CENTRE FOR DISTANCE AND ONLINE EDUCATION

BHARATHIDASAN UNIVERSITY, TIRUCHIRAPPALLI - 620 024.

B.Sc. BOTANY

CHOICE BASED CREDIT SYSTEM

LEARNING OUTCOMES BASED CURRICULUM FRAMEWORK (CBCS - LOCF)

(Applicable to the candidates admitted from the academic year 2026-27 onwards offered through CDOE)

Sem.	Part	Course	Title	Credit	Exam Hours	Marks		Total
						Int.	Ext.	
I	I	Language Course – I (Tamil $ / Other Languages + #)		3	3	25	75	100
	II	English Course - I		3	3	25	75	100
	III	Core Course – I (CC)	Algae, Fungi, Lichens and Bryophytes	5	3	25	75	100
		Core Practical – I (CP)	Algae, Fungi, lichens, Bryophytes	4	3	40	60	100
		First Allied Course – I (AC)	Zoology - I	4	3	25	75	100
		First Allied Practical (AP)	Zoology	-	-	-	-	-
	IV	Value Education		2	3	25	75	100
	TOTAL			**21**	**-**			**600**
II	I	Language Course - II (Tamil $ / Other Languages + #)		3	3	25	75	100
	II	English Course - II		3	3	25	75	100
	III	Core Course – II (CC)	Microbiology, Plant Pathology and Plant Protection	5	3	25	75	100
		Core Practical – II(CP)	Microbiology, Plant Pathology and Plant Protection	4	3	40	60	100
		First Allied Course – II (AC)	Zoology - II	4	3	25	75	100
		First Allied Practical (AP)	Zoology	2	3	40	60	100
	IV	Environmental Studies		2	3	25	75	100
	TOTAL			**23**	**-**			**700**

SUMMARY OF CURRICULUM STRUCTURE OF UG PROGRAMMES

Sl. No.	Part	Types of the Courses	No. of Courses	No. of Credits	Marks
1.	I	Language Courses	4	12	400
2.	II	English Courses	4	12	400
3.	III	Core Courses	9	45	900
4.		Core Practical	6	24	600
5.		Allied Courses I & II	4	16	400
6.		Allied Practical	2	4	200
7.		Major Based Elective Courses	2	8	200
8.		Project	1	7	100
9.	IV	Non-Major Elective Courses	2	4	200
10.		Soft Skills Development	1	2	100
11.		Value Education	1	2	100
12.		Environmental Studies	1	2	100
13.	V	Gender Studies	1	2	100
	Total		**40**	**140**	**3800**

PROGRAMME OBJECTIVES:

On complete the course students will be able to:

(i) Demonstrate the range of plant diversity in term of structure function and environmental relationship; (ii) Understand the responsibilities relevant to the biodiversity conservation practices with the help of applying basic knowledge to assess plant diversity and its importance to the society, health, safety and environmental issues; (iii) Understand the role of plants in the functioning of global ecosystem; (iv) Equip the students with subject domain knowledge and technical skills pertaining to plants in a holistic manner; (v) Analyse the plant form by applying fundamental process of plant and knowledge of basic sciences; (vi) They are made aware about social and environmental issues, significance of plants and relevant to the national economy. Understand the issues of environmental contents and sustainable development.

- Understand the importance of biofertilizer and its importance.
- Understand the environmental sustainability goals as a responsible citizen.
- Demonstrate ability and attitude to acquire knowledge and skills in the advancing global scenario to apply them effectively and ethically for professional and social development.
- Utilize scientific knowledge to pursue higher studies in the relevant field.
- Handle ethical issues with social responsibility.
- Communicate effectively and collaborate successfully with peers to become competent professionals.

PROGRAMME OUTCOME:

The students will be able to:

- Able to communicate scientific ideas in writing and orally.
- Understand the impact of plant diversity in societal environment contents and need for sustainable development.
- The students able to understand different branches of Botany.
- They become competent enough in various analytical and technical skills related to plant sciences.
- They develop scientific temperament and research attitude.
- They able to analyse different plant forms and their anatomical and physiological characteristics.

The students become qualified to take up teaching, research work in research institute or industry, entrepreneurship.

First Year **CORE COURSE I** **Semester I**

ALGAE, FUNGI, LICHENS AND BRYOPHYTES
(Theory)

COURSE OBJECTIVES:

- To relate the skill and methods in thallophytes and non-flowering plant groups.
- To employ knowledge in Understanding the structural and functional diversity of Lower group of plants.
- To organize for collection and examination of lower group of plants from various environment.
- Justify the concept of lichens and bryophytes as indicator for water and air pollution.
- To know about Bryophytes.

UNIT – I ALGAE:

Introduction and general account of Algae, Classification (F. E, Fritsch 1945) Criteria used for algal classification, Range of thallus. Reproductive diversity and Life cycle patterns of Algae. Economic importance of Algae.

UNIT – II ALGAE:

Structure, reproduction and life cycle of the following: cyanophyceae- Oscillatoria, Chlorophyceae - *Chlorella*, *Xanthophyceae - Botrydium, Bacillariophyceae -Navicula, Phaeophyceae - Ectocarpus, Rhodophyeae - Polysiphonia.*

UNIT – III FUNGI:

General characters of fungi, classification of fungi Alexopolous and Mims (1979). Economic importance of fungi, fossil fungi. Characteristics features, thallus organization, reproduction and life cycle of the following: Myxomycotina-*Stemonitis,* Mastigomycotina - *Pythium,* Zygomycotina-*Pilobolus* Ascomycotina-*Penicillium*, Basidiomycotina-*Puccinia,* Dueteromycotina-*Fusarium.*

UNIT – IV LICHENS:

General characters of lichens and its symbionts, classification and distribution, thallus structure and reproduction. Economic importance and ecological role of Lichens. A detailed study of *Usnea.*

UNIT – V BRYOPHYTES:

Bryophytes, General characters, distribution and classification of Bryophytes (Rothmalar, 1955), Structure, reproduction and life cycle of major group – *Marchantiales - Riccia, Anthocerotales- Anthoceros* and *Polytrichales- Polytrichum*. Ecological and economic importance of Bryophytes.

UNIT – VI CURRENT CONTOURS (For Continuous Internal Assessment Only):

Current developments related to the Algae, Fungi, Lichens and Bryophytes during the semester concerned to be kept abreast of continuously and cumulatively through collection, discussion and evaluation from news and events over the world collected through multiple reliable informative sources – Research articles, review materials, print, Internet, Interaction, Social media, Webinars and so on.

REFERENCES:

1. Fritsch F.E.1945, structure and reproduction of algae, Cambridge University press.
2. Chapman, V. J and Chapman, D.J.1975.The Algae, Macmillan India Ltd, Delhi
3. Hale, M.E (Jr) 1983, The Biology of Lichens Edward Arnold Mayland.
4. Bold, H.C & wynne, M.J.1985, Introduction to the algae, prentice Hall of India, New Delhi
5. Sharma, O.P 1998 Text book Algae, Tata McGraw Hil, New Delhi
6. Webster, J and weber, R.W.S. 2007, Introduction to fungi Cambridge University press, New York
7. Lee, R.E.2008, phycology Cambridge University press, New York
8. Nash, T.H.2008, Lichen Biology, Cambridge University press
9. Dr.manoj Kumar Sharma ,Algae, Fungi and Bryophytes
10. Dr G M rane ,Dr P S Baviskar , prof C D Patil Microbial Diversity Algea and Fungi kavayitri bahinabai chaudhari north Maharashtra university
11. Round F.E. 1984, The ecology of Algae, Cambridge University press
12. Reborts, P. Evans, S. 2014 The book of fungi, A life size guide to six hundred specials from around the world, University of Chicago press.
13. watkinson. S.C., Boddy, L and Money, N 2016. The fungi Elsevier, London
14. https://www.britannica.com/science/algae
15. https://www.kngac.ac.in/elearning-portal/ec/admin/contents/2_18K1B01_2020120403315034.pdf
16. https://www.biologydiscussion.com/algae/cyanophyceae-characteristics-occurrence-and-classification/46739
17. https://www.biologydiscussion.com/fungi/classification-of-fungi-by-various-botanists/46471

COURSE OUTCOMES:

- Relate the morphology structure of Algae, Fungi, bryophytes and Lichens.
- Apply the practical knowledge to understanding the diversity of plant forms.
- Examine the importance of structural diversity in the evolution of plant forms.
- State the ecological and economic importance of Algae, Fungi, lichen and bryophytes.
- Compare the structural organization of gametophytes and sporophytes in different classes of bryophytes.

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First Year **CORE PRACTICAL I** **Semester I**

ALGAE, FUNGI, LICHENS AND BRYOPHYTES

(Practical)

COURSE OBJECTIVES:

- To characterize the life cycle patterns of major groups of plants.
- To learn about the practical knowledge on algae.
- To know about the fungi.
- To study about the Parmelia and usnea.
- To gain a knowledge on Bryophytes.

Type study and Micro slide preparation of the following:

Algae:

Cyanophyceae - *Oscillatoria*
Chlorophyceae - *Chlorella*
Xanthophyceae - *Botrydium*
Bacillariophyceae -*Navicula*
Phacephyceae - *Ectocarpus*
Rhodophyceae - P*olysiphonia*.

Fungi:

Myxomycotina – *Stemonitis*
Mastigomycotina – *Pythium*
Zygomycotina - *Pilobolus*
Ascomycotina - *Penicillium*
Basidiomycotina – *Puccinia*
Dueteromycotina – *Fusarium*

Lichens:

Usnea

Bryophytes:

Marchantiales
Anthocerotales
Polytrichales

REFERENCES:

1. Biswas C. and Johri B. M. (1997). Gymnosperms. Narosa Publishers, NewDelhi.
2. Parihar, N.S. (1976). Biology and morphology of the Pteridophytes Central BookDepot.

3. Sporne, K.R. (1986). The morphology of Pteridophytes. Hutchinson University Press. London.
4. Smith, G. M. (1995). The fresh water Algae of the United States, Mc-Graw Hill, New York.
5. Waston E. V. (1971). Structure and life of Bryophytes 3rd Hutchinson University Library London.
6. Vashishta B.R. (1988). Algae. S. Chand & Co., New Delhi.
7. https://www.bdu.ac.in/cde/SLM/B.Sc.%20Botany/I%20Year/B.Sc.Botany_Alagi%2CFungi%20%26%20Plant%20Protection%20%28Practical%29_I-Year_SPS.pdf
8. https://gurunanakcollege.edu.in/files/science/algae-bryophytes-gungi-plant-pathology-and-lichens.pdf

COURSE OUTCOMES:

- Learn about the structure, methods and reproduction of Algae
- Know about the economic importance of algae, fungi and lichens.
- Microscopic observation and identification of algae, fungi, lichens and bryophytes.
- Know about the structure, life history and Economic importance of Gymnosperms.
- Make use of practical knowledge to comprehend the variety of plant types.

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First Year **CORE COURSE II** **Semester II**

MICROBIOLOGY, PLANT PATHOLOGY AND PLANT PROTECTION (Theory)

COURSE OBJECTIVES:

- To evaluate the structure, reproduction, culture and economic importance of bacteria
- To evaluate the structure, reproduction, culture and economic importance of virus
- To know about the factors responsible for the plant diseases
- To collect knowledge on the pathogens causing diseases in plants.
- To relate the plant protection methods.

UNIT – I BACTERIOLOGY:

Bacteria – Discovery, general characteristics and cell structure; nutritional types of bacteria – sexual and asexual Reproduction. Sterilization techniques, bacterial culture and staining (simple and differential: Gram's and endospore). Economic importance.

UNIT – II VIROLOGY:

Viruses – Discovery, general structure. Symptoms of virus infection in plants; transmission of plant viruses – structure and multiplication of bacteriophages;. Structure and multiplication of virioids. Economic importance.

UNIT – III PLANT PATHOLOGY:

Plant Pathology: History – importance – organisms and causal factors responsible for plant diseases (Biotic and Abiotic). General symptoms, Pathogenesis, Host – pathogen interaction.

UNIT – IV COMMON PLANT DISEASES:

Study of plant diseases – Symptoms, causative organisms, disease cycle and control measures: Cereals: Rice – blast disease; Vegetables: Brinjal – Little leaf; Fruits: Banana – Bacterial leaf blight, *Citrus* –Bacterial canker; Oil seeds: Ground nut – Tikka disease; Sugar yielding: Sugarcane – red rot.

UNIT – V PLANT PROTECTION:

Plant Protection – Scope, importance, equipment used - sprayers – dusters – soil injector – seed dressing drum; seed treatment – soil sterilization. Methods of plant protection. Crop rotation and fertilizer; Mechanical – Field sanitation; Physical – Heat and soil Sterilization; Chemical – Bactericides, Fungicides, Insecticides, Herbicides; Biological – Biological control of pests.

UNIT – VI CURRENT CONTOURS (For Continuous Internal Assessment Only)

Current developments related to the Microbiology, Plant Pathology and Plant protection during the semester concerned to be kept abreast of continuously and cumulatively

through collection, discussion and evaluation from news and events over the world collected through multiple reliable informative sources – Research articles, review materials, print, Internet, Interaction, Social media, Webinars and so on.

REFERENCES:

1. Carpenter, P.L. (1967). Microbiology. Saunders Co., Philadelphia, USA.
2. Stanier, R.Y., Adelberg, E.A. and Ingram, J.L. (1978). General Microbiology Mac Millan & Co., New Delhi.
3. Pelizar, M.J., Chan, E.C.S. and Krieg, N.R. (1993). Microbiology. Tata McGraw Hill Publishing Co. Ltd., New Delhi.
4. Dubey, R.C. and Maheshwari, D.K. (2007). A Textbook of Microbiology. S. Chand and Co. Ltd., New Delhi.
5. Microbiology Third Edition - Richard A. Harvey and Cynthia Nau Cornelissen .
6. Bap Reddy, D. and Joshi, N.C. (1991). Plant Protection in India. Allied Publishers Ltd., New Delhi.
7. Rangaswami, G. and Mahadevan, A. (1998). Diseases of Crop Plants in India. Prentice Hall of India Ltd., New Delhi.
8. Pandey, B.P. (2001). Plant Pathology. S. Chand & Co. Ltd., New Delhi.
9. Mehrotra, R.S. (2003). Plant Pathology. Tata McGraw Hill Publishing Co. Ltd., New Delhi.
10. Text book of Plant Protection First edition - Dr. E. Marimuthu, Dr.K. Muthuchelian, Royal book publishing international.
11. 1.A Clinician's Dictionary of Pathogenic Microorganisms by James H. Jorgensen; Michael A. Pfaller 2004.
12. Abiotic Disorders of Landscape Plants: A Diagnostic Guide. Publication 3420.
13. Diseases of Trees and Shrubs. Comstock Publishing Associates, a division of Cornell University Press. Greenwood, P., Halstead, A., Chase, A. R., and Gilrein, D. 2000.
14. http://whttp://www.apsnet.org/Pages/default.aspx
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18. https://www.britannica.com/science/microbiology
19. https://conductscience.com/introduction-and-importance-of-microbiology/
20. https://biologydictionary.net/microbiology/
21. https://www.researchgate.net/publication/356529627_Plant_Pathology_Introducti on
22. https://www.rvskvv.net/images/I-Year-II-Sem_Principles_Plant-
23. Pathology_ANGRAU_20.04.2020.pdf
24. http://www.ca.uky.edu/agc/pubs/ppa/ppa41/ppa41.pdf

COURSE OUTCOMES:

- Understand the structure, reproduction, culture and economic importance of bacteria
- Understand and the structure, reproduction, culture and economic importance of virus
- Explain the causes of different plant diseases
- Recognize different plant pathogens
- Explain different plant protection methods.

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First Year **CORE PRACTICAL II** **Semester II**

MICROBIOLOGY, PLANT PATHOLOGY AND PLANT PROTECTION (Practical)

COURSE OBJECTIVES:

- To know about the microorganisms.
- To discuss the distinct group of microbes which differ in form and other characters.
- To introduce the subject of Plant Pathology, its concepts and principles.
- To impart training on various methods/techniques/instruments used in the study of plant diseases/pathogens.
- To acquaint with the structure, virus-vector relationship, biology and management of plant viruses.

MICROBIOLOGY, PLANT PATHOLOGY & PLANT PROTECTION:

1. Tools and equipment used in microbiology: Spirit lamp, Inoculation loop, Hot air oven, Autoclave, Laminar air flow, Incubator.
2. Media preparation, Serial dilution techniques and pure culture techniques. Types of Bacteria from temporary / permanent slides / photographs. Simple and differential staining (Gram's, endospore).
3. Identification of various plant protection appliances mentioned in the syllabus and their working mechanism.

REFERENCES:

1. Alexopoulos CJ, Mims CW & Blackwell M. 2000. Introductory Mycology. 5th Ed. John Wiley & Sons, New York.
2. Sarbhoy AK. 2000. Text book of Mycology. ICAR, New Delhi.
3. Agrios GN. 2005. Plant Pathology. 5th Ed. Academic Press, New York.
4. Mehrotra RS & Aggarwal A. 2003. Plant Pathology. 2nd Ed. Oxford & IBH, New Delhi.
5. Hull R. 2002. Mathew s Plant Virology. 4th Ed. Academic Press, New York.
6. Jayaraman J & Verma JP. 2002. Fundamentals of Plant Bacteriology. Kalyani Publ., Ludhiana.
7. https://uou.ac.in/sites/default/files/slm/BSCBO-101.pdf
8. https://www.ubkv.ac.in/wp-content/uploads/2014/03/PG-Syllabus_PLANT-PATHOLOGY.pdf

COURSE OUTCOMES:

- Study about the symptoms caused by viruses, transmission, assay of viruses, physical properties and purification.
- Detailed study of symptoms of important diseases of above mentioned crops.
- Collection and dry preservation of diseased specimens of important crops.
- Microscopic study of important pathogens.
- Acquaintance with formulation of different fungicides and plant protection appliances.

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