

B.Sc. – II Semester

BOTANY

Govt. Digvijay Autonomous P.G. College, Rajnandgaon, C.G.
Bachelor of Science (B.Sc.) Four Years UG Programme (FYUP)

Botany

2025-26

Year	Sem.	Course Type	Course Title	Credit	IA	ESE	Max Marks
First Year	I Sem.	DSC-01	Elementary Botany	3+0+0	30	70	100
		DSC-01-LAB	Elementary Botany – LAB	0+0+1	15	35	50
		GE-01	Elementary Botany	3+0+0	30	70	100
		GE-01-LAB	Elementary Botany – LAB	0+0+1	15	35	50
	II Sem.	DSC-02	Microbes and Thallophyta	3+0+0	30	70	100
		DSC-02-LAB	Microbes and Thallophyta - LAB	0+0+1	15	35	50
		GE-02	Microbes and Thallophyta	3+0+0	30	70	100
		GE-02-LAB	Microbes and Thallophyta - LAB	0+0+1	15	35	50
		SEC-01	Gardening and Floriculture	0+0+2	10	40	50
Second Year	III Sem.	DSC-03	Archegoniate and Fossils	3+0+0	30	70	100
		DSC-03-LAB	Archegoniate and Fossils – LAB	0+0+1	15	35	50
		DSE- 01	Natural resources and management	3+0+0	30	70	100
		DSE-01-LAB	Natural resources and management- LAB	0+0+1	15	35	50
		VAC- 01	Herbal Plants & Human Health	2+0+0	10	40	50
	IV Sem.	DSC- IV	Angiosperms	3+0+0	30	70	100
		DSC- IV- LAB	Angiosperms- LAB	0+0+1	15	35	50
		DSE-02	Microbiology and Phytopathology	3+0+0	30	70	100
		DSE-02-LAB	Microbiology and Phytopathology- LAB	0+0+1	15	35	50
		SEC- 02	Flower Decoration	0+0+2	10	40	50

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Third Year	V Sem.	DSC-05	Plant Physiology	3+0+0	20	80	100
		DSC-05-LAB	Plant Physiology- LAB	0+0+1	10	40	50
		DSE-03	Plant Metabolism	3+0+0	20	80	100
		DSE-03-LAB	Plant Metabolism- LAB	0+0+1	10	40	50
		DSE-04	Plant Diseases	3+0+0	20	80	100
		DSE-04-LAB	Plant Diseases-LAB	0+0+1	10	40	50
		SEC-03	Biofertilizer and Biopesticides	0+0+2	10	40	50
	VI Sem.	DSC-06	Plant Pathology	3+0+0	20	80	100
		DSC-06-LAB	Plant Pathology-LAB	0+0+1	10	40	50
		DSE-05	Molecular Biology and Plant Biotechnology	3+0+0	20	80	100
		DSE-05-LAB	Molecular Biology and Plant Biotechnology-LAB	0+0+1	10	40	50
		DSE-06	Economic Botany	3+0+0	20	80	100
		DSE-06-LAB	Economic Botany-LAB	0+0+1	10	40	50
		SEC-04	Mushroom Culture Technology-Project	0+0+2	10	40	50
Fourth Year Bachel or of Honors	VII Sem.	DSC-07	Ecology and Phytogeography	3+0+0	20	80	100
		DSC-07-LAB	Ecology and Phytogeography-LAB	0+0+1	10	40	50
		DSE-07	Instrumentation and Biochemical Technology	3+0+0	20	80	100
		DSE-07-LAB	Instrumentation and Biochemical Technology-LAB	0+0+1	10	40	50
		DSE-08	Biosystematics and Biodiversity	3+0+0	20	80	100
		DSE-08-LAB	Biosystematics and Biodiversity-LAB	0+0+1	10	40	50
		DSE-09	Plant Breeding and Seed Technology	3+0+0	20	80	100
		DSE-09-LAB	Plant Breeding and Seed Technology-LAB	0+0+1	10	40	50
		GE-	Growth and Stress Physiology	3+0+0	20	80	100
	VIII Sem	GE-LAB	Growth and Stress Physiology-LAB	0+0+1	10	40	50
		DSC-08	Molecular Biology and Biostatistics	3+0+0	20	80	100
		DSC-08-	Molecular Biology and	0+0+1	10	40	50

Fourth Year Bachelor of Honors with Research		LAB	Biostatistics- LAB				
		DSE-10	Plant Biotechnology and Crop Improvement	3+0+0	20	80	100
		DSE-10-LAB	Plant Biotechnology and Crop Improvement-LAB	0+0+1	10	40	50
		DSE-11	Applied Botany and Intellectual Property Right (IPR)	3+0+0	20	80	100
		DSE-11-LAB	Applied Botany and Intellectual Property Right (IPR)-LAB	0+0+1	10	40	50
		DSE-12	Biochemistry and Enzymology	3+0+0	20	80	100
		DSE-12-LAB	Biochemistry and Enzymology-LAB	0+0+1	10	40	50
		DSE-13	Bioinformatics and Genetic Technology	3+0+0	20	80	100
		DSE-13-LAB	Bioinformatics and Genetic Technology-LAB	0+0+1	10	40	50
	VII Sem.	DSC-07	Ecology and Phytogeography	3+0+0	20	80	100
		DSC-07-LAB	Ecology and Phytogeography-LAB	0+0+1	10	40	50
		DSE-07	Research Methodology and Ethics	4+0+0	20	80	100
		DSE-08	Biosystematics and Biodiversity	3+0+0	20	80	100
		DSE-08-LAB	Biosystematics and Biodiversity-LAB	0+0+1	10	40	50
		DSE-09	Plant Breeding and Seed Technology	3+0+0	20	80	100
		DSE-09-LAB	Plant Breeding and Seed Technology-LAB	0+0+1	10	40	50
		GE-	Growth and Stress Physiology	3+0+0	20	80	100
		GE-LAB	Growth and Stress Physiology-LAB	0+0+1	10	40	50
	VIII Sem	DSC-08	Molecular Biology and Biostatistics	3+0+0	20	80	100
		DSC-08-LAB	Molecular Biology and Biostatistics- LAB	0+0+1	10	40	50
		DSE-10	Plant Biotechnology and Crop Improvement	3+0+0	20	80	100
		DSE-10-LAB	Plant Biotechnology and Crop Improvement-LAB	0+0+1	10	40	50
		Research Project/ Dissertation		12			

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: ²⁰²⁵⁻²⁶ 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, 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	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, 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):			

① R. G. W. J.
 ② R. G. W. J.
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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, Prentice 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
- www.ignou.ac.in
- www.egyankosh.ac.in
- www.iitm.ac.in
- www.eskillindia.org
- www.eshiksha.mp.gov.in
- www.vlab.co.in
- www.internshala.com
- 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://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://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
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
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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
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Name and Signature of Convener & Members of CBoS:

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① Rishu
② Hemant
③ Anshu
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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: ²⁰²⁵⁻²⁶ 2024-2025
1	Course Code	BOSC-02 P	
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

PART -B: Content of the Course

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. BACTERIAL IDENTIFICATION: Isolation of bacteria Staining techniques: Gram's, staining 4. Study / Slide preparation of available Cyanobacteria 5. PHYCOLOGY: Study / Slide preparation and Staining of algae –Volvox, Oedogonium and Chara; Vaucheria; Ectocarpus Polysiphonia 6. MYCOLOGY: Study/ Slide preparation and . Staining of fungi. <i>Mucor, Phytophthora, Penicillium, Peziza, Ustilago, Puccinia; Agaricus, colletotrichum, Alternaria.</i> 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 R. K. Das
 ② R. K. Das
 ③ R. K. Das
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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
- www.ignou.ac.in
- www.egyankosh.ac.in
- www.iitm.ac.in
- www.eskillindia.org
- www.eshiksha.mp.gov.in
- www.vlab.co.in
- www.internshala.com
- 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%20o%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

Continuous Internal Assessment (CIA): 15 (By Course Teacher)	Internal Test / Quiz-(2): 10 & 10 Assignment/Seminar +Attendance - 05 Total Marks - 15	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against 15 Marks
End Semester Exam (ESE): 35	Laboratory / Field Skill Performance: On spot Assessment 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	Managed by Course teacher as per lab. status

Name and Signature of Convener & Members of CBoS:

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FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)

DEPARTMENT OF BOTANY

COURSE CURRICULUM

PART- A: Introduction			
Program: Bachelor in Life Sciences (Diploma / Degree/Honors)		Semester – III/ IV/V/VI/VII/VIII	Session: 2024-2025 2025-26
1	Course Code	BOGE -02 T	
2	Course Title	Microbes and Thallophyta	
3	Course Type	Generic elective (GE)	
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)			
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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, 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	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, 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):			
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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
- www.ignou.ac.in
- www.egyankosh.ac.in
- www.iitm.ac.in
- www.eskillindia.org
- www.eshiksha.mp.gov.in
- www.vlab.co.in
- www.internshala.com
- 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://eclambathach.in/lms/Economic%20importance%20of%20Algae.pdf>
8. <https://www.slideshare.net/sardar1109/algae-notes-l>
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/Mushroom-culture.pdf>
13. <http://ecoursesonline.iasri.res.in/mod/page/view.php?id=11293>
14. http://www.jnkvv.org/PDF/11042020102651plant_pathology.pdf
15. <https://www.apsnet.org/edcenter/disinfectmngmnt/topc/EpidemiologyTemporal/Pages/ManagementStrategies.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	

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FOUR YEAR UNDERGRADUATE PROGRAM (2024-28)

DEPARTMENT OF BOTANY

COURSE CURRICULUM

PART- A: Introduction			
Program: Bachelor in Life Sciences (Diploma / Degree/Honors)		Semester – III/IV/ V/VI/VII/VIII	Session: 2024-2025 2025-26
1	Course Code	BOGE- 02 P	
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
PART -B: Content of the Course			
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. BACTERIAL IDENTIFICATION: Isolation of bacteria Staining techniques: Gram's, staining 4. Study / Slide preparation of available Cyanobacteria 5. PHYCOLOGY: Study / Slide preparation and Staining of algae – <i>Volvox</i> , <i>Oedogonium</i> and <i>Chara</i> ; <i>Vaucheria</i> ; <i>Ectocarpus</i> <i>Polysiphonia</i> 6. MYCOLOGY: Study/ Slide preparation and . Staining of fungi. <i>Mucor</i> , <i>Phytophthora</i> , <i>Penicillium</i> , <i>Peziza</i> , <i>Ustilago</i> , <i>Puccinia</i> ; <i>Agaricus</i> , <i>colletotrichum</i> , <i>Alternaria</i> .: 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. <i>[Signature]</i>	6. <i>[Signature]</i>		
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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
- www.ignou.ac.in
- www.egvankosh.ac.in
- www.iitm.ac.in
- www.eskillindia.org
- www.eshiksha.mp.gov.in
- www.vlab.co.in
- www.internshala.com
- 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://microbiology society.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.agriffs.ir/sites/default/files/A%20text%20book%20of%20practical%20botany%201%207BAshok%20Bendre%20D%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

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	
	B. Spotting based on tools & technology (written) - 10 Marks	
	C. Viva-voce (based on principle/technology) - 05 Marks	
		Managed by Course teacher as per lab. status

Name and Signature of Convener & Members of CBoS:

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

PART- A: Introduction			
Program: Bachelor in Life Sciences (Certificate / Diploma / Degree)		Semester - III/IV/V/VI	Session: 2024-2025 2025-26
1	Course Code	BOSEC-01	
2	Course Title	Gardening and Floriculture	
3	Course Type	Skill Enhance Course (BOSEC 01)	
4	Pre-requisite (if, any)	As per program	
5	Course Learning Outcomes (CLO)	After completion of this course, the students will be able to - > understand the concept of Gardening & Floriculture > learn about the gardening technique and familiar with gardening tools > adopt the skill of gardening as well as floriculture > student may develop entrepreneurship in this field.	
6	Credit Value	2 Credits (1C + 1C)	Credit = 15 Hours – Theoretical learning and = 30 Hours Laboratory or Field learning/Training
7	Total Marks	Max. Marks: 50	Min Passing Marks: 20
PART -B: Content of the Course			
Total No. of Teaching-learning Periods:			
Theory – 15 Periods (15 Hrs) and Lab. or Field learning/Training 30 Periods (30 Hours)			
Module	Topics (Course contents)		No. of Period
Theory Contents	1. Concept & Types of Garden: Concept of Garden & Landscape Gardening, Styles of garden – Formal & Informal garden, Free style gardens, Home garden, Hanging garden; Types of gardens – English, Mughal, Babylonian garden [Observation & Practices] 2. Garden plants: Ornamental plants - Shrubbery, Fernery, Arches (climbers and creepers), Pergolas, Edges & Hedges and Pot plants, Cacti and Succulents plants, Flower borders and beds, Ground covers and carpet beds [Observation & Practices] 3. Floriculture: Present situation & scope in India. Various types of flowers – Seasonal flowers, Cut flowers. Flower Crops - Rose, Chrysanthemum, Carnation, Gerbera, Gladioli, Tuberose, Aster, Lilly, Dahlia and Marigold. [Observation & Practices]		15
Lab./Field Training Contents	1. Familiarization with different tools and equipments used in gardening work. 2. Design and Plotting of Garden and Preparation of Soil for Garden 3. Soil decontamination techniques, Planting methods, Fertigation method 4. Propagation techniques for selected ornamental plants Weed management 5. Harvesting techniques, Post-harvest handling, Pre cooling, Pulsing, Packing, 6. Preparation of composite mixture and manuring practice in nursery and pots. 7. Practice in budding, cutting, layering and grafting etc. 8. Practice of flower arrangements, flower bouquet.		30
Keywords	Garden, Flower, Floriculture, Garden tools		
Signature of Convener & Members (CBoS) 1. 2. 3. 4. 5. 6. 6. 7. 8. 9. 10.			

PART-C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended –

1. Randhawa, G. S. and Mukhopadhyay, A. (1986) "Floriculture in India." Allied Publisher (India)
2. Bhattacharjee, S. K. (2006) "Advances in Ornamental Horticulture." Vols. I-VI. Pointer Pub.
3. Lauria, A. and Victor, H. R. (2001) "Floriculture – Fundamentals and Practices." Agrobios.
4. Sabina, G. T. and Peter, K. V. (2008) "Ornamental Plants for Gardens." New India pub. India.

Online Resources–

- e-Resources / e-books and e-learning portals
- www.swayam.ac.in
- www.ignou.ac.in
- www.egvankosh.ac.in
- www.iitm.ac.in
- www.eskillindia.org
- www.eshiksha.mp.gov.in
- www.vlab.co.in
- www.internshala.com
- www.ndl.iitkgp.ac.in

Online Resources–

- e-Resources / e-books and e-learning portals
- <https://indiaagronet.com/horticulture/CONTENTS/LANDSCAPE.htm>
- https://www.youtube.com/watch?v=ZUth6ZFO48c&ab_channel=MountainGardens
- <https://www.youtube.com/watch?v=EE0oQO6n9iA>
- <https://www.teachmint.com/tfile/studymaterial/bsc/i1063fog/11styleofgardeningpdf/0dba825bd66d-4180-afe1-28950aa42454>
- https://k8449r.weebly.com/uploads/3/0/7/3/30731055/types_of_gardens_compatibility_model_pdf-signed.pdf
- <https://www.egvankosh.ac.in/bitstream/123456789/73050/1/Unit-2.pdf>
- https://www.academia.edu/40140208/A_HANDBOOK_ON_FLORICULTURE_And_Landscape
- https://k8449r.weebly.com/uploads/3/0/7/3/30731055/landscape_gardening.pdf
- <https://homeguides.sfgate.com/gardening-tools-uses-41745.html>
- <https://tractorguru.in/blog/floriculture-types-of-flowers-tips-and-importance-of-floriculture/>

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 Coordinator)	Internal Test / Quiz-(2): 10 & 10 Assignment/Seminar + Attendance - 05 Total Marks - 15	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against 15 Marks
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End Semester Exam (ESE): 35	Laboratory / Field Skill Performance: On spot Assessment A. Performed the Task based on learned skill - 20 Marks B. Spotting based on tools (written) - 10 Marks C. Viva-voce (based on principle/technology) - 05 Marks	Managed by Coordinator as per skilling
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Name and Signature of Convener & Members of CBoS:

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