

**THIRUVALLUVAR UNIVERSITY**

**BACHELOR OF SCIENCE**

**B.Sc. BOTANY**

**UNDER CBCS**

**(With effect from 2020 - 2021)**

**The Course of Study and the Scheme of Examinations**

S. No.	Part	Study Components		Ins. Hrs / week	Credit	Title of the Paper	Maximum Marks		
		Course Title					CIA	Uni. Exam	Total
<b>SEMESTER I</b>									
1	I	Language	Paper-1	6	4	Tamil/Other Languages	25	75	100
2	II	English (CE)	Paper-1	6	4	<b>Communicative English I</b>	25	75	100
3	III	Core Theory	Paper-1	6	4	Phycology and Mycology	25	75	100
4	III	Core Practical	Practical-1	4	0		0	0	0
5	III	Allied -1	Paper-1	4	3	Zoology I	25	75	100
6	III	Allied- 1	Practical-1	2	0		0	0	0
<b>7</b>	<b>III</b>	<b>PE</b>	<b>Paper 1</b>	<b>6</b>	<b>3</b>	<b>Professional English I</b>	<b>25</b>	<b>75</b>	<b>100</b>
8	IV	Environmental Studies		2	2	Environmental studies	25	75	100
		<b>Sem. Total</b>		<b>36</b>	<b>20</b>		<b>150</b>	<b>450</b>	<b>600</b>
<b>SEMESTER II</b>									
8	I	Language	Paper-2	6	4	Tamil/Other Languages	25	75	100
9	II	English (CE)	Paper-2	6	4	<b>Communicative English II</b>	25	75	100
10	III	Core Theory	Paper-2	5	4	Microbiology, Lichens, Bryology and Plant Pathology	25	75	100
11	III	Core Practical	Practical-1	3	2	Covering Papers 1 and 2	25	75	100
12	III	Allied-1	Paper-2	4	3	Zoology II	25	75	100
13	III	Allied Practical - 1	Practical-1	2	2	Zoology	25	75	100
<b>14</b>	<b>III</b>	<b>PE</b>	<b>Paper 1</b>	<b>6</b>	<b>3</b>	<b>Professional English II</b>	<b>25</b>	<b>75</b>	<b>100</b>
15	IV	Value Education		2	2	Value Education	25	75	100
16	IV	Soft Skill		2	1	Soft Skill	25	75	100
		<b>Sem. Total</b>		<b>36</b>	<b>25</b>		<b>225</b>	<b>675</b>	<b>900</b>

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**SEMESTER: I**

**CORE PAPER - I**

**PHYCOLOGY AND MYCOLOGY**

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**OBJECTIVES**

- ❖ To understand the Salient features and classification of Algae
- ❖ To Study the structure, reproduction and life cycle of various genera
- ❖ To know the importance of Algae
- ❖ To acquire knowledge on general characteristic and classification of fungi
- ❖ To familiarize the structure ,function and economic importance of fungi

**UNIT-I**

General characters of algae, Classification of algae (Lee, 2008). Distribution of algae, Thallus organization, Structure of algal cell. Significant, Contributions of Important Phycologists (Fritsch, Smith, M.O.P. Iyengar, R. N. Singh, T.V. Desikachary, H.D. Kumar)

**UNIT-II**

Salient features of Chlorophyceae. Detailed study of structure, reproduction and Life cycle of Chlorella, Oedogonium and Chara. Salient features of Bacillariophyceae Detailed study of structure, reproduction and life cycle of Diatoms.

**UNIT-III**

Salient features of Phaeophyceae. Detailed study of structure, reproduction and life cycle of Sargassum. Salient features of Rhodophyceae. Detailed study of structure, reproduction and life cycle of Gracilaria. Salient features of Cyanophyceae. Detailed study of structure, reproduction and life cycle of Nostoc. Economic importance of Algae (Eg. Agar, Algicic acid, Diatomite and Spirulina).

## UNIT-IV

General characters, mode of nutrition and occurrence of fungi. Classification for Fungi - (Ainsworth, 1973). Detail study of structure, reproduction and life cycle of Myxomycetes and Phycomycetes: Example - *Stemonites* and *Albugo*.

## UNIT-V

Detailed study of structure, reproduction and life cycle of Ascomycetes, Basidiomycetes and Deuteromycetes. Example - *Penicillium*, *Cercospora* and *Puccinia*. Economic importance of Fungi.

## TEXT BOOKS

Unit-1: Sharma, O.P (2011). Algae, Tata McGraw Hill Education Private limited, New Delhi.

Unit-2: Vashishta, BR, Sinha AK, and SinghVP (2011). Botany For Degree Students Algae, S. Chand. Pub. New Delhi

Unit-3: Pandey, BP (1994). Algae.S. Chand & Company Ltd. New Delhi.

Unit-4: Sharma, OP (2011). Fungi and allied microbes The McGraw –Hill companies, New Delhi

Unit-5: Sharma, PD (2003).The Fungi. Rastogi Publications, Meerut

## REFERENCE ITEMS: BOOKS, JOURNAL

1. Bold, HC & Wynne, MJ (1985). Introduction to the Algae. Prentice Hall of India, New Delhi.
2. Fritsch, FE (1945). Structure and reproduction of Algae. Cambridge University press.
3. Round, FE.(1984).The Ecology of Algae. Cambridge University Press.
4. Lee, RD (2008). Phycology 4th Edition, Cambridge University Press, New York
5. Burnett, J.H. (1971).The fundamentals of Mycology. ELBS Publication, London
6. Bessey, E.A (1979). Morphology and Taxonomy of fungi, Vikas publishing House Pvt.Ltd,New Delhi.
7. Mehrotra, RS, Aneja KR (1990).An Introduction to Mycology , New Age International Pub, New Delhi
8. Sundararajan, S. (2004). Practical manual of fungi , Anmol publications Pvt.ltd New Delhi
9. Webster, J (1970) introduction to fungi , Cambridge university press ,London

## E-MATERIAL

[https://gurukpo.com/Content/B.SC/Algae\\_Lichens\\_and\\_Bryophyta.pdf](https://gurukpo.com/Content/B.SC/Algae_Lichens_and_Bryophyta.pdf)

<https://www.austincc.edu/ddingley/MLAB1331/LectureGuide/Mycology.pdf>

## **COURSE OUT COMES**

1. To learn about the general characters of algae
2. To impart knowledge on various major groups of algae
3. To understand the life history of various groups of algae
4. To differentiate the various groups of fungi
5. To know the knowledge of general distribution of fungi

**ALLIED - 1**  
**PAPER - 1**

**ZOOLOGY I**

Objective;

To acquire knowledge about different kinds of animals species.

To study the systematic and functional morphology of invertebrates and chordates.

UNIT-I

Type study includes life history.

Protozoa – entamoeba, Porifera- Sycon. Coelenterata – Obelia geniculata.

Platyhelminthes - Teania solium.

UNIT II

Annelida – earthworm , Arthropoda – Prawn, Mollusca – Freshwater Mussel, Echinodermata – Sea Star.

UNIT-III

Type study includes morphology, digestive system, respiratory system, circulatory system and urinogenital system of Chordate. Chordate – general characters, Prochordata; morphology of Amphioxus. Vertebrates; Pisces – Shark.

UNIT-IV

Amphibia; Frog, Reptiles; Calotes.

UNIT-V

Aves; Pigeon, Mammalia; Rabbit.

References;

1. Ayyar, E.K. and T.N. Ananthakrishnan. 1992. Manual of Zoology. Volume I & II, S. Viswanathan (printers and publishers) Pvt. Ltd., Madras, 891 p.
2. Kotpal series, 1998 – 1992. Rastogi publications, Meerut.
3. Jordan E.L. and P.S. Verma. 1993. Invertebrate Zoology 12<sup>th</sup> edition, S. Chand & Co., Ltd., New Delhi.
4. Jordan, E.L. and P.S. Verma. 1995. Chordate Zoology and Elements of Animal physiology , S. Chand & Co., Ltd., New Delhi.

Outcomes;

1. The students will be able to understand the life – cycle to and adaptations of protozoa, porifera coelenterata and platy helminthes.
2. The student will be able to understand the functional morphology of Annelids, Arthropods , Molluscs and Echinoderms.
3. The student will be able acquire knowledge about the functional morphology of chordata, prochordatas and pisces.
4. The student will be able have a thorough knowledge about Frog and Calotes.
5. The student will be able to understand the functional morphology of Aves and Mammals.

## SEMESTER: II

### CORE PAPER – 2

# MICROBIOLOGY, LICHENOLOGY, BRYOLOGY AND PLANT PATHOLOGY

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## OBJECTIVES:

1. To give an idea of the world of microbes and to evaluate their role in environment and human welfare.
2. To understand the structure, reproduction, classification and economic importance of bacteria viruses and lichens
3. To understand the structure, reproduction, classification and economic importance of Bryophytes with special reference to the life cycles of few Bryophytes.
4. To have knowledge about the causes and preventive measures of diseases of important plants.

## UNIT-1

Introduction to Microbiology – Classification - R.H. Whittaker's five kingdom concept, Carl Woese's – three Domain classification. Microscopy - principles and application of Light Microscope, Transmission Electron Microscope (TEM) and Scanning Electron Microscope (SEM), Bacterial Staining (simple and differential) , Study of sub viral particles - viroids, virusoids, prions and satellite viruses. Brief account of special groups of bacteria – Archaeobacteria, Mycoplasma, Chlamydia, Actinomycetes, Rickettsias and Cyanobacteria, Economic importance of micro organisms.

## UNIT-2

Bacteria – General characteristics, Classification, Cell structure, Types of flagellation, Nutritional types (based on carbon, nitrogen and energy sources), Respiration, Reproduction – vegetative, asexual and recombination (conjugation, transformation and transduction), Viruses – Classification of viruses, Nature of viruses. Transmission of plant viruses, Structure and replication of plant virus (tobacco mosaic virus); Bacteriophages - Structure and multiplication of T4 bacteriophage (Lytic and Lysogenic cycle).

## UNIT-3

Symbiotic Associations - Lichens - General account, classification, occurrence, thallus organization, structure, physiology and reproduction of crustose, foliose and fruticose

lichens, Lichen ecology with particular reference to role in environmental pollution and succession, Economic importance. Mycorrhiza – Types of mycorrhiza - ectomycorrhiza and endomycorrhiza. Significance of mycorrhiza

#### **UNIT-4**

Bryophytes - General Characters, Classification of bryophytes (Reimers, 1954). Study of thallus Structure, reproduction and life cycle of the following types. (Excluding the developmental studies) *Marchantia*, *Anthoceros* and *Polytrichum*. Economic importance of Bryophytes.

#### **UNIT-5**

Plant pathology – Scope of Plant pathology, classification of plant diseases, Methods of Plant Protection a) Cultural b) Mechanical c) Physical d) Chemical and f) Legal. Study of etiological agent, symptoms, epidemiology, life cycle and management of the following diseases.

- a) Citrus canker
- b) Cauliflower Mosaic Disease
- c) Bunchy top of banana

#### **TEXT BOOKS:**

**Unit-1:** Ananthanaryanan R and Panikar J (2005) Text book of Microbiology, Orient Longmans., and New Delhi. Dubey R.C and Mahewari – (2014) A Text Book of Microbiology – Chand and Co., New Delhi

**Unit-2:** Dube H.C. (2007) A Text Book of fungi, bacteria and viruses, Student Edition, New Delhi.

**Unit-3:** Siddiqui K.A. (2013) Text book of Botany-II (Diversity of Algae, Lichens & Bryophytes) – Kitab Mahal Publisher, New Delhi.

**Unit-4:** Pandey, B.P. (2001). College Botany Vol. I:Algae, Fungi, Lichens, Bacteria, Viruses, Plant Pathology, Industrial Microbiology and Bryophyta. S. Chand & Company Ltd., New Delhi.

**Unit-5:** Bilgrami, K.S. and Dubey, R.C. (1985). Text book of Modern Plant Pathology. Vikas Publishing House Private Limited, New Delhi.

#### **REFERENCE ITEMS:**

1. Oladele Ogunseitan (2008) Microbial Diversity: Form and Function in Prokaryotes Wiley- Blackwell. New Jersey, United States.
2. Pelczar, M.J. (2001) Microbiology, 5th edition, Tata Mc Graw-Hill Co, New Delhi.

3. Prescott, L. Harley, J. and Klein, D. (2005) Microbiology, 6th edition, Tata Mc Graw-Hill Co., New Delhi.
4. Smith, G.M (1955): Cryptogamic Botany (Vol. I Algae, Fungi, & Lichens) McGraw-Hill Book Co., New York.
5. Tortora, G.J., Funke, B.R., Case, C.L. (2010). Microbiology: An Introduction (10th edition). Pearson Benjamin Cummings, U.S.A.
6. Prescott L.M. Harley J.P. and Klein D.A. (2013) Microbiology Mccrawtill, New York
7. Mehrotra, R.S. (2003). Plant Pathology (Second edition). Tata McGraw-Hill Education, New Delhi.
8. Rangasami, G. and Mahadevan, A. (1998). Diseases of Crop Plants in India. Prentice Hall of India
9. Sharma P.D., (2019), Microbiology and Plant pathology, Rastogi Publication. New Delhi.

### **E- MATERIALS:**

1. General Microbiology at Boundless -<https://bio.libretexts.org>
2. Plant Disease: An Advanced Treatise: How Disease Is Managed edited by James G. Horsfall - <https://books.google.co.in>

### **COURSE OUT COMES:**

1. To understand the diversity of microorganisms, their importance and basics of microscopes.
2. To know about bacteria and viruses and how they are classified.
3. To know about symbionts in botany.
4. To know about bryophytes, the non vascular plants.
5. To understand the concept of plant diseases and protective measures.

## CORE PRACTICAL – I

# PHYCOLOGY, MYCOLOGY, MICROBIOLOGY, LICHENOLOGY, BRYOLOGY AND PLANT PATHOLOGY

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### OBJECTIVES

1. To learn practical knowledge of structure and reproduction of algae
2. To know the microscopic structure of various fungi genera.
3. To knowledge the structure of bacteria and virus
4. To learn the thallus and reproduction structure of lichens.
5. To familiarize the detailed internal structure and some bryophytes

### I. PHYCOLOGY AND MYCOLOGY

1. A detailed study of structure of thallus and reproductive structure of forms given below *Nostoc*, *Chlorella*, *Oedogonium*, *Chara*, *Diatoms*, *Sargassum* and *Gracilaria*.
2. Observation and recognition of materials and organisms given in fungi. *Stemonites*, *Albugo*, *Penicillium*, *Cercospora* and *Puccinia*.
3. Economic importance of Agar-Agar, Diatomite, Spirulina, Edible Mushroom and Penicillin.

### II. MICROBIOLOGY, LICHENOLOGY, BRYOLOGY AND PLANT PATHOLOGY

1. Structure of bacteria (*E. coli*), TMV and T4-Bacteriophage
2. General observation of thallus and reproductive structure of Crustose, foliose and fruticose lichens, *Marchantia*, *Anthoceros* and *Polytrichum*.
3. Recognition of Pathological specimens and control measures of plant diseases given in Unit V.

### REFERENCE ITEMS: BOOKS, JOURNAL

1. Bold, HC & Wynne, MJ (1985). Introduction to the Algae. Prentice Hall of India, New Delhi.
2. Burnett, J.H. (1971). The fundamentals of Mycology. ELBS Publication, London
3. Sundararajan, S. (2004). Practical manual of fungi, Anmol publications Pvt.ltd New Delhi
4. Mehrotra, R.S. 2003. Plant Pathology (Second edition). Tata McGraw-Hill Education, New Delhi.
5. Pandey, B.P. (2001). College Botany Vol. I: Algae, Fungi, Lichens, Bacteria, Viruses, Plant Pathology, Industrial Microbiology and Bryophyta. S. Chand & Company Ltd., New Delhi.

**ALLIED 1**  
**PAPER 2**  
**ZOOLOGY II**

Objective;

- To study the principles of Cell biology and Genetics.
- To study the principles of Developmental Biology and Physiology.
- To have a complete knowledge about circulatory systems and excretory system.
- To create awareness towards recent changes in the environment and preventive measures.
- To understand the concepts of origin of life.

UNIT-I

Cell Biology – structure of animal cell, Genetic; molecular structure of gene – gene function, sex linked inheritance. Genetic engineering and its application.

UNIT-II

Embryology – cleavage and gastrulation of Amphioxus.

Human Physiology; Digestion, circulation – blood components, structure of heart, heart function.

UNIT-III

Disease of Circulatory system – blood pressure, heart disease – Ischemia, Myocardial infarction, Rheumatic heart disease, stroke.

Excretion – structure of kidney and mechanisms of urine formation.

UNIT-IV

Environmental Biology – Biotic factors and Abiotic factors, food chain and food web. Pollution – Environmental Degradation, (Air, Water and Land) – Green house effect – Bioremediation, - Global warming – acid rain.

UNIT-V

Evolution; Theories of Lamarkism & Darwinism.

Reference;

1. Ekambaranatha Ayyar, and Ananthakrishnan, T.N. 1993. Outlines of Zoology, Vol I & II, Viswanathan and Co, Madras.

2. Sambasiviah, I, Kamalakara Rao, A.P., Augustine Chellappa, S. 1983. Text book of Animal Physiology, S. Chand & Co., New Delhi.
3. Verma and Agarwal. 1983. Text book of animal Ecology, S. Chand & Co., New Delhi.
4. Verma and Agarwal and Tyagi. 1991. Chordate Embryology, S. Chand & Co., New Delhi.
5. Rastogi and Jayaraj. 2000. Text book of genetics. Rastogi publications, Meerut.
6. Verma and Agarwal. 2000. Cell Biology, Genetics, Molecular Biology, Evolution and Ecology, S. Chand & Co., New Delhi.

Outcomes;

1. The student will acquire knowledge about cell structure, gene function and Genetic engineering.
2. The student will be able to understand the cleavage pattern and gastrulation in Amphioxus.
3. The students will have a thorough knowledge about the diseases of circulatory systems and urine formation.
4. The student will be have an awareness about the environment.
5. The student will understand the basic concepts of evolution.

## ALLIED PRACTICAL

### ZOOLOGY

#### I MAJOR PRACTICAL

##### DISSECTIONS

Cockroach; Digestive and nervous system

Prawn; nervous system

#### II MINOR PRACTICAL

##### MOUNTING

1. Mouth parts of Mosquito and Honey bee
2. Earthworm – Body setae
3. Placoid scales of Shark

#### III SPOTTERS

Entamoeba, Sycan, Obelia, Taenia solium (entire, scolex) earthworm (entire, Pineal setae) Prawn (entire), Fresh water mussel, Sea star, Amphioxus – Entire, Amphioxus – T.S. through pharynx, Shark, Frog, Calotes, Pigeon, feathers of pigeon and Rabbit.

Sphygnomanometer, Stethoscope, Rain gauge.

##### References;

- 1.verma. P.S. 2011. A manual of practical Zoology – INVERTEBRATES. Chand & Co., Ltd., Ram Nagar, New Delhi.
2. Verma. P.S. 2011. A manual of practical Zoology – CHORDATES. Chand & Co., Ltd., Ram Nagar, New Delhi.

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