

# 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	Viruses: - 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.Actinomycetes: general characteristics ,Structure, reproduction and economic importance. Mycoplasma, Phytoplasma,: general characteristics , structure, reproduction and their economic uses.		12
II	Bacteria: 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. Cyanobacteria : General characteristics, morphology,Heterocyst, cell structure of Cyanobacteria, reproduction and economic importance of Bacteria.		11
III	Phycology: 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,EctocarpusandPolysiphonia. 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	Mycology, Mushroom Cultivation, Lichenology &Mycorrhiza: 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, PhytophthoraPenicillium, Peziza. Ustilago, Puccinia, Agaricus; Colletotrichum, Alternaria. Edible Mushroom- Button and Oyster mushroom and their cultivation. General account of lichens. General account of Myccorrhiza.		11
Keywords	Mycoplasma, Transduction, Biofertilizer, Parasexuality.		
Signature of Convener & Members (CBoS) :			
<div><div>9</div><div>10</div><div>11</div><div>12</div><div>13</div><div>14</div><div>15</div><div>16</div><div>17</div><div>18</div><div>19</div><div>20</div><div>21</div><div>22</div><div>23</div><div>24</div><div>25</div><div>26</div><div>27</div><div>28</div><div>29</div><div>30</div><div>31</div><div>32</div><div>33</div><div>34</div><div>35</div><div>36</div><div>37</div><div>38</div><div>39</div><div>40</div><div>41</div><div>42</div><div>43</div><div>44</div><div>45</div><div>46</div><div>47</div><div>48</div><div>49</div><div>50</div><div>51</div><div>52</div><div>53</div><div>54</div><div>55</div><div>56</div><div>57</div><div>58</div><div>59</div><div>60</div><div>61</div><div>62</div><div>63</div><div>64</div><div>65</div><div>66</div><div>67</div><div>68</div><div>69</div><div>70</div><div>71</div><div>72</div><div>73</div><div>74</div><div>75</div><div>76</div><div>77</div><div>78</div><div>79</div><div>80</div><div>81</div><div>82</div><div>83</div><div>84</div><div>85</div><div>86</div><div>87</div><div>88</div><div>89</div><div>90</div><div>91</div><div>92</div><div>93</div><div>94</div><div>95</div><div>96</div><div>97</div><div>98</div><div>99</div><div>100</div></div>			

① R. S. Roy  
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## 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: 9788188826230 Edition: 03Year : 2016Author : Dr. Purohit SS , Dr. Deo Publisher : Student Edition Language : Hindi
5. Modern Microbiology (hindi) (hb) ISBN: 9788177543599Edition : 1Year : 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.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

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://gclambathach.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://agrimoon.com/wp-content/uploads/Mashroom-culture.pdf>
13. <http://ecoursesonline.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/disimpactmngmnt/topc/EpidemiologyTemporal/Pages/ManagementStrategi.es.aspx>
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  
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:

① Rishu  
② Kumar  
③ Nothing  
④  
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# 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)	<ol style="list-style-type: none"> <li>1. Understand the Viruses, Bacteria, Phycology, Mycology and Plant pathology</li> <li>2. Learn microbial techniques which will be beneficial for agriculture and industry.</li> <li>3. Learn life cycles of selected genera of different groups</li> <li>4. Understand etiology of plant diseases</li> <li>5. Apply their knowledge in the crop fields to eradicate or avoid the diseases</li> </ol>	
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. Collection of viral/ Bactrial /fungal infected plants</li> <li>2. Study of plant disease symptoms caused by viral/ Bactrial /fungal/ Mycoplasma</li> <li>3. <b>BACTERIAL IDENTIFICATION:</b> Isolation of bacteria Staining techniques: Gram's, staining</li> <li>4. Study / Slide preparation of available Cyanobacteria</li> <li>5. <b>PHYCOLOGY:</b> Study / Slide preparation and Staining of algae –Volvox, Oedogonium and Chara; Vaucheria; Ectocarpus Polysiphonia</li> <li>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</li> </ol>		30
Keywords	infected plants, VAM, algae, fungi		
Signature of Convener & Members (CBoS) :			

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② R. Rao

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⑤ R. Rao

⑥ R. Rao

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⑧ R. Rao

⑨ R. Rao

⑩ R. Rao

## 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.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

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.agrifs.ir/sites/default/files/A%20text%20book%20of%20practical%20botany%201%20%7BAshok%20Bendre%7D%20%5B8>
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

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

Name and Signature of Convener & Members of CBoS:

① R. Rao  
② R. Rao  
③ M. S. Srinivasan  
④ M. S. Srinivasan  
⑤ R. Rao  
⑥ R. Rao  
⑦ R. Rao  
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⑨ R. Rao  
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