Syllabus & Evaluation Scheme B.Sc. Micro/CBZ

Iyear

Dev Bhoomi Institute of Management Sciences

Sri Dev Suman Uttarakhand. University
Badshahithaul, Tehri Garhwal
Syllabus
B.Sc. Microbiology

Marks-Distribution

Theory: 80 marks External, 20 Internal Assessment (80+20 = 100) each paper
Practical: 40 marks end term Practical + 10 Internal (40 + 10 = 50) each semester

B.Sc. 1st Year

Paper 1st: Fundamentals of Microbiology - 50
Paper 2nd: Bacteria, Virus and Protozoa – 50
Paper 3rd: Algae, Fungi & Plant Pathology-50
Paper 4th: Microbial Physiology &Biochemistry-50
Lab Course: Practical - 50

Class	Semester	Paper	Marks Distribution		Total Marks
1 Year	I		Theory	Practical	
		i. Fundamentals of Microbiology	50	50	300
		ii. Bacteria, Virus & Protozoa	50		
	II	iii. Algae, Fungi & Plant Pathology	50	50	
		iv. Microbial Physiology &Biochemistry	50		

	Dev Bhoomi Institute Of Management Sciences		**SEMESTER: I**
	Department of Microbiology		
	Course Level: Beginner	**Course Type: Core**	**Credit: 4**
	Total Contact Hours: 40	**LTP -3-1-0**	**External Marks/Internal Marks: 80/20**
Course Title: Fundamentals of Microbiology	**Course Code:MB101**		**Duration of External Exam: 3 Hours**

Learning Objectives-

The course in designed to give a basic understanding on the fundamental aspects of microbiology from historical development of the branch of microbiology to diseases caused by various groups of microorganisms. The students will be introduced to the microbial world, the structure and significance of bacteria, fungi, algae, protozoa and viruses.

B.Sc. Microbiology (First year)
I Semester
Paper I: General Microbiology

Unit I

History of microbiology, scope and relevance of microbiology, classification of microbial world; bacteria, cyanobacteria, Achaea, actinomycetes, fungi, algae and protozoa.

Unit II

Principle, types and application of microscopes, LAF cabinet, autoclave, oven, colony counter, spectrophotometer, ph. meter, anaerobic chamber; Principle, basic apparatus and applications of electrophoresis, thermocyclar (PCR), centrifuge, blotting, Chromatography & its types.

Unit III

Isolation, cultivation and identification techniques for microorganisms, aerobic and anaerobic cultivation, biochemical methods for identification, culture media & its type, maintenance & preservation of pure cultures.

Unit IV

Study of Morphology of microbes by staining methods –staining, Simple (Leffer'spolychrome methylene blue& negative staining) Gram's staining, Zielneelson staining, Flurochrome staining, Leishman'sstaining, Giemsa's staining, special staining methods to demonstrate granules, capsules & spores.

Books-

There are lots of books which are helpful for beginners. Some of the books are -

- Microbiology- pelczar, chan and kreig
- General microbiology- stainer, Ingharam, Wheelis and Painter
- Biology of microorganisms-Brock and Madigan

- Introduction to microbiology- Ingraham and Ingraham
- General microbiology-Powar C.B and H.F Daginawala
- All these books give introduction to microbiology.

Out Come-

- On completion of the cause the students are expected to have a clear understanding on microscopy, sterilization, disinfection, bacterial cultivation techniques, their growth dynamics, and metabolic processes, genetic and ecological factors.
- The students are also introduced to the beneficial and harmful manifestations of microorganisms especially of bacteria and their role in microbial mineralization and disease processes.
- All these are to be accomplished through formal lectures, class room discussions and the students will be assessed by examinations.

Practical Aspect-

- The practical laboratory exercises are designed to give the basic safety and handling protocol in a microbiology laboratory; hands on training on light microscopy –staining techniques, sterilization and disinfection principles and practice;
- Enumeration and isolation techniques of bacteria and fungi.

	Dev Bhoomi Institute Of Management Sciences		**SEMESTER: I**
	Department of Microbiology		
	Course Level: Beginner	**Course Type: Core**	**Credit: 4**
	Total Contact Hours: 40	**LTP -3-1-0**	**External Marks/Internal Marks: 80/20**
Course Title: Bacteria, Virus and Protozoa	**Course Code:MB102**		**Duration of External Exam: 3 Hours**

Learning Objectives-

Students will learn about the structure function and major role of bacteria, Virus and Protozoa. They will learn how they are helpful and harmful to our living things and nonliving things.

B.Sc. Microbiology (First year)
Paper II: Bacteria, Virus& Protozoa

Unit I

Morphology and ultra-structure of bacteria; structure, properties and function of cell wall, cell membranes, flagella, cilia, pili, gas vesicle, chromosomes, carboxysomes, magnetosomes and phycobilisomes, nucleoid.

Unit II

General virology; nomenclature and classification of viruses, Morphology and ultrastructure, capsids and their arrangements, types of envelopes and their compositions. Viral genome, their types and structures. Virus related organisms (viroid's, virusoids and prions).

Unit III

Bacterial viruses : Bacteriophage structural organization, life cycle, one step growth curve, transcription, DNA replication, eclipsed phase, phage production, burst size, lysogenic size, bacteriophage typing, application in bacterial genetics.

Unit IV

Flagellate protozoa: the Mastigophora, amoeboid protozoa: the Rhizopoda, ciliate protozoa: the ciliophora. Protozoal disease: malaria, Giardiasis, Trichomoniasis, Toxoplasmosis, Pneumocystis pneumonia and disease caused by Leishmania, Trypanosomes

Text book-

- H.C. Dube
- Surendra Kumar
- R.C. Dubey
- S.Chand

Out Come-

- Studends able to know that how microbial world working in our surroundings
- They able to understand the cultivation of microbial world mainly the bacteria

Practical Aspects-

- Blood cell test to know about the basophil,neutrophile etc.
- Culture of bacteria in the micro lab and their identification of shape and sizes.
- Enumeration of soil microflora by means of dilution method.

	Dev Bhoomi Institute Of Management Sciences		**SEMESTER: II**
	Department of Microbiology		
	Course Level: Beginner	**Course Type: Core**	**Credit: 4**
	Total Contact Hours: 40	**LTP -3-1-0**	**External Marks/Internal Marks: 80/20**
Course Title: Algae, Fungi and Plant pathology	**Course Code:MB201**		**Duration of External Exam: 3 Hours**

Learning Objectives-
Students enable about the basic knowledge of taxonomic position of cyanobacteria.
Enable about the algal cultivation and will have basic idea about the mechanism helpful in the many aspects like soil, atmospheric and plant.

B. Sc. Microbiology (First Year)
II semester
Paper III: Algae, Fungi and Plant pathology

Unit I

Algae; General account of habitat, cell structure, pigments, flagellum, reserve Food. Conflicts of taxonomic position of Cyanobactera.Algal growth and Reproduction.

Unit II

Cultivation of algae in laboratory. Nitrogen fixation, Biological and economic Aspects of algae, algal biotechnology. Fossil records of algae. Algal blooms and Eutrophication.

Unit III

Fungi: Habitat, fungal structure and thallus organization, wall structure, hyphal Growth, sexual and asexual reproductive structures. Nutrition and reproduction in Fungi, Mycorrhiza, lichens, Heterothallism, sex hormones in fungi. Evolutionary tendencies in lower fungi. Economic importance. Fungal diseases.

Unit IV

Concept of plant disease; signs and symptoms associated with microbial plant Pathogens. Microbial enzymes, toxins, growth regulators and suppressor of plant Defense in plant diseases, effects of pathogens on plant physiology, concept of passive and active resistance and mechanism in plants. Concepts of monocyclic& polycyclic disease, physical, chemical and biological control, integrated eco Friendly approach of plant disease control.

Books-

- Singh
- Pandey
- Jain

Out Come-

- Enable to know about the Eutrophication, algal blooms, Nitrogen fixation.
- Idea about the fungi and fungal diseases.
- Idea about the plant pathogenicity and their control.

Practical Aspects-

- Fungi culture in the microbiology lab.
- Collection of plant disease part and examination under the microscope.
- Enumeration of fungi on the basis of their color appearance.

	Dev Bhoomi Institute Of Management Sciences		**SEMESTER: II**
	Department of Microbiology		
	Course Level: Beginner	**Course Type: Core**	**Credit: 4**
	Total Contact Hours: 40	**LTP -3-1-0**	**External Marks/Internal Marks: 80/20**
Course Title: Microbial Physiology & Biochemistry	**Course Code:MB202**		**Duration of External Exam: 3 Hours**

Learning Objectives-
About enzyme- effect, ph., inhibition mechanism, properties and functions
Microbial Metabolism, pathways (degradative and generative), respiratory mechanism.

B.Sc. Microbiology (First year)
II semester
Paper IV: Microbial Physiology & Biochemistry

Unit I

Enzymes as biocatalyst, enzymes classification, properties. Enzymes kinetics : MichaelisMenton equation for simple enzymes, Effects of pH and temperatures, On enzymes action, enzyme inhibition. Electron carriers, artificial electron donors, Inhibitors uncouplers, energy bond and phosphorylation.

Unit II

Microbial metabolism: anabolism and catabolism, energy production in aerobic, anaerobic process and photosynthesis, chemiosmotic hypothesis of ATP synthesis. Bacterial electron transport chain. Autotrophy, Heterotrophy, chemolithotrophy, fermentation. Transport of nutrients by active and passive transport.

Unit III

Respiratory metabolism – Glycolysis, EMP pathway, ED pathway, Glyoxallate Pathway, Kreb's cycle-oxidative and substrate level phosphorylation. Reverse TCA Cycle – Gluconeogenesis, fermentation and carbohydrates –homo and

Heterolacticfermentataions.

Unit IV

Assimilation of nitrogen –dinitrogen, nitrate nitrogen, ammonia assimilation,
Synthesis of major amino acids, synthesis of Polysaccharides –peptidoglycan,
Biopolymers as cell components

Books-

- Anantnarayan, Book of microbiology
- Pelczar, microbiology
- Prescott, microbiology

Out Come-

They know about the enzyme properties and their mechanism and also how they are helpful in microbial metabolism of life.

Practical Aspects-

- Testing of enzyme reaction by means of catalase test
- Enumeration of starch and carbohydrates in the plants and food material.
- Study about the the bacterial cell wall

Sri Dev Suman Uttarakhand. University
Badshahithaul, Tehri Garhwal
Syllabus
B.Sc. Microbiology/CBZ (I year)
Zoology

Syllabus: Theory

The B.Sc. examination will be spread over three years (six semester). There shall be two theory papers and one practical examination every semester. Each theory paper has been divided into four units. Each paper will be of 100 marks (Theory-80, Sessional-20). Likewise, each practical will be of 50 marks (Theory-40, Sessional-10).

Course Contents & Teaching Schedules:	**No. of Lectures**	**MM**
B.Sc. First Year		
1st Semester		
Paper I : Non-Chordata	36	100
Paper 2 : Cell Biology & Genetics	36	100
Practical: Based on paper 1 and 2	72	50
2nd Semester		
Paper 3: Chordata	36	100
Paper 4: Taxonomy, Evolution	36	100

	Dev Bhoomi Institute Of Management Studies		**SEMESTER: I**
	Department of CBZ/MICRO		
	Course Level: Beginner	**Course Type: Core**	**Credit: 3**
	Total Contact Hours: 24	Paper 2	**External Marks/Internal Marks: 50/25**
	Course Title: CELL BIOLOGY AND GENETICS	**Course Code**	**Duration of External Exam: 3 Hours**

Pre – Requisite: knowledge of basic cell biology its organelles and functions and genetics

Objective:

1. Students will understand the structures and purposes of basic components of prokaryotic and eukaryotic cells, especially macromolecules, membranes, and organelles
2. Students will understand how these cellular components are used to generate and utilize energy in cells
3. Students will understand the cellular components underlying mitotic cell division.
4. Students will apply their knowledge of cell biology to selected examples of changes or losses in cell function. These can include responses to environmental or physiological changes, or alterations of cell function brought about by mutation

5 Medelian inheritance, and gene functionality.

6.To understand DNA structure, cellular replication and chromosome aberrations

UNIT-I

Generalized structure of Pro- & Eukaryote cell. Elementary knowledge of the structure & function of plasma membrane. Introduction to the organelles constituting endo-membrane system (Endoplasmic reticulum, Golgi complex, Lysosome).

UNIT-II

Nucleus & nucleolus; Ribosome; Mitochondria. Introduction to cytoskeleton.
Cell Division-Mitosis & Meiosis. Basic features of Cell cycle;
Elementary idea of cell transformation and cancer.

UNIT-III

Mendel's law; Exceptions to Mendel's law. Incomplete dominance and Co-dominance, Multiple alleles, Lethal alleles, Epistasis.
Sex-linked inheritance; Extra chromosomal inheritance.

UNIT-IV

Linkage & Crossing over. Sex determination.
Chromosome structure; Euchromatin; Heterochromatin; Histones.
Polytene & lampbhrush chromosomes, Eugenesis,

Text Books:

[T1] Barnes: Invertebrate Zoology (4th ed.), Holt-Saunders

[T2] Kotpal, Agrawal & Khetrapal: Modern Text-book of Zoology, Invertebrates.11/E. Rastogi publication

Reference Book:

1. Alberts et al.: Molecular Biology of the Cell, Garland Pulb., New York, 1989.
2. Strickberger: Genetics, Prentice Hall, 1996.
3. DeRobertis & DeRobertis: Cell & Molecular Biology, 1996

4. Gupta P.K. : Cell And Molecular Biology, Rastogi Publications
5. Sarkar B : Cell Structure and Function, Medtech
6. Verma & Agarwal: Cell Biology, genetics, Molecular Biology. S.Chand & Company

Course Outcome	Description
CO1	To learn about history of cell biology how eukaryotic cells are different from prokaryotic cell, cell internal organelles structure and function.
CO2	To learn evolutionary genetics and use it to find any genetical correlations of disease
CO3	To learn application of genetics in actual world.

	Dev Bhoomi Institute Of Management Studies		**SEMESTER: I**
	Department of cbz/micro		
	Course Level: Beginner	**Course Type: Core**	**Credit: 2**
	Total Contact Hours: 24	**Paper 1**	**External Marks/Internal Marks: 50/25**
	Course Title: Animal Diversity(Non-Chordata)	**Course Code**	**Duration of External Exam: 3 Hours**

Pre – Requisite: knowledge of minor phyla which includes organisms whioch don't have noto chord , it contains introductory information of how lower organisms are classified.

B.Sc. 1st Year (Zoology)-1st Semester
Paper I: Animal Diversity (Non-Chordata)
UNIT-I
Protozoa: General characters and classification up to classes; locomotion and nutrition in Protozoa.
Porifera: General characters and classification up to classes; Canal system in sponges.
UNIT-II
Coelenterata: General characters and classification up to classes; Polymorphism in Coelenterates; Corals and coral reefs.

Helminthes: General characters of Nemathelminthes and Platyhelminthes; Life history of Ascaris *lumbricoides and Taenia solium* and their parasitic adaptations.

UNIT-III

Annelida: General characters and classification up to classes; Metamerism in Annelida; Trochphore larva and its significance.

Arthropoda: General characters and classification up to classes; Zoological importance of *Peripatus* and *Limulus*. Metamorphosis in Insects.

UNIT-IV

Mollusca: General characters and classification up to classes; Torsion in Gastropoda; Pearl formation

Echinodermata: General characters and classification up to classes; Water vascular system in star fish; Echinoderm larvae and their significance.

TEXT BOOKS:

[T1] Barnes: Invertebrate Zoology (4th ed.), Holt-Saunders

[T2] Kotpal, Agrawal & Khetrapal: Modern Text-book of Zoology, Invertebrates.11/E. Rastogi publication.

REFERENCE BOOK:

1. Kotpal, Agrawal & Khetrapal: Modern Text-book of Zoology, Invertebrates.11/E. Rastogi publication.
2. Marshall & William: Text book of Zoology, Vol I (Parker & Haswell, 7th ed.) Macmillian,.
3. Nigam: Biology of Non-Chordates, Nagin Chand,.
4. B.Sc. Zoology Series -Animal Diversity ,Tata McGraw Hill Edu Pvt. Ltd. N.Delhi
5. Jordan E.L. et al.: Invertebrate Zoology. S.Chand & Company Ltd.
6. Barnes: Invertebrate Zoology (4th ed.), Holt-Saunders.
7. Barrington: Invertebrate Structure and Function, Nelson.
8. Iyer: A Manual of Zoology, Part I. Visawanathan,

Course Outcome	Description
CO1	To learn knowledge of classification of organisms according to their characters
CO2	Knowing about lower organisms which don't have noto chord.
CO3	To learn different type of special characters of organisms which are termed as non chordates

	Dev Bhoomi Institute Of Management Studies		**SEMESTER: II**
	Department of cbz/micro		
	Course Level: Beginner	**Course Type: Core**	**Credit: 3**
	Total Contact Hours: 24	**Paper 3**	**External Marks/Internal Marks: 50/25**

	Course Title: Chordates	Course Code	Duration of External Exam: 3 Hours

Pre – Requisite: 1. Describe the distinguishing characteristics of chordates

2. Identify the derived characters of craniates that sets them apart from other chordates

3. Describe the developmental fate of the notochord in vertebrates

B.Sc. 1st Year (Zoology)-2nd Semester

Paper 3: Chordata No. of Lectures

UNIT- I

Protochordates: General features and Phylogeny of Protochordats. Body organization of Balanoglossus, Herdmania and *Amphioxus*.

UNIT- II

Agnatha: General features of Agnatha and classification of cyclostomes up to Classes, Comparison between Lampreys and Hagfishes.

Pisces: General features and Classification up to orders; Scales and fins of fishes, Hill stream adaptations

UNIT- III

Amphibia: General features and Classification up to orders; Parental care; Neoteny

Reptiles: General features and Classification up to orders; Poisonous and non-poisonous snakes; Biting mechanism in snakes; Venum and antivenum.

UNIT- IV

Aves: General features and Classification up to orders; Feathers in Birds; Adaptations for aerial mode of life;

Mammalia: Origin of mammals; General organization, distribution and affinities of Prototheria, Metatheria and Eutheria; Aerial and aquatic adaptations in mammals.

Text Books:

1. R.L. Kotpal: Modern Text-book of Zoology, Vertebrates. Rastogi Publication.
2. E.L. Jordan and P.S. Verma: Chordate Zoology. S. Chand & Co. Ltd.

Reference books:

1. Pandey B.N. and Mathur V. Biology of Chordates, PHI Learning, 2018
2. R.L. Kotpal: Modern Text-book of Zoology, Vertebrates. Rastogi Publication.
3. E.L. Jordan and P.S. Verma: Chordate Zoology. S. Chand & Co. Ltd.
4. Hildebrand: Analysis of Vertebrate structure.

5. Romer & Parsons: The Vertebrate Body, Saunders.

Course Outcome	Description
CO1	To learn and recognize the four major characteristics of chordates
CO2	To learn and identify the major groups within the Phylum Chordata
CO3	Understanding of adaptive features of major phyla; main identifying behavior and characters of amphibians, reptiles and mammals

	Dev Bhoomi Institute Of Management Studies		**SEMESTER: II**
	Department of cbz/ micro		
	Course Level: Beginner	**Course Type: Core**	**Credit: 2**
	Total Contact Hours: 24	**Paper 4**	**External Marks/Internal Marks: 50/25**
	Course Title: Taxonomy and Evolution	**Course Code**	**Duration of External Exam: 3 Hours**

Pre – Requisite: knowledge of naming of animals (taxonomy) and evolution of organisms
Objective:

1. Firstly, taxonomy aims at classifying organisms into taxa on the basis of similarities in phenotypic (phenetic) characteristics i.e. the characteristics which are expressed in an organism and can be examined visually or can be tested by other means.
2. The second objective of taxonomy is to assign each taxon a name. This naming of a taxon is known as nomenclature
3. The third aim is to understand evolutionary theories of organisms
4. Fourth aim is to see are these theories are applicable to animal world.

B.Sc. 1st Year (Zoology) - 2nd Semester
Paper 4: Taxonomy and Evolution No. of Lectures
UNIT-I
Taxonomy: Definition & scope; relationship with Systematic
Zoological nomenclature: Binominal & Trinominal; ICZN.
Components of classification: Linnaean hierarchy.
Concepts of species: Typological, Nomenalistic & Biological
UNIT-II
Geological distribution of animals, period of evolution and extinction of major groups. Direct Evidences of Evolution: Type of Fossils & fossilization. Dating of fossils. Significance of fossil record. Evolution of Horse.
UNIT- III
Evolutionary theories: Lamarckism, Darwinism, Neo-Darwinism;

Processes of Evolutionary Change: Organic variations; Isolating Mechanisms; Natural selection (Example: Industrial melanism); Types of natural selection (Directional, Stabilizing, Disruptive), Artificial selection

UNIT-IV

Species Concept: Biological species concept (Advantages and Limitations); Modes of speciation (Allopatric, Sympatric), Macro-evolutionary principles (example: Darwin's Finches), Role of extinction in evolution

Text Books: 1. Cell Biology, Genetics, Molecular Biology, Evolution and Ecology ,Reprint Edn. 2006 Edition by P.S. Verma

2. Ashok Verma - Animal Taxonomy

Reference books:

1. Ashok Verma - Animal Taxonomy

2. Ernst Mayr- Principals of Systematic

3. Simpson- Principals and Practices of Animal Taxonomy

4. Kapoor- Theory and Practices of Animal Taxonomy, Oxford & Ibh

5. Strickberger: Evolution, CBS Publ. 1994.

6. Douglas, J. Futuyma. *Evolutionary Biology*. Sinauer Associate (1997)

7. Jain P.C. : Paleontology, Vishal Publ. Co.

8. Arora M.P.: Organic Evolution, Himalaya Publ.

Course Outcome	Description
CO1	To learn about naming of different organisms scientifically.
CO2	To gain Knowledge about history of taxonomy and its fundamental features.
CO3	To learn how life on earth started.
CO4	To know different types of theories given by scientist, who work upon how present world organisms existed.

Sri Dev Suman Uttarakhand. University
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Syllabus
B.Sc. Microbiology/CBZ(IYear)
Botany

Semester-1

Paper No.	Title	Paper code	Max. Marks(100)	
			External	Internal
1	Microbiology	BBO101	80	20
2	Fungi, elementary Plant Pathology and Lichens	BBO102	80	20
	Lab Course	BBO10P	40	10

Semester-2

Paper No.	Title	Paper code	Max. Marks(100)	
			External	Internal
1	Algae and Bryophytes	BBO201	80	20
2	Pteridophyta,Gymnosperm and elementary Paleobotany	BBO202	80	20
	Lab Course	BBO20P	40	10

	Dev Bhoomi Institute of Management Studies		**Sem: I**
	Department of Botany **Paper -I Microbiology**		
	Course Level: Beginner	**Course Type: Core**	**Credit: 3**
	Total Contact Hours: 24	**L P 2 1**	**External Marks:**
	Course Title: Botany	**Course Code**	**Duration of External Exam: 3 Hours**

Pre – Requisite: knowledge of basic science.
Objective:

1. To develop interest in studying micro organisms.
2. To explain group of organisms known as the fungi.
3. To explain develop scientific study of diseases in plants caused by pathogens (infectious organisms) and environmental conditions (physiological factors)

Unit-1

1. History and scope of Microbiology.
2. A brief idea of microbial diversity and distribution, position of microorganism in the living world.

3. Classification of microorganism

Unit-2

1. Elementary principles and methods of isolation, purification and culture of microorganism(bacteria and fungi)
2. Role of microorganism in biogeochemical cycle in nature.
3. Bacteria: structure, reproduction, nutrition, plasmid and economic importance.

Unit-3

1. Virus: general characteristics, structure , replication, transmission
2. A brief idea of bacteriophages, cyanophages

Unit-4

1. Viroids and prions
2. Mycoplasma: a general account.

Book –

R C Dubey and Maheswari, A Textbook of Microbiology, S. Chand (publication)
Pelczar. Book of Microbiology
Text book of Fungi- Vashistha, S.Chand publication
P D Sharma , Rastogi Publication

	Dev Bhoomi Institute of Management Studies		**Sem: I**
	Department of Botany **Paper -II Fungi, Microbiology and Elementary Plant Pathology**		
	Course Level: Beginner	**Course Type: Core**	**Credit: 3**
	Total Contact Hours: 24	**L P 2 1**	**External Marks:**
	Course Title: Botany	**Course Code**	**Duration of External Exam: 3 Hours**

Pre – Requisite: knowledge of basic science.
Objective:

1. To develop interest in studying micro organisms.
2. To explain group of organisms known as the fungi.
3. To explain develop scientific study of diseases in plants caused by pathogens (infectious organisms) and environmental conditions (physiological factors)

UNIT-I

Brief history and salient features of fungi. Outlines of classification of Alexopolous and salient features of the important group. Habit and habitat, structure and methods of reproduction of fungi

based on the following representatives. *Stemonitis*, *Synchytrium*, *Saprolegnia*, *Mucor*, *Penicillium*, *Phyllactinia*, *Eurotium*, *Sacharomyces*, *Morchella*, *Puccinia*, *Agaricus*, *Alternaria*.

UNIT-II

Distribution and classification of the microorganisms. Elementary principles of isolation and purification of the microorganisms. Identification and differentiation of bacteria on the basis of morphology and stains (Negative staining, Gram's stain, acid fast). Decomposition of the organic matter in soil and the role of the microorganisms in carbon and nitrogen cycle in nature.

UNIT-III

Fine structure of bacteria, their classification, nutrit ion and reproduction. Economic importance of bacteria. Viruses: Nature, structure, transmission, multiplication and economic importance Bacteriophages-a brief idea. Mycoplasma: a general account.

UNIT-IV

Lichens: Occurrence, physiology (symbiotic relationship) and general structure. Nutrition and reproduction in lichens with special refrence to *Parmella*. Economic importance of Lichens.

UNIT-V

General symptoms of plant diseases. General principles of infection and resistance. General methods of chemical and biological control of the plant diseases. The symptoms, morphology of the causal organism, disease cycle and control measures of the following disease: White rust of crucifers, Late blight of potato, Loose smut of wheat, Black rust of wheat, and wart disease of potato, Red rot of sugarcane.

TEXT BOOKS:

[T1] B.R. Vashishta, Text book of Fungi.

[T2] Singh, Pande and Jain, A text book of Botany

REFERENCE BOOKS:

[R1] H.C Gangulee and A.K. Kar, College Botany Vol II.

Course Outcome	Description
CO1	The student will learn about infectious *disease* include *fungi*, oomycetes, bacteria, viruses, viroids, virus-like organisms, phytoplasmas, protozoa, nematodes and parasitic *plants*.
CO2	The student will learn various types of staining for bacteria, cellular components of prokaryotes, mycoplasma.

	Dev Bhoomi Institute Of Management Studies		**Year: I/semester-II**
	Department of Botany **Paper -I Algae and Bryophytes**		
	Course Level: Beginner	**Course Type: Core**	**Credit: 7**
	Total Contact Hours: 24	**L P 6 1**	**External Marks:**
	Course Title: Botany	**Course Code**	**Duration of External Exam: 3 Hours**

Objectives:
The study will cover the diversity of algae (red, green and brown algae), lower plants (Bryophytes) emphasizing their major divisions, distributions and life cycle as well as structures and economic importance such as food, medicinal and ecological values

Unit-1
1. General Characteristics of Algae.
2. Classification of Algae, basic outline of Fritsch's classification
3. Organization of thallus, pigmentation and mode of reproduction in algae

Unit-2
1. Occurrence, structure of thallus and mode of reproduction in the following genera: Chlamynomodas, Cladophora, Vaucheria and Chara
2. General account of the Bacillariophyceae.

Unit-3
3. Occurrence, structure and mode of reproduction in polysiphonia.
4. Cyanobacteria- a general account and Nitrogen fixation by Cyanobacteria
5. Economic importance of algae as food and fodder, in agriculture, industry and in public health.

Unit-4
1. Outline and basic principles of classification of the bryophytes
2. Comparative account of the gross morphology, vegetative and sexual reproduction, structure and evolution of the sporophytes of Marchantia, Anthoceros and Funeria.
3. Origin, habitat, distribution and economic importance of bryophytes

Books-
Botany algae and Bryophytes-
Khan, M, 1983. Fundamental of Phycology, Bishen Singh Mahendra Pal Singh, Dehradun.
Parihar, N.S. 1976. The Biology and Morphology of Bryophtes, Central Book Depot. Allahbad.
Puri,P 1980. Bryophytes , Atma Ram & Sons, Delhi.
Sharma, O.P. 1989. Text book of Bryophyta, Pragati Prakashan, Merrut.

Course Outcome	Description
CO1	Give the significant differences between old and modern of classification system.
CO2	List the principles of plant taxonomy
CO3	Give the relation of taxonomy to other sciences

	Dev Bhoomi Institute Of Management Studies		**Year: I/semester-II**
	Department of Botany **Paper -II Pteridophyta,elementary gymnosperm and Paleobotany**		
	Course Level: Beginner	**Course Type: Core**	**Credit: 7**
	Total Contact Hours: 24	**L P 6 1**	**External Marks:**
	Course Title: Botany	**Course Code**	**Duration of External Exam: 3 Hours**

Pre – Requisite: knowledge of basic science.

Objective:

1. To develop interest in studying micro organisms.
2. To explain group of organisms known as the fungi.
3. To explain develop scientific study of diseases in plants caused by pathogens (infectious organisms) and environmental conditions (physiological factors)

Unit-1

1. General characteristics of the Pteridophytes and classification as proposed by sporn
2. A comparative study of Rhynia, Segalina, Equisetum & Marsilea on the basis of following features: morphology and anatomy of the vegetative plant body and spore producing organ.

Unit-2

1. A brief account of telome theory, Stelar system and its evolution.
2. Hetrospory and seed habitate in Pteridophytes.

Unit-3

1. Outline of classification as proposed by D.D Pant and distingh-uishing features of Gymnosperm in India.
2. Comparative account of the structure,life history and evolutionary trends and economic importance based on cycas, Pinus and Ephedra.

Unit-4

1. Process of fossilization.
2. Types of Fossils.
3. Living nad pseudofossils.

Books-

Khan.M 1983. Fundamental of phycology
Puri
Parihar, N.S 1976
Pandey, S.N textbook of pteridophyta.

Practicals:-

Study of the following and preparation of temporary slides in the botany lab:
Chara, Vaucheria, Polysiphonia.
Study of morphological features of cycas, ephedra.
Study of external features of Marselia, Equisetum etc.

Course Outcome	Description
CO1	Give the significant differences between old and modern of classification system.
CO2	List the principles of plant taxonomy
CO3	Give the relation of taxonomy to other sciences