

# B. Sc. 1<sup>st</sup> (Botany)

## FOUR YEAR UNDERGRADUATE PROGRAM (NEP-2020) Program: Bachelor in Life Science (2024 -28) DISCIPLINE -- BOTANY Session - 2024 -25

DSC -01 to 08		DSE -01 to 12	
Code	Title	Code	Title
BOSC -01T	Elementary Botany	BOSE -01T	Natural resources and management
BOSC -01P	Lab. Course -01 (Elementary Botany)	BOSE -01P	Lab. Course -01 (Natural resources and management)
BOSC -02T	Microbes and Thallophyta	BOSE -02T	Microbiology and Phytopathology
BOSC -02P	Lab. Course -02 (Microbes and Thallophyta)	BOSE -02P	Lab. Course -02 (Microbiology and Phytopathology)
BOSC -03T	Archegoniate and Fossils	BOSE -03T	Phytopaleontology and Evolutionary Botany
BOSC -03P	Lab. Course-03 (Archegoniate and Fossils)	BOSE -03P	Lab. Course -03 (Phytopaleontology and Evolutionary Botany)
BOSC -04T	Angiosperms	BOSE -04T	Ethnobotany and Medicinal plants
BOSC -04P	Lab. Course -04 (Angiosperms)	BOSE -04P	Lab. Course-04 (Ethnobotany & Medicinal plants)
BOSC -05T	Cytology and Genetics	BOSE -05T	Biosystematics and Biodiversity
BOSC -05P	Lab. Course -05 (Cytology and Genetics)	BOSE -05P	Lab. Course -05 (Biosystematics and Biodiversity)
BOSC -06T	Plant Physiology and Economic Botany	BOSE -06T	Plant breeding and Seed technology
BOSC -06P	Lab. Course -06 (Plant Physiology and Economic Botany)	BOSE -06P	Lab. Course -06 (Plant breeding and Seed technology)
BOSC -07T	Ecology and Phytogeography	BOSE -07T	Instrumentation and biochemical technology
BOSC -07P	Lab. Course -07 (Ecology and Phytogeography)	BOSE -07P	Lab. Course -07 (Instrumentation and biochemical technology)
BOSC -08T	Molecular biology and Biostatistics	BOSE -08T	Growth and Stress Physiology
BOSC -08P	Lab. Course-08 (Molecular biology and Biostatistics)	BOSE -08P	Lab. Course -08 (Growth and Stress Physiology)
		BOSE -09T	Plant biotechnology and crop improvement
		BOSE -09P	Lab. Course -09 (Plant biotechnology and crop improvement)
		BOSE -10T	Applied Botany and Intellectual property right (IPR)
		BOSE -10P	Lab. Course -10 (Applied Botany and IPR)
		BOSE -11T	Biochemistry and Enzymology
		BOSE -11P	Lab. Course -11 (Biochemistry and Enzymology)
		BOSE -12T	Bioinformatics and Gene Technology
		BOSE -12P	Lab. Course-12 (Bioinformatics & Gene Technology)
<b>GE -01 &amp; 02</b>		<b>VAC</b>	
BOGE -01T	Elementary Botany	BOVAC-01	Herbal Plant & Human Health
BOGE -01P	Lab. Course -01 (Elementary Botany)		<b>SEC</b>
BOGE -02T	Microbes and Thallophyta	BOSEC-01	Gardening and Floriculture
BOGE -02P	Lab. Course -02 (Microbes and Thallophyta)		

### Program Outcomes (PO):

1. Demonstrate and apply the fundamental knowledge of the basic principles of major fields of biology
2. Apply knowledge to solve the issues related to plant sciences with the help of computer technology
3. Apply knowledge for conservation of endemic and endangered plant species

### Program Specific Outcomes (PSO):

1. Collaborate effectively on team-oriented projects in the field of life sciences.
2. Communicate scientific information in a clear and concise manner both orally and in writing
3. Explain Biodiversity, climate change and plant pathology.
4. Apply Biotechnology, Ecology, Genetics and Plant breeding techniques in plant sciences
5. Apply knowledge of Medicinal and Economic botany in day to day life.
6. Apply the knowledge to develop the sustainable and eco-friendly technology.

1. Principles of Botany  
2. Microbiology  
3. Medicinal  
4. Herbal  
5. Plant

6. Plant  
7. Plant  
8. Plant  
9. Plant  
10. Plant

**FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)**  
**DEPARTMENT OF BOTANY**  
**COURSE CURRICULUM**

<b>PART- A: Introduction</b>		
Program: Bachelor in Life Sciences (Certificate / Diploma / Degree/Honors)		Semester - I
Session: 2024-2025		
1	Course Code	BOSC -01 T
2	Course Title	Elementary Botany
3	Course Type	Discipline Specific course (DSC)
4	Pre-requisite (if, any)	As per program
5	Course Learning Outcomes (CLO)	At the end of this course, the students will be able to > Understand the Basics of Botany and its branches. > Get acquainted with complex interrelationship between organisms and environment. > Develop a comprehensive understanding of the identification, cultivation, and processing of medicinal plants, and their chemical constituents. > Utilize plants resources for livelihood.
6	Credit Value	3 Credits      Credit = 15 Hours - learning & Observation
7	Total Marks	Max. Marks: 100      Min Passing Marks: 40

**PART -B: Content of the Course**

Total No. of Teaching-learning Periods (01 Hr. per period) - 45 Periods (45 Hours)

Unit	Topics (Course contents)	No. of Period
I	<b>Basics of Plant Science:</b> Differences and resemblances between; living and nonliving plants and animals, plant and animal cell. Concept of prokaryotes and eukaryotes. Important features of thallophyta, Bryophyta, Pteridophyta, Gymnosperm and Angiosperm. Structure and function of a typical flowering plant.	12
✓ II	<b>Branches of botany:</b> General idea, features, and significance; Anatomy, Cytology, Economic Botany, Ethnobotany, Forestry, Genetics, Histology, Microbiology, Palaeobotany, Phytochemistry, Phytopathology, Plant biotechnology, Plant breeding, Plant ecology, Plant morphology, Plant physiology, Plant Taxonomy, etc.	11
III	<b>Plants for human welfare:</b> Plant Resources for Rural livelihood – Mahua, Tendu patla, Bamboo and Firewood. Ethnobotany in India: Methods to study Ethnobotany, Applications of Ethnobotany, ethnomedicinal plants and ethnoecology. Application of plant products for certain diseases- Cough and cold, Jaundice, Infertility, Diabetes, Blood pressure and Skin diseases.	11
✓ IV	<b>Ancient Indian Botany:</b> Indigenous Medicinal Sciences; Definition and Scope-Ayurveda; History, origin, panchamahabhutas, saptadhatu and tridosha concepts, Rasayana, plants used in ayurvedic treatments, Siddha: Origin of Siddha medicinal systems, Basis of Siddha system, plants used in Siddha medicine. Unani: history, concept. Charaksamhita. Ancient and modern Botanists and their contributions. -Charak, Jagdish Chandra Bose, B.P.Pal, Desikachary, K.C. Mehta M.S. Swaminathan etc.	11
Keywords	Prokaryotes, Ethnobotany, Taxonomy, Ayurveda	

Signature of Convener & Members (CBoS) :

*Blawan*  
*Pravesh*  
*Sh. Tan*  
*Ms*  
*Madhu*  
*Sh. Tan*  
*Sh. Tan*  
*Sh. Tan*  
*Sh. Tan*

## PART-C: Learning Resources

### Text Books, Reference Books and Others

#### Text Books Recommended -

1. College Botany Ganguli Kar and dutta , HIMALAYA Publishers
2. "Handbook of Medicinal Plants" by L.D. Kapoor
3. "Indian Medicinal Plants: An Illustrated Dictionary" by C.P. Khare
4. "Medicinal Plants in India: Conservation and Sustainable Utilization in the Emerging Global Scenario" edited by V.K. Gupta
5. "A Compendium of Medicinal Plants in India: An Introduction to Ayurveda" by S.L. Kochhar
6. A handbook of forest utilization by T. Mehta
7. Plants and human welfare by O.P.Sharma

#### Reference Books Recommended -

1. Charak Samhita
2. Medicinal Plants of India" by C.P. Khare

#### Online Resources-

- e-books and e-learning portals
- [www.swayam.ac.in](http://www.swayam.ac.in)
- [www.ignou.ac.in](http://www.ignou.ac.in)
- [www.egvankosh.ac.in](http://www.egvankosh.ac.in)
- [www.iitm.ac.in](http://www.iitm.ac.in)
- [www.eskillindia.org](http://www.eskillindia.org)
- [www.eshiksha.mp.gov.in](http://www.eshiksha.mp.gov.in)
- [www.vlab.co.in](http://www.vlab.co.in)
- [www.internshala.com](http://www.internshala.com)
- [www.ndl.iitkgp.ac.in](http://www.ndl.iitkgp.ac.in)

#### Online Resources-

#### e-Resources / e-books and e-learning portals

- <https://extension.oregonstate.edu/collection/botany-basics>
- <https://www.pbs.org/video/botany-basics-iiu2bl/>
- <https://efaidnbmnnnibpcajpcglclefindmkaj/https://www2.ca.uky.edu/agcomm/pubs/ho/ho96/ho96.pdf>
- <https://www.botanytoday.com/branches-of-botany/>
- <https://efaidnbmnnnibpcajpcglclefindmkaj/https://www.unanijournal.com/articles/9473-11-206.pdf>
- [https://efaidnbmnnnibpcajpcglclefindmkaj/https://wgbis.ces.iisc.ac.in/biodiversity/sahvadi/documents/botany\\_history.pdf](https://efaidnbmnnnibpcajpcglclefindmkaj/https://wgbis.ces.iisc.ac.in/biodiversity/sahvadi/documents/botany_history.pdf)
- <https://vedpuran.files.wordpress.com/2016/07/charaksamhitaatrivedajigupt-vol-1.pdf>
- <https://egvankosh.ac.in/handle/123456789/89429>

## PART -D: Assessment and Evaluation

### Suggested Continuous Evaluation Methods:

Maximum Marks: 100 Marks

Continuous Internal Assessment (CIA): 30 Marks

End Semester Exam (ESE): 70 Marks

Continuous Internal Assessment (CIA): 30  
(By Course Teacher)

Internal Test / Quiz-(2): 20 +20  
Assignment / Seminar - 10  
Total Marks - 30

Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against 30 Marks

End Semester Exam (ESE): 70

Two section - A & B  
Section A: Q1. Objective - 10 x1= 10 Mark; Q2. Short answer type- 5x4 =20 Marks  
Section B: Descriptive answer type qts., 1out of 2 from each unit-4x10=40 Marks

Name and Signature of Convener & Members of CBoS:

*Handwritten signatures and initials:*  
⑦ [Signature]  
⑧ [Signature]  
⑨ [Signature]  
⑩ [Signature]



**FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)**  
**DEPARTMENT OF BOTANY**  
**COURSE CURRICULUM**

<b>PART- A: Introduction</b>			
Program: Bachelor in Life Sciences (Certificate / Diploma / Degree/ Honors)		Semester - I	Session: 2024-2025
1	Course Code	BOSC -01	
2	Course Title	Lab. Course -01 (Elementary Botany)	
3	Course Type	Laboratory course	
4	Pre-requisite (if, any)	As per program	
5	Course Learning Outcomes (CLO)	At the end of this course, the students will be able to > Understand structure of plant cell, prokaryotic cell and eukaryotic cell. > Identify pteridophytes of college campus. > Learn about the different types of plant tissues. > Learn about Ayurvedic system of medicine.	
6	Credit Value	1 Credits	Credit =30 Hours Laboratory or Field learning/Training
7	Total Marks	Max. Marks: 50	Min Passing Marks: 20

<b>PART -B: Content of the Course</b>		
Total No. of learning-Training/performance Periods: 30 Periods (30 Hours)		
Module	Topics (Course contents)	No. of Period
Lab./Field Training/ Experiment Contents of Course	<ol style="list-style-type: none"> <li>1. Microscopic study of plant cell.</li> <li>2. Microscopic study of prokaryotic (Bacteria) and eukaryotic cell (algae and fungi).</li> <li>3. Study of thallus structure of <i>Riccia</i> and <i>Marchantia</i>.</li> <li>4. Identification of different plants growing in college campus.</li> <li>5. Study of a typical flowering plant and it's parts.</li> <li>6. Study of internal structure of root and stem.</li> <li>7. Study of parenchyma, collenchyma and sclerenchyma.</li> <li>8. Study of medicinal plants of college campus.</li> <li>9. Study of plants used to cure cough and cold, jaundice and skin diseases.</li> <li>10. Visit to any local ayurvedic hospital / practitioner to understand Ayurveda.</li> </ol>	30
Keywords	Prokaryotic, Parenchyma, Jaundice, Ayurveda.	

Signature of Convener & Members (CBoS) :

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*R. Sivan*  
*Arundh*  
*Shalin*  
*As*  
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 8) *Arundh*  
 9) *Arundh*  
 10) *Arundh*

## PART-C: Learning Resources

Text Books, Reference Books and Others

*Text Books Recommended –*

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1. College Botany Ganguli Kar and dutta , HIMALAYA Publishers
2. "Handbook of Medicinal Plants" by L.D. Kapoor
3. "Indian Medicinal Plants: An Illustrated Dictionary" by C.P. Khare
4. "Medicinal Plants in India: Conservation and Sustainable Utilization in the Emerging Global Scenario" edited by V.K. Gupta
5. "A Compendium of Medicinal Plants in India: An Introduction to Ayurveda" by S.L. Kochhar
6. A handbook of forest utilization by T. Mehta
7. Plants and human welfare by O.P.Sharma

*Reference Books Recommended –*

1. Charak Samhita
2. Medicinal Plants of India" by C.P. Khare

*Online Resources–*

- e-Resources / e-books and e-learning portals
- [www.swayam.ac.in](http://www.swayam.ac.in)
- [www.ignou.ac.in](http://www.ignou.ac.in)
- [www.egyankosh.ac.in](http://www.egyankosh.ac.in)
- [www.iitm.ac.in](http://www.iitm.ac.in)
- [www.eskillindia.org](http://www.eskillindia.org)
- [www.eshiksha.mp.gov.in](http://www.eshiksha.mp.gov.in)
- [www.vlab.co.in](http://www.vlab.co.in)
- [www.internshala.com](http://www.internshala.com)
- [www.ndl.iitkgp.ac.in](http://www.ndl.iitkgp.ac.in)

*Online Resources–*

- e-Resources / e-books and e-learning portals
- <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5871155/>
- <https://cms.botanv.org/home/careers-jobs/careers-in-botanv/areas-of-specialization-in-botanv.html>

## PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks: 50 Marks

Continuous Internal Assessment (CIA): 15 Marks

End Semester Exam (ESE): 35 Marks

Continuous Internal Assessment (CIA): 15 (By Course Teacher)	Internal Test / Quiz-(2): 10 & 10	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against 15 Marks
	Assignment/Seminar +Attendance - 05	
	Total Marks - 15	

End Semester Exam (ESE): 35

Laboratory / Field Skill Performance: On spot Assessment		Managed by Course teacher as per lab. status
A. Performed the Task based on lab. work	- 20 Marks	
B. Spotting based on tools & technology (written) – 10 Marks		
C. Viva-voce (based on principle/technology)	- 05 Marks	

Name and Signature of Convener & Members of CBoS:

*[Handwritten signatures]*

⑧ *[Signature]*  
⑨ *[Signature]*  
⑩ *[Signature]*

**FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)**  
**DEPARTMENT OF BOTANY**  
**COURSE CURRICULUM**

**PART- A: Introduction**

Program: Bachelor in Life Sciences (Certificate / Diploma / Degree/Honors)		Semester - II	Session: 2024-2025
1	Course Code	BOSC -02 T	
2	Course Title	Microbes and Thallophyta	
3	Course Type	Discipline Specific course (DSC)	
4	Pre-requisite (if, any)	As per program	
5	Course Learning Outcomes (CLO)	At the end of this course, the students will be able to 1. Understand about the Microbes and their Importance. 2. Identify edible mushrooms and learn cultivation techniques. 3. Learn about bio-fertilizers and their uses. 4. Understand life cycles of different algae and fungi.	
6	Credit Value	3 Credits	Credit = 15 Hours - learning & Observation
7	Total Marks	Max. Marks: 100	Min Passing Marks: 40

**PART -B: Content of the Course**

Total No. of Teaching-learning Periods (01 Hr. per period) - 45 Periods (45 Hours)

Unit	Topics (Course contents)	No. of Period
I	<b>Viruses:</b> - general characteristics, nature, structure and nomenclature, Bacteriophages and TMV; Lytic and Lysogenic cycles, transmission and replication of viruses, Symptoms of viral diseases on plants, important plant diseases, viroid, prions. <b>Actinomycetes:</b> general characteristics, Structure, reproduction and economic importance. <b>Mycoplasma, Phytoplasma:</b> general characteristics, structure, reproduction and their economic uses.	12
II	<b>Bacteria:</b> History, general character, classification and morphology, Gram positive and Gram-negative bacteria, structure of bacteria shape, size flagella and ultra structure of bacterial cell; Bacterial Growth curve, factors affecting growth of microbes; sporulation, reproduction, recombination in bacteria- Transformation Conjugation and Transduction, and Economic importance. <b>Cyanobacteria:</b> General characteristics, morphology, Heterocyst, cell structure of Cyanobacteria, reproduction and economic importance of Bacteria.	11
III	<b>Phycology:</b> General characteristic features of Algae. Algae in diversified habitat, Salient features, occurrence, classification and range of thallus organization. Prominent pigments found in Algae. Reproduction classification, general character and life cycle of -Volvox, Oedogonium, Chara, Vaucheria, Ectocarpus and Polysiphonia. Economic importance of algae - Role of algae in soil fertility, algae as biofertilizer, blue green algae and nitrogen fixation. Symbiosis; algal products - Agar, biofuel	11
IV	<b>Mycology, Mushroom Cultivation, Lichenology &amp; Mycorrhiza:</b> General characteristic features of Fungi, Economic importance and Classification of Fungi, Nutrition, Heterothallism, Physiological specialization, Heterokaryosis & Parasexuality in Fungi. Fungi as biocontrol agent. Classification, general character and life cycle of -Mucor, Phytophthora, Penicillium, Peziza, Ustilago, Puccinia, Agaricus; Colletotrichum, Alternaria. Edible Mushroom- Button and Oyster mushroom and their cultivation. General account of lichens. General account of Mycorrhiza.	11

**Keywords** *Mycoplasma, Transduction, Biofertilizer, Parasexuality.*

**Signature of Convener & Members (CBoS):**

*(Handwritten signatures and initials)*  
 9 *Boyer*  
 7 *Blair*  
 10 *W. C. C.*

## PART-C: Learning Resources

### Text Books, Reference Books and Others

#### Text Books Recommended -

1. Kumar, H.D. (1999). Introductory Phycology. Affiliated East-West. Press Pvt. Ltd. Delhi. 2nd edition.
2. Tortora, G.J., Funke, B.R., Case, C.L. (2010). Microbiology: An Introduction, Pearson Benjamin Cummings, U.S.A. 10th edition.
3. Sethi, I.K. and Walia, S.K. (2011). Text book of Fungi & Their Allies, MacMillan Publishers Pvt. Ltd., Delhi.
4. Aggarwal, S. K. 2009. Foundation Course in Biology, A one books Pvt. Ltd., New Delhi.
5. Aneja, K. R. 1993. Experiments in Microbiology, Pathology and Tissue Culture, VishwaPrakashan, NewDelhi.
6. Annie Ragland, 2012. Algae and Bryophytes, Saras Publication, Kanyakumari, India.
7. Basu, A. N. 1993. Essentials of Plant Viruses, Vectors and Plant diseases, New Age International, New Delhi.
8. Chopra, G. L. 1984. A text book of Algae, Rastogi publications, Meerut, India.
9. Dubey, R. C. and Maheshwari, D K. 2012. Practical Microbiology, S. Chand & Company, Pvt. Ltd., NewDelhi.
10. Fritsch, R. E. 1977. Structure and Reproduction of Algae, Cambridge University Press, London.
11. Sharma, P.D. (2011). Plant Pathology. Meerut, U.P.: Rastogi Publication.
12. Pandey B.P. 2001. College Botany Volume 1, S Chand & Company Pvt.Ltd, New Delhi.

#### Reference books:

1. Webster, J., Weber, R. (2007). Introduction to Fungi, 3rd edition. Cambridge, U.K.: Cambridge University Press.
2. Pelzar, 1963. Microbiology, Tata McGraw Hill, New Delhi
3. Rangaswamy, G. 2009. Disease of Crop Plants in India, Prientice Hall of India, New Delhi.
4. Microbiology Fundamental and Applications (hindi) (pb) 9. ISBN: 9788138826230 Edition: 03Year : 2016Author : Dr. Purohit SS , Dr. Deo Publisher : Student Edition Language : Hindi
5. Modern Microbiology (hindi) (hb) ISBN: 9788177543599Edition : 1 Year : 2018Author : Dr. Purohit SS , Dr. Singh T Publisher : Agrobios (India)
6. Plant pathology by R.S. Mehrotra, Tata McGraw-Hill Publication

#### Online Resources-

- > e-Resources / e-learning portals
- > [www.swavam.ac.in](http://www.swavam.ac.in)
- > [www.ignou.ac.in](http://www.ignou.ac.in)
- > [www.egvankosh.ac.in](http://www.egvankosh.ac.in)
- > [www.iitm.ac.in](http://www.iitm.ac.in)
- > [www.eskillindia.org](http://www.eskillindia.org)
- > [www.eschiksha.mp.gov.in](http://www.eschiksha.mp.gov.in)
- > [www.vlab.co.in](http://www.vlab.co.in)
- > [www.internshala.com](http://www.internshala.com)
- > [www.ndl.iitkcp.ac.in](http://www.ndl.iitkcp.ac.in)

#### Online Resources-

##### > e-Resources / e-books and e-learning portals

1. <https://www.classcentral.com/tag/microbiology>
2. <https://www.edx.org/learn/microbiology>
3. <https://www.mooc-list.com/tags/microbiology>
4. <https://www.udemy.com/topic/microbiology/>
5. <https://ucmp.berkeley.edu/bacteria/bacteria.html>
6. <https://www.livescience.com/53272-what-is-a-virus.html>
7. <https://eclambathach.in/lms/Economic%20importance%20of%20Algae.pdf>
8. <https://www.slideshare.net/sardar1109/algae-notes-1>
9. <https://www.onlinebiologynotes.com/algae-general-characteristics-classification/>
10. <https://www.sciencedirect.com/topics/immunology-and-microbiology/fungus>
11. <https://ucmp.berkeley.edu/fungi/fungi.html>
12. <https://agrinoon.com/wp-content/uploads/Mashroom-culture.pdf>
13. <http://ecourseonline.iasri.res.in/mod/page/view.php?id=11293>
14. [http://www.jnkvv.org/PDF/11042020102651plant\\_pathology.pdf](http://www.jnkvv.org/PDF/11042020102651plant_pathology.pdf)
15. <https://www.apsnet.org/edcenter/disimpac:mngmnt/topc/EpidemiologyTemporal/Pages/ManagementStrategi>
16. <https://www.agrilcareer.com/6-easy-steps-for-mushroom-cultivation/>

## PART-D: Assessment and Evaluation

### Suggested Continuous Evaluation Methods:

Maximum Marks:	100 Marks
Continuous Internal Assessment (CIA):	30 Marks
End Semester Exam (ESE):	70 Marks

Continuous Internal Assessment (CIA): 30 (By Course Teacher)	Internal Test / Quiz-(2): 20 +20	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against 30 Marks
	Assignment / Seminar - 10 Total Marks - 30	
End Semester Exam (ESE): 70	Two section - A & B Section A: Q1. Objective - 10 x1= 10 Mark; Q2. Short answer type- 5x4 =20 Marks Section B: Descriptive answer type qts., 1out of 2 from each unit-4x10=40 Marks	

Name and Signature of Convener & Members of CBoS:



**FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)**

**DEPARTMENT OF BOTANY**

**COURSE CURRICULUM**

<b>PART- A: Introduction</b>			
Program: Bachelor in Life Sciences (Certificate / Diploma / Degree/Honors)		Semester - II	Session: 2024-2025
1	Course Code	BOSC-02	
2	Course Title	Lab. Course -02 (Microbes and Thallophyta)	
3	Course Type	Laboratory course	
4	Pre-requisite (if any)	As per program	
5	Course Learning Outcomes (CLO)	1. Understand the Viruses, Bacteria, Phycology, Mycology and Plant pathology 2. Learn microbial techniques which will be beneficial for agriculture and industry. 3. Learn life cycles of selected genera of different groups 4. Understand etiology of plant diseases 5. Apply their knowledge in the crop fields to eradicate or avoid the diseases	
6	Credit Value	1 Credits	Credit =30 Hours Laboratory or Field learning/Training
7	Total Marks	Max. Marks: 50	Min Passing Marks: 20
<b>PART -B: Content of the Course</b>			
Total No. of learning-Training/performance Periods: 30 Periods (30 Hours)			
Module	Topics (Course contents)		No. of Period
Lab./Field Training/ Experiment Contents of Course	1. Collection of viral/ Bactrial /fungal infected plants 2. Study of plant disease symptoms caused by viral/ Bactrial /fungal/ Mycoplasma 3. <b>BACTERIAL IDENTIFICATION:</b> Isolation of bacteria Staining techniques: Gram's, staining 4. Study / Slide preparation of available Cyanobacteria 5. <b>PHYCOLOGY:</b> Study / Slide preparation and Staining of algac -Volvox, Oedogonium and Chara; Vaucheria; Ectocarpus Polysiphonia 6. <b>MYCOLOGY:</b> Study/ Slide preparation and . Staining of fungi. Mucor, Phytophthora, Penicillium, Peziza, Ustilago, Puccinia; Agaricus, colletotrichum, Alternaria.: Study of Button and Oyster Mushroom Lichens: crustose, foliose and fruticose specimens. Study of VAM fungi		30
Keywords	infected plants, VAM, algae, fungi		
Signature of Convener & Members (CBoS) :			

1) Ramesh  
 2) Anand  
 3) Mohan  
 4) Anand  
 5) Anand  
 6) Anand

8) Anand  
 9) Anand  
 10) Anand





### PART-C: Learning Resources

Text Books, Reference Books and Others

**Text Books Recommended –**

1. Practical Botany (Part I) ISBN #:81-301-0008-8 Sunil D Purohit, Gotam K Kukda & Anamika Singhvi Edition:2013 Apex Publishing House Durga Nursery Road, Udaipur, Rajasthan (bilingual).
2. Pandey S.K. (2012). Quick Concept of Botany. Publisher LAP, LAMBERT Academic Publishing GmbH & Co. KG, Germany (ISBN: 978-3-8484-3104-5).
3. Dubey, R. C. and Maheshwari. D.K. 2012. Practical Microbiology, S. Chand & Company, Pvt. Ltd., New Delhi.
4. Pandey. B.P. 2014 Modern Practical Botany, (Vol-I) S. Chand and Company Pvt. Ltd., New Delhi.

**Online Resources–**

- > e-Resources / e-books and e-learning portals
- > [www.swavam.ac.in](http://www.swavam.ac.in)
- > [www.ignou.ac.in](http://www.ignou.ac.in)
- > [www.cgyanakosh.ac.in](http://www.cgyanakosh.ac.in)
- > [www.iitm.ac.in](http://www.iitm.ac.in)
- > [www.eskillindia.org](http://www.eskillindia.org)
- > [www.eshiksha.mp.gov.in](http://www.eshiksha.mp.gov.in)
- > [www.vlab.co.in](http://www.vlab.co.in)
- > [www.interushala.com](http://www.interushala.com)
- > [www.ndl.iitkgp.ac.in](http://www.ndl.iitkgp.ac.in)

**Online Resources–**

- > e-Resources / e-books and e-learning portals
- 1. <https://community.plantae.org/tags/moocfuturelearn.com/courses/teaching-biology-inspiring-students-with-plants-in-science>
- 2. <https://microbiologysociety.org/publication/education-outreach-resources/basic-practical-microbiology-a-manual.html>
- 3. <https://microbiologyonline.org/file/7926d7789d8a2f7b2075109f68c3175e.pdf>
- 4. <http://allaboutalgae.com/benefits/>
- 5. <https://repository.cimmyt.org/xmlui/bitstream/handle/10883/3219/64331.pdf>
- 6. <https://www.mooc-list.com/tags/microbiology/>
- 7. <http://www.agrifis.ir/sites/default/files/A%20text%20book%20of%20practical%20botany%201%20%7B%20Bendre%20%20%5B81%20%7B%20Ashok%20%20%5D%20%281984%29.pdf>
- 8. <https://171339239%5D%20%281984%29.pdf>

### PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks:	50 Marks
Continuous Internal Assessment (CIA):	15 Marks
End Semester Exam (ESE):	35 Marks

Continuous Internal Assessment (CIA): 15 (By Course Teacher)	Internal Test / Quiz-(2): 10 & 10	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against 15 Marks
	Assignment/Seminar + Attendance - 05 Total Marks - 15	
End Semester Exam (ESE): 35	Laboratory / Field Skill Performance: On spot Assessment	
	A. Performed the Task based on lab. work - 20 Marks	Managed by Course teacher as per lab. status
	B. Spotting based on tools & technology (written) - 10 Marks	
C. Viva-voce (based on principle/technology) - 05 Marks		

Name and Signature of Convener & Members of CBoS:

Dr. S. S. S. S.  
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