



(Bachelor of Sciences) (BOTANY)  
(B.Sc.) (Botany) Semester III

Course Code	<b>US03CBOT51 (T)</b>	Title of the Course	<b>PHYCOLOGY, MYCOLOGY AND PHYTOPATHOLOGY</b>
Total Credits of the Course	04	Hours per Week	04

Course Objectives:	<ol style="list-style-type: none"><li>1. To make acquainted with the basic characteristic features of lower group of plants such as Algae and Fungi with suitable examples of each sub categories.</li><li>2. To give exposure for applied role and importance of such lower groups of plants.</li><li>3. To make aware for various plant pathological features of our important agricultural crops.</li></ol>
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Course Content		
Unit	Description	Weightage* (%)
1.	<p><b>Phycology: General characteristics</b> of Cyanophyta, Xanthophyta, Chlorophyta, Charophyta, Phaeophyta and Rhodophyta. <b>Type study:</b> <i>Nostoc, Vaucheria, Chlamydomonas, Chara, Ectocarpus</i> and <i>Polysiphonia</i>. (Classification (as per G. M. Smith), Occurrence, Morphology, thallus organization, Cell structure, Reproduction and life-cycle). Significant contributions of renowned Phycologists (F.E. Fritsch, G.M. Smith, R.N. Singh, T.V. Desikachary, H.D. Kumar, M.O.P. Iyengar). <b>Role of algae</b> in the environment, agriculture, biotechnology and industry.</p>	25%
2.	<p><b>Introduction to true fungi</b> General characteristics; Affinities with plants and animals; <b>Mycology: General Characteristic</b> features of Chytridiomycota, Oomycota, Zygomycota, Ascomycota, Basidiomycota. <b>Type study:</b> <i>Synchytrium, Phytophthora, Albugo, Aspergillus, Neurospora, Agaricus, Alternaria</i>. (Classification (as per G. C. Ainsworth, 1973), Occurrence, Morphology, thallus organization, Cell structure, Reproduction and life-cycle).</p>	25%
3.	<p><b>Symbiotic association and Applied mycology:</b> Symbiotic associations: Lichen - Occurrence; General characteristics; Growth forms and range of thallus organization; Nature of associations of algal and fungal partners; Reproduction. Symbiotic associations: Mycorrhiza - Ectomycorrhiza, Endomycorrhiza and their significance. <b>Applied Mycology:</b> Role of fungi in biotechnology; Application of</p>	25%





	fungi in food industry (Flavour & texture, Fermentation, Baking, Organic acids, Enzymes); Secondary metabolites	
4.	<p><b>Phytopathology:</b>  <b>Major Plant Diseases:</b> Differentiation between bacterial, viral and fungal diseases using morphological symptoms.  Study of the following diseases (symptoms, causal organism, disease cycle and disease control).  <b>Bacterial diseases</b> – Citrus Canker, Angular leaf spot of cotton.  <b>Viral diseases</b> -Leaf curl of papaya, Yellow vein mosaic in bhindi.  <b>Fungal diseases</b>- White rust of crucifers, Red rot of sugarcane, Tikka disease of groundnut, and Stripe rust of wheat.  <b>Phytoplasma diseases:</b> Little leaf of brinjal.  Significant contributions of Prof.Karam Chand Mehta.</p>	25%

Teaching-Learning Methodology	<p>Classroom interactions  Multimedia presentation  Chart/model presentation  Live /preserved specimen observation  Student seminar and unit test, quiz etc  Question bank circulation  Student’s assignments  Student counselling for any problem of subject understanding  Student-Teacher interaction on social media platform for any query (MS team, Google classroom, email, etc)</p>
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Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written / Practical Examination (As per CBCS R.6.8.3)	15%
2.	Internal Continuous Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments, Attendance (As per CBCS R.6.8.3)	15%
3.	University Examination	70%

Course Outcomes: Having completed this course, the learner will be able to	
1.	Identify true fungi and demonstrate the principles and application of plant pathology in the control of plant disease.
2.	Demonstrate skills in laboratory, field and glasshouse work related to mycology and plant pathology





3.	Develop an understanding of microbes, fungi and lichens and appreciate their adaptive strategies
4.	Identify the common plant diseases according to geographical locations and device control measures

Suggested References:

Sr. No.	References
1.	A TEXT BOOK OF BOTANY, SINGH, PANDE AND JAIN
2.	Agrios, G.N. (1997) Plant Pathology, 4th edition, Academic Press, U.K.
3.	Alexopoulos, C.J., Mims, C.W., Blackwell, M. (1996).
4.	R.S. Mehrotra, Plant Pathology
5.	B. R. Vashistha, Fungi
6.	Gangulee and Kar, College Botany Vol 2
7.	John Wiley & Sons, Introductory Mycology, (Asia) Singapore. 4th edition.
8.	Sethi, I.K. and Walia, S.K. (2011). Text book of Fungi and Their Allies, Macmillan Publishers India Ltd.
9.	Sharma, P.D. (2011). Plant Pathology, Rastogi Publication, Meerut, India. Kumar, H.D. (1999).
10.	Singh R. S. Plant Pathology
11.	Webster, J. and Weber, R. (2007). Introduction to Fungi, Cambridge University Press, Cambridge. 3rd edition.

On-line resources to be used if available as reference material

<https://www.biologydiscussion.com/biologyarticles>

<https://nlist.inflibnet.ac.in/> e books/e-journals

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(Bachelor of Sciences) (Botany)  
(B.Sc.) (Botany) Semester (III)

Course Code	US03CBOT52(T)	Title of the Course	GENETICS AND BIOINFORMATICS
Total Credits of the Course	04	Hours per Week	04

Course Objectives:	<ol style="list-style-type: none"><li>1. To learn life cycles of genetically important organisms</li><li>2. To know about mendelism and its extension</li><li>3. To have an idea about linkage, crossing over and Cytoplasmic inheritance</li><li>4. A student completing shall be able to apply: knowledge and awareness of the basic principles and concepts of biology, computer science and mathematics. existing software effectively to extract information from large databases and to use this information in computer modelling</li></ol>
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Course Content		
Unit	Description	Weightage* (%)
1.	<b>Genetics:</b> Introduction: Definition, scope, branches and application of genetics, selection of genetic material, Profiles of some geneticists and molecular biologists, Life cycle of some genetically important organisms like Bacteriophage, E. Coli, Yeast, Neurospora, Chlamydomonas, Maize and Arabidopsis.	25%
2.	<b>Mendelian genetics and its extension</b> Mendelism: History; Principles of inheritance; Chromosome theory of inheritance; Autosomes and sex chromosomes; Incomplete dominance and codominance; Multiple alleles, Lethal alleles, Epistasis, Pleiotropy, Recessive and Dominant traits, Penetrance and Expressivity, Polygenic inheritance.	25%
3.	Genetics: Linkage-Definition, History, Kinds, Linkage groups and significance. Crossing Over-Definition, Types, Mechanism, Kinds and significance. Maternal effects and cytoplasmic inheritance: Maternal effects in snails, Streptomycin resistance in Chlamydomonas, mitochondrial mutations in yeast, Kappa particles in <i>Paramecium</i> , plastid inheritance in <i>Mirabilis jalapa</i> , male sterility in plants.	25%
4.	<b>Introduction to Bioinformatics:</b> <b>Introduction:</b> What is bioinformatics? Definition, A multidisciplinary approach, Branches of Bioinformatics, History, Aim, Scope and Research areas of Bioinformatics, applications of bioinformatics. Bioinformatics in India-the flourishing approach.	25%





	<b>Databases in Bioinformatics:</b> Introduction, Biological Databases, Classification, format of Biological Databases, Biological Database Retrieval System.	
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<b>Teaching-Learning Methodology</b>	Classroom interactions Multimedia presentation Chart/model presentation Live /preserved specimen observation Student seminar and unit test, quiz etc Question bank circulation Students' assignments Student counselling for any problem of subject understanding Student-Teacher interaction on social media platform for any query (MS team, Google classroom, email, etc)
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Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written / Practical Examination (As per CBCS R.6.8.3)	15%
2.	Internal Continuous Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments, Attendance (As per CBCS R.6.8.3)	15%
3.	University Examination	70%

Course Outcomes: Having completed this course, the learner will be able to	
1.	Have conceptual understanding of laws of inheritance, genetic basis of loci and alleles and their linkage.
2.	Develop critical understanding of chemical basis of genes and their interactions at population and evolutionary levels.
3.	Basic concept and life cycle of genetically important organisms.
4.	Learn about Introductory Bioinformatics and its databases.

Suggested References:	
Sr. No.	References





1.	Klug, W.S., Cummings, M.R., Spencer, C.A. (2009). Concepts of Genetics. Benjamin Cummings, U.S.A. 9th edition.
2.	Verma and Agarwal, 9th edition GENETICS
3.	Gardner, E.J., Simmons, M.J., Snustad, D.P. (1991). Principles of Genetics, John Wiley & sons, India. 8th edition
4.	Watson J. D., Baker, T. A., Bell, S. P., Gann, A., Levine, M., Losick, R. (2007). Molecular Biology of the Gene, Pearson Benjamin Cummings, CSHL Press, New York, U.S.A. 6th edition.
5.	Sharma, Munjal and Shankar, A Text book of Bioinformatics (Rastogi publication)

On-line resources to be used if available as reference material

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<https://nlist.inflibnet.ac.in/> e books/e-journals

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**(Bachelor of Sciences) (Botany)**  
**(B.Sc.) (Botany) Semester (III)**

Course Code	<b>US03CBOT53 (P)</b>	Title of the Course	<b>BOTANY PRACTICAL</b>
Total Credits of the Course	<b>04</b>	Hours per Week	<b>08</b>

Course Objectives:	<ol style="list-style-type: none"> <li>1. To get hands on training to use various botany laboratory equipment.</li> <li>2. To do experiment as per the given syllabus through fresh/preserved specimen/slides/models/charts etc</li> </ol>
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<b>Course content [equal Weightage (%) for each practical]</b>	
No.	AIM
<b>SECTION-I CREDIT-2 PRACTICAL-4 HOUR</b>	
1.	Study of <i>Nostoc</i> and <i>Vaucheria</i> (Classification, Thallus morphology, reproduction through mounting or permanent slides/charts/photographs).
2.	Study of <i>Chlamydomonas</i> and <i>Chara</i> (Classification, Thallus morphology, reproduction through mounting or permanent slides/charts/photographs).
3.	Study of <i>Ectocarpus</i> and <i>Polysiphonia</i> (Classification, Thallus morphology, reproduction through mounting or permanent slides/charts/photographs).
4.	Study of <i>Synchytrium</i> , <i>Aspergillus</i> and <i>Neurospora</i> , <i>Alternaria</i> . Classification, Thallus morphology, and reproduction (through mounting/permanent slides/charts/photographs).
5.	Study of types of Lichens. (through specimen/ charts/slides)
6.	Nucleic acid and protein databases.
7.	Sequence retrieval from databases.
8.	Sequence alignment.
9.	Field visit.
<b>SECTION-II CREDIT-2 PRACTICAL-4 HOUR</b>	
1.	Study of white rust of crucifers (specimen showing symptoms on plant parts, causal organisms through sectioning and or permanent slides/charts/photographs).
2.	Study of early blight of potato (specimen showing symptoms on plant parts, causal organisms through sectioning and or permanent slides/charts/photographs).
3.	Study of late blight of potato (specimen showing symptoms on plant parts, causal organisms through sectioning and or permanent slides/charts/photographs)
4.	Study of Rust of wheat (specimen showing symptoms on plant parts, causal organisms through sectioning and or permanent slides/charts/photographs).
5.	Study of Tikka disease of ground nut (specimen showing symptoms on plant parts, causal organisms through sectioning and or permanent slides/charts/photographs).
6.	Preparation of potato dextrose culture medium and slants and To enumerate the steps involved for Culturing of fungi.
7.	Meiosis through temporary squash preparation/permanent slides/photographs.
8.	Mendel's laws through seed ratios. Laboratory exercises in probability and chi-square.
9.	To study life cycle of genetically important organisms as per syllabus
10.	Submission of disease specimens.
11.	Field activity related to syllabus.





Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	University Examination	100%

Course Outcomes: Having completed this course, the learner in the laboratory course, will be able to

1.	Gain hands-on experience of using various optical instruments and making temporary mountings.
2.	Identifying various pathogens for plant diseases.
3.	Study the characteristics of algae, fungi and lichens.
4.	Study the characteristics of some selected plant families and their economic role through specimens/charts/field specimens.
5.	Carried out field visits to explore ecological understanding and learn range of biodiversity.

Suggested References:

Sr. No.	References
1.	Practical botany Vol 1 and 2 Ashok KumarBendre

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