 5.4 Important characteristics of Pteropsida; structure and reproduction in *Pteris* and *Marsilea*.

Note for paper setting

Section I will carry one compulsory question with seven parts (drawn from all the five units) each carrying one mark. Answer to each part to be restricted to one line only. Section II will carry ten short answer type questions, two from each unit. Students will be required to attempt five questions, one from each unit. Each question will carry three marks. Answer to each question should be restricted to three pages. Section III will carry five questions, one from each unit. Candidates will attempt any three questions. Answer to each question will be restricted to six pages. Each question will carry six marks.

Suggested Readings

- Bilgrami, K.S. and Saha L.C. 1992. A Textbook of Algae. CBS Publishers and Distributors, Delhi.
- Clifton, A. 1958, Introduction to the Bacteria, McGraw Hill and Co., New York.
- Dube, H.C. 1990, An introduction to fungi. Vikas Publishing House Pvt. Ltd., Delhi.
- Parihar, N. S. 1996. The biology and morphology of pteridophytes. Central Book Distributors, Allahabad.



- Puri, P. 1980, Bryophyta: broad prospectives. Atma Ram & Sons, Delhi.
- Rashid A. (1976). An introduction to Pteridophytes- Diversity and differentiation, Vikas Publishing House.
- Smith, G.M. 1971, Cryptogamic Botany, Vol-I, Algae & Fungi, Tata McGraw Hill Publishing Co., New Delhi.
- Smith, G.M. 1971, Cryptogamic Botany, Vol. II, Bryophytes & Pteridophytes. Tata McGraw Hill Publishing Co., New Delhi.
- Sporne, K. R. 1970. The morphology of pteridophytes, Hutchinson Univ. Library, London.
- Sumbali, G. and Mehrotra, R. S. 2009, Principles of Microbiology. The McGraw Hill Education Pvt. Ltd. New Delhi.
- Sumbali G. 2010. The fungi- 2nd edition, Narosa Publishing House, New Delhi.

Suggested Laboratory Exercises

1. Study of the genera included under algae and fungi.
2. Study of morphology, reproductive structures and anatomy of the examples cited in theory under Bryophyta and Pteridophyta.
3. Observation of disease symptoms in hosts infected by fungi, viruses and mycoplasma. Section cutting of diseased materials and identification of the pathogens as per the theory syllabus.
4. Gram staining of bacteria.
5. Study of crustose, foliose and other types of lichen thalli.



Paper-B (Cell Biology and Genetics)

Maximum marks: External examination	=	40
Internal Assessment	=	10
Minimum pass marks: External examination	=	14
Internal Assessment	=	04
Duration of exam	=	3.00 hrs.

Unit-I Cell Structure

- 1.1 Cell wall; Primary cell wall, its structure, formation and function.
- 1.2 Plasma membrane; The lipid bilayer structure, fluid mosaic model; functions of plasma membrane.
- 1.3 Cell organelles; structure and functions of endoplasmic reticulum, golgi bodies, chloroplasts, mitochondria and ribosomes.
- 1.4 Ultrastructure of nuclear membrane; nucleolus: organization and function.

Unit-II Chromosome structure and multiplication.

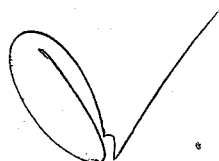
- II.1 Physical and chemical structure of chromosome; structure and importance of centromere and telomere; concept of sex chromosomes.
- II.2 Reductional and equational divisions: Various stages; detailed structure of pairing and crossing over.
- II.3 Basic Unit: DNA: structure and replication; satellite and repetitive DNA.
- II.4 Extranuclear genome: structure and function of mitochondrial and plastid DNA; Plasmids.

Unit-III Genome Organization and function/Gene to protein.

- III.1 Organization of DNA in prokaryotic and eukaryotic genomes. Role of Proteins; nucleosome model.
- III.2 Concept of gene; genetic code; structure and functions of mRNA and tRNA.
- III.3 Protein synthesis; transcription; regulation of gene expression in prokaryotes and eukaryotes.
- III.4 Protein synthesis: translation; primary, secondary and tertiary structure of proteins.

Unit-IV Alterations of the genome.

- IV.1 Structural alterations; types, effect and detection of intrachromosomal alterations; deletions, duplications and inversions.
- IV.2 Mechanism, effect and detection of interchromosomal alterations (translocations).
- IV.3 Euploidy-types, origin and effect with suitable examples (wheat and cotton).
- IV.4 Aneuploidy-types, origin and effect with suitable examples.



Unit-V Alterations in the basic unit of inheritance and inheritance patterns.

- V.1 Gene/Point mutations-spontaneous and induced; mechanisms of induction; uses.
- V.2 Concept and salient features of transposable elements in prokaryotes (Is and Tn) and eukaryotes (Ac-Ds). DNA damage and repair mechanisms.
- V.3 Mendelism, laws of segregation and independent assortment; allelic and non-allelic interactions.
- V.4 Linkage and recombination, linkage in mapping of genes.

Note for paper setting

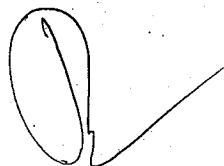
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Suggested Readings:

- Alberts; B., Bray, D., Lewis, J., Raft, M., Hoberts, K and Watson I.D. 1999, Molecular Biology of Cell, Garland Publishing Inc. New York, USA.
- Atherly, AG., Girton, J.R. and Mc.donald, J.F. 1999, The Science of Genetics; Saunders College Publishing. Fort Worth, USA.
- Gupta, PK. 1999, A Text Book of Cell and Molecular Biology; Rastogi Publications, Meerut, India.
- Kleinsmith, L J. And Kishl, V. M. 1995. Principles of Cell and Molecular Biology (2nd edition), Harper Collins College, Publishers, New York, USA.
- Lodish, H., Berk, A., Zipursky, S.L., Matsudaria P., Baltimore, D and Damell, J. 2000. Molecular Cell Biology. W.H. Freeman & Co. New York, USA.
- Russell, P J. 1998. Genetics. The Benjamin/Cummings Publishing Co. Inc., USA.
- Snustad, D.P. and Simmons, M.J. 2000. Principles of Genetics, John Wiley & sons, Inc. USA.
- Wolfe, S.L. 1993. Molecular and Cell biology, Wadsworth Publishing Co. California, USA.

Suggested Laboratory Exercises.

1. To study cell structure from onion leaf peels, demonstration of staining and mounting methods.
2. Comparative study of cell structure in onion cells, *Hydrilla* and *Spirogyra*. Study of cyclosis in *Tradescantia* petal cells.
3. Study of plastids to examine pigment distribution in plants (e.g. *Cassia*, *Lycopersicon* and *Capsicum*).
4. Examination of electron micrographs of eukaryotic cells with special reference to organelles.



5. Study of electron micrographs of viruses, bacteria, cyanobacteria and eukaryotic cells for comparative cellular organization.
6. Examination of various stages of mitosis and meiosis using appropriate plant material (e.g. onion root tips, onion flower buds).
7. Preparation of karyotypes from dividing root tip cells and pollen grains.
8. Cytological examination of special types of chromosomes; barr body, lampbrush and polytene chromosomes.
9. Working out the laws of inheritance (monohybrid, dihybrid, gene interactions) using seed mixtures.
10. Working out the mode of inheritance of linked genes from test cross and or F_2 data.

