

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	Phytogeobotany and Evolutionary Botany
BOSC -03P	Lab. Course -03 (Archegoniate and Fossils)	BOSE -03P	Lab. Course -03 (Phytogeobotany 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)
GE -01 & 02		VAC	
BOGE -01T	Elementary Botany	BOVAC-01	Herbal Plant & Human Health
BOGE -01P	Lab. Course -01 (Elementary Botany)		SEC
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.

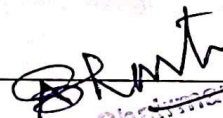
1. R. D. Singh
2. M. K. Singh
3. S. K. Singh
4. M. K. Singh
5. M. K. Singh

6. M. K. Singh
7. M. K. Singh
8. M. K. Singh
9. M. K. Singh
10. M. K. Singh

Chairman
of Studies
Nandkumar Patel
Raigarh (C.O.)

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

PART- A: Introduction			
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	Basics of Plant Science: 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	Branches of botany: General idea, features, and significance; Anatomy, Cytology, Economic Botany, Ethnobotany, Forestry, Genetics, Histology, Microbiology, Paleobotany, Phytochemistry, Phytopathology, Plant biotechnology, Plant breeding, Plant ecology, Plant morphology, Plant physiology, Plant Taxonomy, etc.		11
III	Plants for human welfare: Plant Resources for Rural livelihood – Mahua, Tendu patta, Bamboo and Firwood. 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	Ancient Indian Botany: 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):			


 Nandkumar Patel
 Head, Botany, Raigarh (C.O.)

- ① Bhowan
- ② Ramesh
- ③ A. S. Pan
- ④ M. S.
- ⑤ Anil Kumar
- ⑥ S. K.
- ⑦ K. S.
- ⑧ S. K.
- ⑨ S. K.
- ⑩ S. K.
- ⑪ S. K.

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. Mehra
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.svayam.ac.in
- www.ignou.ac.in
- www.ezyankosh.ac.in
- www.iftm.ac.in
- www.eskllindia.org
- www.eskllsha.mp.gov.in
- www.vlab.co.in
- www.internshala.com
- www.ndl.litkpp.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-juu2bl/>
- <https://eaidnbmmnnibpcnjpcgicfndmkaj/https://www2.ca.uky.edu/ngcomm/pubs/ho/ho96/ho96.pdf>
- <https://www.botanytoday.com/branches-of-botany/>
- <https://eaidnbmmnnibpcnjpcgicfndmkaj/https://www.unanijournal.com/articles/94/3-1-11-206.pdf>
- https://eaidnbmmnnibpcnjpcgicfndmkaj/https://wpbis.ccs.iisc.ac.in/biodiversity/sahyadri/documents/botany_history.pdf
- <https://vedpuran.files.wordpress.com/2016/07/charak-samhita-naradeva-jigupta-vol-1.pdf>
- <https://ezyankosh.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	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:

① R. P. Wans
② Nandkumar
③ Dr. Anil
④ Mr. Anil
⑤ Dr. Anil
⑥ Dr. Anil

⑦ Dr. Anil
⑧ Dr. Anil
⑨ Dr. Anil
⑩ Dr. Anil

Dr. Anil
Chairman
Studies
Dr. Nandkumar Patel
Bhopal, Raigarh (C.G.)

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

PART- A: Introduction			
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
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. Microscopic study of plant cell. 2. Microscopic study of prokaryotic (Bacteria) and eukaryotic cell (algae and fungi). 3. Study of thallus structure of <i>Riccia</i> and <i>Marchantia</i> . 4. Identification of different plants growing in college campus. 5. Study of a typical flowering plant and it's parts. 6. Study of internal structure of root and stem. 7. Study of parenchyma, collenchyma and sclerenchyma. 8. Study of medicinal plants of college campus. 9. Study of plants used to cure cough and cold, jaundice and skin diseases. 10. Visit to any local ayurvedic hospital / practitioner to understand Ayurveda.		30
Keywords	Prokaryotic, Parenchyma, Jaundice, Ayurveda.		

Signature of Convener & Members (CBoS) :

① Rishwan
 ② Anand
 ③ Anshu
 ④ Anshu
 ⑤ Anshu
 ⑥ Anshu
 ⑦ Anshu
 ⑧ Anshu
 ⑨ Anshu
 ⑩ Anshu

Chairman
 Studies
 Dr. Nandkumar Patel
 Jyoti, Raigarh (C.G.)

PART-C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended –**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-Resources / e-books and e-learning portals
- www.swavam.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://www.ncbi.nlm.nih.gov/pmc/articles/PMC5871155/>
- <https://cms.botany.org/home/careers-jobs/careers-in-botany/areas-of-specialization-in-botany.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	
	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:

① R. Sivan
② Nandkumar
③ Indira
④ M. S.
⑤ A. S.
⑥ H. S.
⑦ A.

⑧ G. S.
⑨ S. S.
⑩ V. S.

BR. Sivan
Chairman
Studies
Nandkumar Patel
Jayya, Raigarh (C.G.)

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):

① R. Singh
 ② K. Singh
 ③ S. Singh
 ④ H. Singh
 ⑤ J. Singh
 ⑥ R. Singh
 ⑦ H. Singh
 ⑧ B. Singh
 ⑨ B. Singh
 ⑩ V. Singh

B. Singh
 Chairman

Joint Studies
 and Mandukumar Patel
 Raigad, Raigad (C.G.)

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. Anceja, 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.swavam.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://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/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/disimpactmngmnt/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 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 Hemant
③ Anshu
④ Anshu
⑤ Anshu
⑥ Anshu
⑦ Anshu
⑧ Anshu
⑨ Anshu
⑩ Anshu

BRANT
Kumar Patel
Rajya, Raigarh (C.G)

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	
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 R. K. Das

② S. K. Das

③ S. K. Das

④ S. K. Das

⑤ S. K. Das

⑥ S. K. Das

⑦ S. K. Das

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⑩ S. K. Das

[Signature]
Chairman

Studies
 Dr. Sandkumar Patel
 Uda, Raigarh (C.G.)

Text Books, Reference Books and Others

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.

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

[illegible]

Suggested Continuous Evaluation Methods:

Maximum Marks: 50 Marks

Continuous Internal Assessment (CIA):	15 Marks
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End Semester Exam (ESE):	35 Marks
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Continuous Internal	Internal Test / Quiz-(2):	10 & 10
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Assessment (CIA): 15	Assignment/Seminar + Attendance - 05
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(By Course Teacher)	Total Marks -	15
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End Semester	Laboratory / Field Skill Performance
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Exam (ESE): 35

B. Spotting based on tools & techn

	C. Viva-voce (based on principle/te
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Better marks out of the two Test / Quiz
+ obtained marks in Assignment shall be
considered against 15 Marks

On spot Assessment work - 20 Marks	Managed by Course teacher
Essay (written) – 10 Marks	as per lab. status

Technology) - 05 Marks

Name and Signature of Convener & Members of CBoS:

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② Rhoor
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⑧ Rhoor
⑨ Rhoor
⑩ Rhoor

Dr. R. K. Patil
Chairman
Studies
Dr. R. K. Patil
Dr. R. K. Patil (C.C.)

FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)

DEPARTMENT OF BOTANY COURSE CURRICULUM

PART- A:

Introduction

Program: Bachelor in Life sciences (Certificate / Diploma / Degree)		Semester - I/III/IV	Session: 2024-2025
1	Course Code	BOVAC-01	
2	Course Title	Herbal Plant & Human Health	
3	Course Type	Value Addition Course (BOVAC-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 value of herbs, herbal medicine and use of herbal medicine. ➤ Know about botanical medicine professionals in the complementary and alternative medicine (CAM) ➤ Demonstrate the knowledge of the toxicity of plant and essential oil ingredients. ➤ Understand the possibility for allergic and unpleasant reactions to herbal products and the impact of herbal quality on potential toxicity. ➤ Use the herbal plants in their daily life ➤ Adopt the value of herbal medicine to save their health.	
6	Credit Value	2 Credits	Credit = 15 Hours - learning & Observation
7	Total Marks	Max. Marks: 50	Min Passing Marks: 20

PART -B: Content of the Course

Total No. of Teaching-learning Periods (01 Hr. per period) - 30 Periods (30 Hours)

Unit	Topics (Course contents)	No. of Period
I	Introduction: Elementary knowledge of Herbal plant and Concept of Herb as medicine. Concept of ethno-medicine, folk medicines, ethno-ecology, ethnic communities of the India & the Chhattisgarh. Concept of Herbal garden. Collection of ethnic information. Observation/In Practices - Survey and familiarization with herbs & local herbal plants	08
II	Importance of medicinal plants: Importance of Herbal / Medicinal plant in human health care – health and balanced diet (Role of proteins, carbohydrates, lipids and vitamins). Common plants & plant parts providing metals and vitamins. Observation/In Practices - Survey and familiarization with local herbal medicinal plants	07
III	Tribal medicine and Traditional knowledge: Introduction, Concept of Tribal medicine, methods of disease diagnosis and treatment – common Plants in folk religion. Traditional knowledge and utility of some medicinal plants in Chhattisgarh. Collection /Identification of Herbal plants commonly used by villagers of the state – • Centella asiatica, • Aloe vera, • Solanum nigrum, • Achyranthus aspera, • Withania somnifera, • Papaver somniferum, • Strychnos nux-vomica, • Atropa belladonna;	08
IV	Plants in day to day life: Nutritive and medicinal value of common herbal fruits and vegetables of daily use. Precautions during use of herbal medicinal products. Basic idea of contribution of national research laboratories like CDRI, CIMAP, NBRI, etc. Collection /Identification of Herbal plants commonly used in daily life - Tulsi, Garlic, Ginger, Turmeric, Ajwain, Methi, Flax, Tea and Coffee.	08

Keywords: Herbal medicine, Folk medicine, Ethno-medicine, Tribal medicine

Signature of Convener & Members (CBOS)

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PART-C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended -

1. Kumar, N.C. (1993). An Introduction to Medical botany and Pharmacognosy. Emkay Publications, New Delhi.
2. Rao, A.P. (1999). Herbs that heal. Diamond Pocket Books (P) Ltd., New Delhi.
3. Iris F. F. Benzie and Sissi Wachtel-Galut. Herbal Medicine, 2nd edition Biomolecular and Clinical Aspects, CRC Press Taylor & Francis, 2011
4. Fabrizio Denovan (2020) Medicinal Herbs: The Ultimate Guide to Natural Healing. Learn The Benefits of Herbs and Use the Nature's Most Powerful Medicinal Plants in Making Your Own A-Z Remedies to Treat Diseases, Author's Republic.
5. Stargrove Mitchell Bebel ND, Herb, Nutrient, and Drug Interactions, Publisher: Elsevier - Health Sciences Division
6. Iris F. F. Benzie (Editor), Herbal Medicine (Oxidative Stress and Disease) 2nd Edition,

Online Resources-

- > e-Resources / e-books and e-learning portals
- > www.swayam.ac.in
- > www.ignou.ac.in
- > www.evyankosh.ac.in
- > www.iitm.ac.in
- > www.eskillindia.org
- > www.eschiksha.mp.gov.in
- > www.vlab.co.in
- > www.internshala.com
- > www.ndl.iitkpn.ac.in

Online Resources-

- > <https://pubmed.ncbi.nlm.nih.gov/22593937/>
- > <https://crimsonpublishers.com/acam/pdf/ACAM.000551.pdf>
- > https://www.researchgate.net/publication/329823358_Medicinal_Plants_Used_in_the_Treatment_of_Mental_and_Neurological_Disorders_in_Ghana
- > <https://www.sciencedirect.com/science/article/abs/pii/S0378874115003013>
- > <https://core.ac.uk/download/pdf/143841457.pdf>
- > <https://practicalselfreliance.com/medicinal-plants/>
- > <https://practicalselfreliance.com/medicinal-plants/>
- > <https://www.pcfdrive.com/medicinal-plants-books.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):	Internal Test / Quiz (2): 10 & 10	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against 15 Marks
(By Course Teacher)	Assignment / Seminar + Attendance - 05	
	Total Marks - 15	

End Semester Exam (ESE):	Two section - A & B
	Section A: Q1. Objective - 05 x1 = 05 Mark; Q2. Short answer type- 5x2 =10 Marks
	Section B: Descriptive answer type cts. 1out of 2 from each unit- 4x05 =20 Marks

Name and Signature of Convener & Members of CBAs:

1. R. S. Rao

2. R. S. Rao

3. R. S. Rao

4. R. S. Rao

5. R. S. Rao

6. R. S. Rao

7. R. S. Rao

8. R. S. Rao

9. R. S. Rao

10. R. S. Rao

R. S. Rao

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
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. 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. Bhattacharyee, S. K. (2006) "Advances in Ornamental Horticulture," Vols. I-VI, Pointer Pub.
3. Lamm, A. and Victor, H. R. (2001) "Floriculture - Fundamentals and Practices," Agrobios.
4. Sadana, 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.smyam.ac.in
- www.ignou.ac.in
- www.egyankosh.ac.in
- www.itm.ac.in
- www.eskillindia.org
- www.eshtksha.mpp.gov.in
- www.1lab.co.in
- www.internshala.com
- www.ndl.ftkcp.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=ZUIh6ZFO48c&ab_channel=MountainGardens
- <https://www.youtube.com/watch?v=EE0oQO6n9IA>
- <https://www.teachmint.com/ille/studymaterial/hsc/11063f0g/11styleofgardeningpdf/0dha825bul6ed-4180-ate1-28950aa42454>
- https://k8449r.weebly.com/uploads/3/0/7/3/30731055/types_of_gardens_compatibility_model_pdf-signed.pdf
- <https://www.egyankosh.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://tractoroguru.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
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

Name and Signature of Convener & Members of CBoS:

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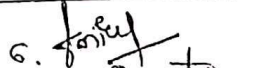
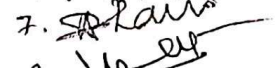
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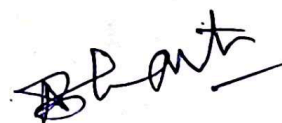
FOUR YEAR UNDERGRADUATE PROGRAM (2024 -2028)
DEPT. OF BOTANY: VALUE ADDITION COURSE
COURSE CURRICULUM (2024-25)

PART-A: Introduction			
Program: Undergraduate (Certificate / Diploma / Degree/Honors)		Semester - I/III/V	Session: 2024-2025
1	Course Code	BOVAC – 02	
2	Course Title	Academic Research & Report Writing	
3	Course Type	Value Addition Course (VAC)	
4	Pre-requisite(if,any)	As per Government norms / Institutional scheme	
5	Course Learning Outcomes (CLO)	<i>After completion of this course, the students will be able to -</i> ➤ Understand the academic research and its scope & prospects. ➤ Know the Importance of Report writing in academic and Research and Necessity of report writing for achievement of academic & research goals ➤ Demonstrates the knowledge of the toxicity of plant and essential oil ingredients. ➤ Understand the kinds & characteristics of academic and research reports / presentation and its prospective application. ➤ Use the tools and techniques of academic research and report writing ➤ Adopt the skill of research designing and report/ paper /thesis writing	
6	Credit Value	2 Credits	Credit = 15 Hours - learning & Observation
7	Total Marks	Max. Marks: 50	Min Passing Marks: 20
PART -B: Content of the Course			
Total No. of Teaching-learning Periods (01 Hr. per period) - 30 Periods (30 Hours)			
Module	Topics (Course contents): Learning and Practices		No. of Hrs
I	Introduction: Concept of - Academic Research and Research Project, Component of a concept Paper for academic research, Research-Characteristics, Type, Formulation & Design, Format, Scope, Motivation & Prospects. Popular Scheme & Organization in India promoting Research - INSPIRE, NSF, MEF, DBT, DST, DNES, STARD, ICAR, ICMR, CSIR, INSA.-		08 Hours
II	Research paper / Review writing: Steps of writing a research report. Types of Research paper, Structure of Research papers, Research paper formats, Abstract writing, Methodology, Results and Discussion, Different formats referencing, Ways of communicating a research papers, (Assignments)		07 Hours
III	Report/ Dissertation / Thesis Writing - Structure of a thesis , Scope of the work, Literature review, Experimental / Computational details, Preliminary studies, Result and Discussion, Figures & Table Preparation, Conclusion and Future works, Bibliography, Appendixes (Assignments)		07 Hours
IV	Tools, Techniques & Presentation-- Various word processors - MS Office- Word, Excel & PowerPoint, Libre-office, Latex etc. Making effective presentations using Power Point and Beamer. Basic idea of Data collection, Tabulation & Presentation. Plagiarism detection tools (Assignments)		08 Hours
Keywords	Academic Research, Research report, Project, Thesis/ Dissertation/ Review writing		

Signature of Convener & Members of CBOS:

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PART-C

BVAC – 02 (Academic Research & Report Writing)

Learning Resources: Text Books, Reference Books and Others

Text Books Recommended –

- Technical Report Writing and Research Methodology by Dr Naushad Alam Dr Quadri Javeed Ahmad Peer Dr Banarsi Lal, Write & Print Publications
- Research Writing A Complete Guide (PB) by Srinivasan R, How Academics
- GUIDE TO REPORT WRITING by Netzley, Snow, PEARSON INDIA
- A Student Guide to Writing Research Reports, Papers, Theses and Dissertations By Cathal Ó Siochrá; ISBN 9780367621049. Published 2022 by Routledge
- <https://www.goodreads.com/shelf/show/report-writing>

Online Resources–

- e-Resources / e-books and e-learning portals
 - <https://www.questionpro.com/blog/research-reports/>
 - <https://egvankosh.ac.in/bitstream/123456789/39238/1/Unit-5.pdf>
 - <https://www.studocu.com/in/document/visvesvaraya-technological-university/research-methodology/general-format-of-a-research-report/33791300>
 - <https://students.unimelb.edu.au/academic-skills/resources/report-writing/research-reports>

❖ Use of following sites

- <https://www.wiley.com/en->
ie/Student+Research+and+Report+Writing:+From+Topic+Selection+to+the+Complete+Paper-p-9781118963913
- https://www.researchgate.net/publication/275654158_HAND_BOOK_FOR_WRITING_RESEARCH_PAPER

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

End Semester Exam (ESE):		
Continuous Internal Assessment (CIA): (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):	Two section – A & B	
	Section A: Q1. Objective – 05 x1= 05 Mark; Q2. Short answer type- 5x2 =10 Marks Section B: Descriptive answer type qts., 1out of 2 from each unit- 4x05 =20 Marks	

Signature of Convener & Members of CBOS:

1. Rajeev
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FOUR YEAR UNDERGRADUATE PROGRAM (2024 -2028)
DEPT. OF BOTANY: SKILL ENHANCEMENT COURSE
COURSE CURRICULUM (2024-25)

PART-A: Introduction			
Program: Undergraduate (Certificate / Diploma / Degree/Honors)		Semester - II/IV	Session: 2024-2025
1	Course Code	BOSEC-02	
2	Course Title	Flower Decoration	
3	Course Type	Skill Enhance Course (SEC)	
4	Pre-requisite (if, any)	As per Government norms / Institutional scheme	
5	Course Learning Outcomes(CLO)	<i>After completion of this course, the students will be able to-</i> > -understand the concept of Flower arrangement & Decoration > -learn the idea, design and style of Flower decoration and its importance > -learn the skill of different types Flower arrangement with local/social application, commercial value and social demand > -adopt the skill of Indian, Western, Japanese and other/local style of flower arrangement / decoration towards level of entrepreneurs' start-up	
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): learning, Observation and Preparation	No. of Hrs
I	Introduction: Basic knowledge of Flowering plants, Ornamental plants, Decorative plants- Shade plants, Ferns, Bonsai, Decorative Flowers, Flower shows. Commercial flowers, Common Ornamental plants and flowers of local area /state. Famous flower Gardens of India. [Learning and Practices]	04Hours Learning and 07 Hours Practices
II	Floral ornaments & Flower arrangements: Garlands, Floral bouquets, Floral rangoli, Flower arrangements – concept, idea , design and style – Western styles, Japanes or Ikebana styles, Common types of Flower arrangement – Elliptical, Vertical, Horizontal Triangular, Crescent, S & Oval shapes and Cascade .flower arrangement. [Learning and Practices]	04Hours Learning and 07HoursPra ctices
III	Flower decoration: Flowers used for decoration; Different idea of flower decoration for Home, Festivals, office, Gallery, Stage, Wall, Table, Gate. Flower Pot / Vas / Bottle decoration. [Learning and Practices]	03 Hours + 07 Hours
IV	Creative decorations: Flower drying and Dry flower decoration, Foliage arrangement; Dry foliage decoration; Flower decoration by Oil Painting, Resin art of Flower decoration Terrarium – concept, design and creation of different forms. Bonsai, Shady foliage, Fern and Water plant/ flower decoration. [Learning and Practices]	04Hours Learning and 09 Hours Practices
Keywords	Floral ornaments, Flower arrangement, Flower decoration	

Signature of Convener & Members of SCBOS:

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PART-C

BOSEC-02 (Flower Decoration)

Learning Resources: Text Books, Reference Books and Others

Text Books Recommended

Textbooks:

1. Floriculture in India, G. S. Randhawa and A. Mukhopadhyay, Allied Publishers Pvt. Ltd.
2. Modern Ikebana: A New Wave in Floral Design Hardcover-2020 by Tom Loxley & Victoria Gaiger
3. On Flowers: Lessons from an Accidental Florist, Illustrated, 2019 by Amy Merrick (Author)
4. Flower School: A Practical Guide to the Art of Flower Arranging, 2020 by Calvert Crary (Author)
5. The Flower Expert: Ideas and Inspiration for a Life With Flowers, 2019 by Fleur McHarg (Author)
6. The Art of Flower Arranging, 1992 by Jan Hall (Author)
7. A Personal Guide to Flower Arranging: Volume 2 Spring and Summer, 2021 by Wendy Markby
8. The Flower Chef: A Modern Guide to Do-It-Yourself Floral Arrangements, 2016 by Carly Cylinder
9. Easy Ikebana: 30 Beautiful Flower Arrangements, 2020 by Shinichi Nagatsuka (Author)

Reference Book:

<https://www.gardensillustrated.com/reviews/the-best-new-floristry-books>

Online Resources-

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

Use of following sites

- <https://en.wikipedia.org/wiki/Ikebana>
- <https://www.artsy.net/article/artsy-editorial-thriving-art-ikebana-japanese-tradition-flower-arranging>
- https://agritech.tnau.ac.in/horticulture/horti_Landscaping_drvflower_tech.html
- <https://librarv.ihbt.res.in/Institute%20Brochures/drv%20flower.pdf>
- https://static.vikaspedia.in/media/files_en/agriculture/farm-based-enterprises/value-added-products/drv-flower-production-1.pdf
- https://www.researchgate.net/publication/362645798_Drv_Flower_Technology_A_Value_Addition_to_Floriculture_Industry
- <https://in.pinterest.com/smsastrv/flower-decoration/>
- <https://in.pinterest.com/galisreelatha/flower-decoration/>
- <https://www.britannica.com/art/floral-decoration>
- <https://homebnc.com/best-creative-flower-decoration-ideas/>

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): (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
End Semester Exam (ESE):	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

Name and Signature of Convener & Members of CBOS:

1. *R. Sree*
2. *[Signature]*
3. *[Signature]*
4. *[Signature]*
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6. *[Signature]*
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PART-C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended –

1. Kumar, N.C. (1993). An Introduction to Medical botany and Pharmacognosy. Emkay Publications, New Delhi.
2. Rao, A.P. (1999). Herbs that heal. Diamond Pocket Books (P) Ltd., New Delhi.
3. Iris F. F. Benzie and Sissi Wachtel-Galor. Herbal Medicine, 2nd edition Biomolecular and Clinical Aspects, CRC Press/Taylor & Francis; 2011
4. Fabrizio Donovan (2020) Medicinal Herbs: The Ultimate Guide to Natural Healing, Learn The Benefits of Herbs and Use the Nature's Most Powerful Medicinal Plants in Making Your Own AZ Remedies to Treat Diseases, Author's Republic.
5. Stargrove Mitchell Bebel ND, Herb, Nutrient, and Drug Interactions, Publisher: Elsevier – Health Sciences Division
6. Iris F. F. Benzie (Editor), Herbal Medicine (Oxidative Stress and Disease) 2nd Edition,

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.mpp.gov.in
- www.vlab.co.in
- www.internshala.com
- www.ndl.iitkgp.ac.in

Online Resources–

- <https://pubmed.ncbi.nlm.nih.gov/22593937/>
- <https://crimsonpublishers.com/acam/pdf/ACAM.000551.pdf>
- https://www.researchgate.net/publication/329823398_Medicinal_Plants_Used_in_the_Treatment_of_Mental_and_Neurological_Disorders_in_Ghana
- <https://www.sciencedirect.com/science/article/abs/pii/S0378874115003013>
- <https://core.ac.uk/download/pdf/143841457.pdf>
- <https://practicalselfreliance.com/medicinal-plants/>
- <https://practicalselfreliance.com/medicinal-plants/>
- <https://www.pdfdrive.com/medicinal-plants-books.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): (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):	Two section – A & B	
	Section A: Q1. Objective – 05 x1= 05 Mark; Q2. Short answer type- 5x2 =10 Marks	
	Section B: Descriptive answer type qts., 1out of 2 from each unit- 4x05 =20 Marks	

Name and Signature of Convener & Members of CBOS:

1. *[Signature]*

2. *[Signature]*

3. *[Signature]*

4. *[Signature]*

5. *[Signature]*

6. *[Signature]*

7. *[Signature]*

8. *[Signature]*

9. *[Signature]*

10. *[Signature]*

[Signature]

शहीद नंदकुमार पटेल विश्वविद्यालय, रायगढ़ (छ.ग.)

(छत्तीसगढ़ विश्वविद्यालय अधिनियम 1973 द्वारा स्थापित राजकीय विश्वविद्यालय)



राष्ट्रीय शिक्षा नीति – 2020
के तहत तृतीय एवं चतुर्थ सेमेस्टर
नवीन पाठ्यक्रम
(सत्र 2025–26)

वनस्पति शास्त्र

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

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. *R. Singh*
2. *M. Singh*
3. *Aditi*
4. *M. Singh*
5. *H.*

6. *A. Singh*
7. *A. Singh*
8. *M. Singh*
9. *H.*
10. *A. Singh*

Chairman
of Studies
Nandkumar Patel
Raigadh, Raigarh (C.C.)

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

PART- A: Introduction			
Program: Bachelor in Life Sciences (Diploma / Degree/Honors)		Semester - III	Session: 2024-2025
1	Course Code	BOSC-03 T	
2	Course Title	Archegoniate and Fossils	
3	Course Type	Discipline Specific course (DSC)	
4	Pre-requisite (if, any)	As per program	
5	Course Learning Outcomes (CLO)	➤ students will be familiar with amphibians and reptiles plants ➤ progressive evolution in plants ➤ relics of past plants ➤ diversity in plants ➤ development of seeds.	
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	Bryophyta: Morphology, structure, reproduction and life history, distribution, classification, evolution of gametophytes and sterilization of sporogenous tissue. General account of- Riccia, Marchantia, Anthoceros and Funaria , Economic and ecological importance of bryophytes.	12	
II	Pteridophytes: Morphology, anatomy and reproduction, classification, evolution of stele, heterospory, telome theory and origin of seed habit, general account and life history of of Psilotum, Lycopodium, Sellaginella, Equisetum Pteris, Marsilea	11	
III	Gymnosperm : Characteristics of Gymnosperms, the vessel - less & fruitless seed plants, Classification of Gymnosperm; Polyembryony in Gymnosperms and its role; Distribution of Gymnosperm in India; Economic importance of Gymnosperm. General account of Cycas, Pinus, Gnetum Concepts of living fossil (Cycas & Ginkgo); Angiospermic characters of Gnetum.	11	
IV	Fossil: Fossil and fossilization, types of fossils Geological time table Brief account of the families of Pteridospermales –Rhynia, Calamites. General Account and Affinities - Cycadeoidales Pentoxylales and Cordaitales	11	
Keywords Archegonia, seedless, heterospory, fossils			
Signature of Convener & Members (CBoS) :			

① R. Singh
② R. Singh
③ R. Singh
④ R. Singh
⑤ R. Singh
⑥ R. Singh
⑦ R. Singh

⑧ R. Singh
⑨ R. Singh
⑩ R. Singh

NB
अध्ययन में 10.17.25
शहीद नंदकुमार पटेल
विश्वविद्यालय, रायगढ़ (छ.ग.)

Chairman
R. Singh
Studies
R. Singh (C.O.)

PART-C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended –

1. Puri, P. (1980) Bryophytes, Atma Ram and Sons, Delhi.
2. Vashishtha, B. R. (2005) Pteridophytes S. Chand and Co., Delhi.
3. Bhatnagar, S. P., Moitra, A. (1996) Gymnosperms, New Age International Pvt. Ltd., New Delhi.

Text Books Recommended –

4. Sporne, K. K. (1991) The Morphology of Gymnosperm. B. I. Publishing Pvt. Ltd., Bombay.
5. Stewart, W. N. and Ruthwell, G. W. (1993) Paleobotany and the Evolution of Plants. Cambridge Univ. Press, UK.
6. Singh, H. (1978) Embryology of Gymnosperms; Encyclopedia of Plant Anatomy X. Gebruder Bortraeger, Berlin.

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.mpg.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://study.com/learn/lesson/bryophytes-characteristics-examples.html>
- [https://bio.libretexts.org/Bookshelves/Introductory_and_General_Biology/Book%3AGeneral_Biology_\(Boundless\)/26%3ASeed_Plants/26.02%3AGymnosperms/26.2A%3ACharacteristics_of_Gymnosperms](https://bio.libretexts.org/Bookshelves/Introductory_and_General_Biology/Book%3AGeneral_Biology_(Boundless)/26%3ASeed_Plants/26.02%3AGymnosperms/26.2A%3ACharacteristics_of_Gymnosperms)
- https://www.google.com/search?q=fossils&sc=esv=09379ecd0b6efd91&rlz=1C1CHBD_enIN10911N1093&ssrf=ACQVn09ytIzqRGwbydx-nl5OZFXGRnmfcw%3A1713546819943&ei=Q6YiZvefOde5vr0PtMuyqAg&og=fossils&gs_l=Egnd3Mtd2l6LXNlcnAiB2Zvc3NpbHMqAggAMg0QABIABBixAxdGloFMgoQLhiABBDGloFMgoUQABIABDIFEAAAYgAQyBRAAGIAEMgoQAIBABBDGloFMgoUQABIABDIFEAAAYgAQyBRAAGIAEMgoUQABIABEjhKIAAVPIUcAB4AJABAjgBwKqAYcLqgEFMC41LJK4AQHIAQD4AQGYAggAukLwplKECMYgAQYJxiKBCICBBAjGCICAhEQLhiABBDixAxiRAxiDARjHIAcICCBAAGIAEGLEDwqKEAAAYgAQYFBIHAggDAJIHBTauMv40oAfSWVw&scient=gws-wiz-serp
- https://www.google.com/search?q=fossils&sc=esv=09379ecd0b6efd91&rlz=1C1CHBD_enIN10911N1093&ssrf=ACQVn09ytIzqRGwbydx-nl5OZFXGRnmfcw%3A1713546819943&ei=Q6YiZvefOde5vr0PtMuyqAg&og=fossils&gs_l=Egnd3Mtd2l6LXNlcnAiB2Zvc3NpbHMqAggAMg0QABIABBixAxdGloFMgoQLhiABBDGloFMgoUQABIABDIFEAAAYgAQyBRAAGIAEMgoQAIBABBDGloFMgoUQABIABDIFEAAAYgAQyBRAAGIAEMgoUQABIABEjhKIAAVPIUcAB4AJABAjgBwKqAYcLqgEFMC41LJK4AQHIAQD4AQGYAggAukLwplKECMYgAQYJxiKBCICBBAjGCICAhEQLhiABBDixAxiRAxiDARjHIAcICCBAAGIAEGLEDwqKEAAAYgAQYFBIHAggDAJIHBTauMv40oAfSWVw&scient=gws-wiz-serp
- https://www.google.com/search?q=pteridophytes&sc=esv=09379ecd0b6efd91&rlz=1C1CHBD_enIN10911N1093&ssrf=ACQVn0-V0lp75OZG3shfKrltXB0GPdZyA%3A1713546628592&ei=hKUiZuvFI9q-juNIPkr-DkAY&og=pter&gs_l=Egnd3Mtd2l6LXNlcnAiBHB0ZXIqAggAMg0QABIABBixAxdGloFMgoQABIABBhDGloFMgoQABIABBhDGloFMgoQABIABBhDGloFMgoUQABIABDIKEAAAYgAQYQxiKBTINEC4YgAQYsQMYYxiKBTINEC4YgAQYChAAGIAEGEMyigUvChAAGIAEGEMyigUvIihQAfIXCnAAeACQAQCYAIFQBoAGIBqoBBTAMi4vuAEBvAEEA-AEBmAlEoALgBsICChAijGIAEGGCyigXCAGQQIYgnwqIKEC4YgAQYQxiKHZgDAJIHBTauMi4voAfOSg&scient=gws-wiz-serp
- [https://bio.libretexts.org/Bookshelves/Introductory_and_General_Biology/Book%3AGeneral_Biology_\(Boundless\)/26%3ASeed_Plants/26.02%3AGymnosperms/26.2A%3ACharacteristics_of_Gymnosperms](https://bio.libretexts.org/Bookshelves/Introductory_and_General_Biology/Book%3AGeneral_Biology_(Boundless)/26%3ASeed_Plants/26.02%3AGymnosperms/26.2A%3ACharacteristics_of_Gymnosperms)

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. out of 2 from each unit-4x10=40 Marks

Name and Signature of Convener & Members of CBoS:

अध्यक्ष
शहीद नोश्तरी
विश्वविद्यालय, रायगढ़ (छ.ग.)

① R. Bhoos
② R. Bhoos
③ R. Bhoos
④ R. Bhoos
⑤ R. Bhoos
⑥ R. Bhoos
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⑧ R. Bhoos

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

PART- A: Introduction			
Program: Bachelor in Life Sciences (Diploma / Degree/Honors)		Semester - III	Session: 2024-2025
1	Course Code	BOSC-03	
2	Course Title	Lab. Course-03 (Archegoniate and Fossils)	
3	Course Type	Laboratory course	
4	Pre-requisite (if, any)	As per program	
5	Course Learning Outcomes (CLO)	At the end of the course students will be familiar > with amphibians and reptiles plants > progressive evolution in plants > relics of past plants > diversity in plants > Development of seeds.	
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	Bryophyta: Comparative study of the anatomy of vegetative and reproductive parts of <i>Marchantia</i> , <i>Pellia</i> , <i>Anthoceros</i> , <i>Notothylus</i> , <i>Funaria</i> , <i>Polytrichum</i> . Pteridophyta: Comparative study of the anatomy of vegetative and reproductive parts of <i>Psilotum</i> , <i>Lycopodium</i> , <i>Selaginella</i> , <i>Equisetum</i> , <i>Gleichenia</i> , <i>Pteris</i> , <i>Ophioglossum</i> , <i>Isoetes</i> . Gymnosperms: Comparative study of the anatomy of vegetative and reproductive parts of <i>Cycas</i> , <i>Ginkgo</i> , <i>Cedrus</i> , <i>Abies</i> , <i>Picea</i> , <i>Cupressus</i> , <i>Araucaria</i> , <i>Cryptomeria</i> , <i>Taxodium</i> , <i>Podocarpus</i> , <i>Agathis</i> , <i>Taxus</i> , <i>Ephedra</i> and <i>Gnetum</i> . ▪ Collection of various gymnospermic plant materials. ▪ Field work – as far practicable conveniently. Fossil: Study of important fossil gymnosperms from prepared photographs, slides and specimens.		30
Keywords	Archegonia, venter, bryophytes, pteridophytes		

Signature of Convener & Members (CBoS) :

① R. Swar
 ② R. Swar
 ③ R. Swar
 ④ R. Swar

⑤ R. Swar
 ⑥ R. Swar
 ⑦ R. Swar
 ⑧ R. Swar
 ⑨ R. Swar

⑩ R. Swar
 ⑪ R. Swar
 ⑫ R. Swar
 ⑬ R. Swar
 ⑭ R. Swar
 ⑮ R. Swar

10/07/25
 अध्यक्ष महोदय
 शहीद नंदकुमार पटेल
 विश्वविद्यालय, (प. त.)

R. Swar

PART-C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended –

1. The Practical Fossil Finder (Practical Handbook) Hardcover – 1 October 1991 by Steve Parker (Author) Publishers Facts On File Inc
2. 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).
3. Pandey S.K. (2012). Quick Concept of Botany. Publisher LAP LAMBERT Academic Publishing GmbH & Co. KG, Germany (ISBN: 978-3-8484-3104-5).
4. Dubey, R. C. and Maheshwari. D.K. 2012. Practical Microbiology, S. Chand & Company, Pvt. Ltd., New Delhi.
5. Pandey. B.P. 2014 Modern Practical Botany, (Vol-I) S. Chand and Company Pvt. Ltd., New Delhi.

Reference Books Recommended –

1. Principles of Palaeontology Edition 3 Paperback–1 January 2006 by Arnold Miller, Michael Foote Publishers - W.H.Freeman & Co Lt

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.eskiksha.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://cfaidnbmnnnibpcajpcgicfindmkaj/https://egyankosh.ac.in/bitstream/123456789/69611/1/Unit-9.pdf>
- 2. <https://www.encyclopedia.com/science/encyclopedias-almanacs-transcripts-and-maps/fossil-and-fossilization>
- 3. <https://palaeobotany.org>

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): 30	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:

① R. Prasad
 ② Dr. S. K. Pandey
 ③ Dr. S. K. Pandey
 ④ Dr. S. K. Pandey
 ⑤ Dr. S. K. Pandey
 ⑥ Dr. S. K. Pandey
 ⑦ Dr. S. K. Pandey
 ⑧ Dr. S. K. Pandey
 ⑨ Dr. S. K. Pandey
 ⑩ Dr. S. K. Pandey

⑪ Dr. S. K. Pandey
 ⑫ Dr. S. K. Pandey
 ⑬ Dr. S. K. Pandey
 ⑭ Dr. S. K. Pandey
 ⑮ Dr. S. K. Pandey

MD
 10/7/25
 अध्यक्ष मंडल
 शहीद नवकुमार कृष्ण
 विश्वविद्यालय, रायपुर (छ.प्र.)

Dr. S. K. Pandey

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

PART- A: Introduction			
Program: Bachelor in Life sciences (Diploma / Degree/Honors)		Semester - IV	Session: 2024-2025
1	Course Code	BOSC-04 T	
2	Course Title	Angiosperms	
3	Course Type	Discipline Specific course (DSC)	
4	Pre-requisite (if, any)	As per program	
5	Course Learning Outcomes (CLO)	At the end of the course, the students will be able : > Understand basics of plant identification, classification and nomenclature > Understand the concept, diversity and evolution of Angiosperm plants. > Become familiar with the internal structure of plants and concept of plant tissues with its revolutionary concept. > Understand the reproductive system in flowering plants.	
6	Credit Value	3 Credits	Credit = 15 Hours - learning & Observation
7	Total Marks	Max. Marks: 100	Min Passing Marks: 40

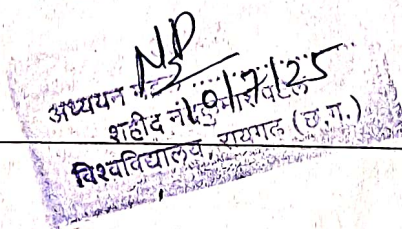
PART -B: Content of the Course

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

Unit	Topics (Course contents)	No. of Period
I	Plant taxonomy: Types of classification-artificial, natural and phylogenetic Bentham & Hooker (upto series), Engler & Prantl (upto series) and Hutchinson system of classification with its merit and demerits, Modern trends of taxonomy and Numerical taxonomy. Binomial nomenclature system. Principles and rules (ICBN/ICN) Ranks and names, Typification, author citation, validation, publication, principle of priority and its limitations; Herbarium technique, important herbaria, e herbarium and Botanical gardens of India.	12
II	Taxonomic Description: Characteristics, systematics and economic importance of Dicotyledonous families- Brassicaceae, Malvaceae, Fabaceae (subfamily), Apiaceae, Rutaceae, Euphorbiaceae, Lamiaceae, Asteraceae. Monocotyledonous families -Orchidaceae, Liliaceae, Cyperaceae, Musaceae and Poaceae. (Floral features, Floral formula and floral diagram are essential)	11
III	Anatomy: Tissue system features, functions of different types of meristematic and permanent tissues. Internal Structure of dicot and monocot root stem and leaf. Root and shoot apex organization: Structure and function of cambium and secondary growth in root and stem. Wood (heartwood and sapwood, annual rings) Abnormal Secondary Growth (<i>Dracaena</i> , <i>Achyranthes</i> , <i>Nyctanthes</i> , <i>Boerhavia</i>)	11
IV	Embryology: Structure of anther and pollen. Structure and types of ovules, Embryo sacs-types, Pollination and Fertilization, Double fertilization, Endosperm types, structure and functions. Development of embryo-Dicot and monocot embryo. Concept of Apomixes and Polyembryony, Seed structure; appendages and dispersal mechanisms.	11
Keywords	Taxonomy, Herbarium, Tissue, Fertilization	

Signature of Convener & Members (CBoS) :

- ① R. Singh
- ② K. Singh
- ③ Indira
- ④ K. Singh
- ⑤ K. Singh
- ⑥ K. Singh
- ⑦ K. Singh
- ⑧ K. Singh
- ⑨ K. Singh
- ⑩ K. Singh



Handwritten signature: K. Singh

PART-C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended –

1. Simpson, M.G. (2006) Plant Systematics. Elsevier Academic Press, San Diego, CA, USA
2. Beck, C.B. (2010). An Introduction to Plant Structure and Development, II edition.
3. Johri, B.M. (1984). Embryology of Angiosperms. Springer-Verlag, Berlin
4. Singh, G. (2012) Plant Systematics. Theory and Practice. Oxford & IBH Pvt. Ltd, New Delhi.
5. Bhojwani, SS. & Bhatnagar, SP (2011). Embryology of Angiosperms. Vikas Publication House Pvt.Ltd. New Delhi 5 edition
6. Mauseth. I.I (1988) Plant Anatomy. The Benjamin Cummings Publisher. USA
7. Pandey, B. P. (LatesEdt), Plant Anatomy

Reference Books Recommended –

1. Simpson, M.G. (2006) Plant Systematics. Elsevier Academic Press, San Diego, CA, USA
2. Beck, C.B. (2010). An Introduction to Plant Structure and Development, II edition.
3. Mauseth. I.I (1988) Plant Anatomy. The Benjamin Cummings Publisher. USA
4. Jeffrey, C. (1982). An Introduction to Plant Taxonomy. Cambridge University Press, Cambridge
5. Judd, W.S., Campbell, C.S., Kellogg, E.A., Stevens, P.F. (2002). Plant Systematics-A Phylogenetic Approach. Sinauer Associates Inc., U.S.A. 2 nd edition.
6. Maheshwari, J.K. (1963). Flora of Delhi. CSIR, New Delhi.
7. Radford, A.E. (1986). Fundamentals of Plant Systematics. Harper and Row, New York
8. Saxena N.B. and Saxena S. (2012). Plant Taxonomy Pragati Prakashan.
9. Sharma O.P. (2013). Plant Taxonomy. MC GRAW HILL INDIA.
10. Sharma, M.K. (2013) Plant Structures (An Introduction to Plant Anatomy). Vayu Education of India.
11. Chopra G.L. (2005) Angiosperm, Pradeep Publication, Jalandhar.

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.eschiksha.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://www.fs.usda.gov/managing-land/wildflowers/pollinators/what-ispollination>
<https://www.pw.live/exams/ncet/embryo/#:-:text=Dicot%20and%20monocot%20embryos%20develop,one%20that%20is%20significantly%20smaller.>
<https://byjus.com/biology/apomixis/>
<https://examupdates.in/plant-anatomy-and-embryology-book>

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): 15 (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): 35	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 R. R. R.
② R. R. R.
③ R. R. R.
④ R. R. R.
⑤ R. R. R.
⑥ R. R. R.

⑦ R. R. R.
⑧ R. R. R.
⑨ R. R. R.
⑩ R. R. R.

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R. R. R.

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

PART- A: Introduction			
Program: Bachelor in Life Sciences (Diploma / Degree/ Honors)		Semester - IV	Session: 2024-2025
1	Course Code	BOSC-04	
2	Course Title	Lab. Course – 04 (Angiosperms)	
3	Course Type	Laboratory Course	
4	Pre-requisite (If, any)	As per program	
5	Course Learning Outcomes (CLO)	At the end of this course, students will be able to: ➤ Understand the systematic status of flowering plants. ➤ Learn collection of local flora , identification and herbarium preparation. ➤ Understand internal structure of different plant parts. ➤ Understand the pollination and seed dispersal mechanism. ➤ Understand about reproduction system in flowering plants.	
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	• Description of local plants of the syllabus in semitechnical language, floral formula and floral diagrams should be drawn. • Preparation of herbarium of local flora. • Anatomy of primary and secondary growth in monocots and dicots stem using hand sections or permanent slides. • Anatomy of root, primary and secondary structure. • Study of placentation. • Study of types of ovule in permanent slide. • Isolation of globular, heart shape and torpedo embryo. • Study of pollination by insects.		30
Keywords	Herbarium, Monocot, Placentation, Pollination		

Signature of Convener & Members (CBoS) :

- ① Dr. [Signature]
- ② [Signature]
- ③ [Signature]
- ④ [Signature]
- ⑤ [Signature]
- ⑥ [Signature]
- ⑦ [Signature]
- ⑧ [Signature]
- ⑨ [Signature]
- ⑩ [Signature]

अध्यक्ष 10.10.25
 शहीद नंदकुमार पटेल
 विश्वविद्यालय, रायगड (छ.प्र.)

[Signature]

PART-C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended –

1. Pandey, B.P. (2014). Modern Practical Botany Vol. II. S. Chand and Company Ltd., New Delhi.
2. Bendre, A.M. and Kumar A. (2003). Manual of Practical Botany Vol. II. Rastogi Publications, Meerut.
3. Santra S.C. and Chatterjee (2005). College Botany Practical Vol. II New Central Book Agency Pvt. Ltd

Online Resources–

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

- > www.swayam.ac.in
- > www.ignou.ac.in
- > www.cgankosh.ac.in
- > www.iitm.ac.in
- > www.eskillindia.org
- > www.esiksha.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://visiblebody.com/learn/biology/monocot-dicot/roots>

<https://www.toppr.com/guides/biology/differences-between/monocot-and-dicot-stem/>

<https://examupdates.in/plant-anatomy-and-embryology-book/>

<https://jrs.ac.in/working folder/DOWNLOAD-D-12-180- 618C09F700115.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 CBaS:

- ① R. S. Rao
- ② R. S. Rao
- ③ R. S. Rao
- ④ M. S. Rao
- ⑤ R. S. Rao
- ⑥ R. S. Rao
- ⑦ R. S. Rao
- ⑧ R. S. Rao
- ⑨ R. S. Rao
- ⑩ R. S. Rao

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R. S. Rao

FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)

DEPARTMENT OF BOTANY COURSE CURRICULUM

PART- A: Introduction			
Program: Bachelor in Life Science (Diploma / Degree/Honors)		Semester - III	Session: 2024-2025
1	Course Code	BOSE- 01 T	
2	Course Title	Natural resources and management	
3	Course Type	Discipline specific Elective (DSE)	
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 natural resources and their sustainable utilization. > Knowledge on land, water, energy, and forest resources. > Students will learn about the practices of natural resource management. > Knowledge on the international and national efforts of natural resource management.	
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	Natural resources > Definition and types. > Natural resources' conservation Role of an individual in conservation of natural resources, Significance, > Sustainable utilization of resources' : Concept, approaches economic, ecological, and socio-cultural activities.		12
II	Land and freshwater resources > Land as a resource > Soil erosion and desertification > Soil degradation and management. > Forest resources use and over exploitation, deforestation > Water resources, use and overutilization of surface and ground water > Fresh Marine and estuarine ecosystems; > Wetlands threats and management strategies		11
III	Biological Resources > Biodiversity-definition and types > Value of biodiversity > Biodiversity at global, national and regional levels > Threats; Management strategies; > Bioprospecting. IPR; CBD; National Biodiversity Action Plan). > Forests: Cover and its significance (with special reference to India); > Major and minor Forest products; > Renewable and non-renewable sources of energy.		11
IV	Contemporary practices in resource management > National and international efforts in resource management and conservation. > Waste management practices > Natural resource Accounting > Environmental impact assessment EIA > Geographical information System GIS > Participatory Appraisal of natural Resource > Ecological Footprint with emphasis on carbon footprint,		11
Keywords		Resources, Biodiversity, Resources management, IPR, CBD.	

1. Dr. Jyoti
 2. Dr. Jyoti
 3. Dr. Jyoti
 4. Dr. Jyoti
 5. Dr. Jyoti
 6. Dr. Jyoti

7. Dr. Jyoti
 8. Dr. Jyoti
 9. Dr. Jyoti
 10. Dr. Jyoti

10/10/25
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 विश्वविद्यालय, रायपुर (छ.ग.)

Dr. Jyoti

PART-C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended –

1. Vasudevan, N. (2006). Essentials of Environmental Science. Narosa Publishing House, New Delhi.
2. Singh, J. S., Singh, S.P. and Gupta, S. (2006). Ecology, Environment and Resource Conservation. Anamaya Publications, New Delhi.

Reference Books Recommended –

- 1, Rogers, P.P., Jalal, K.F. and Boyd, J.A. (2008). An Introduction to Sustainable Development. Prentice Hall of India Private Limited, New Delhi.

Online Resources–

- e-Resources / e-books and e-learning portals
- <https://www.sciencedirect.com/topics/social-sciences/natural-resource>
- <https://cfaidnbmnnibpcajpeglefindmkaj/https://egvankosh.ac.in/bitstream/123456789/66166/2/Unit4.pdf>
- https://cfaidnbmnnibpcajpeglefindmkaj/https://www.ers.usda.gov/webdocs/publications/41964/30289_biological.pdf?v=0#:~:text=16-What%20Are%20Biological%20Resources%3F,forests%2C%20and%20other%20natural%20lands.
- <http://surl.li/spedd>
- <https://shorturl.at/ewyIP>
- <https://shorturl.at/cimoF>

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

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:

① R. K. Singh
② P. K. Singh
③ M. Singh
④ S. Singh
⑤ A. Singh
⑥ B. Singh

⑦ S. Singh
⑧ S. Singh
⑨ S. Singh
⑩ S. Singh

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अध्यक्ष
श्री १०१२२५
विश्वविद्यालय, दिल्ली

FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)

DEPARTMENT OF BOTANY

COURSE CURRICULUM

PART- A: Introduction			
Program: Bachelor in Life Science (Diploma / Degree/ Honors)		Semester - III	Session: 2024-2025
1	Course Code	BOSE -01 P	
2	Course Title	Lab course -01 (Natural resources and management)	
3	Course Type	Laboratory course	
4	Pre-requisite (if, any)	As per program	
5	Course Learning Outcomes (CLO)	at the end of then of the sesn ○ To understand natural resources and their sustainable utilization. ○ Acquire knowledge on land, water, energy, and forest resources. ○ Students will learn about the practices of natural resource management. ○ Acquire knowledge on the international and national efforts of natural resource management.	
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) To compare protected and unprotected grassland stands using community coefficients 2) To estimate IVI of the species in a woodland using point centered quarter method. 3) To find out important grassland species using chi square test. 4) Scientific visits to a protected area, a wet land, a mangrove, NBPGR, BSI, CSIR, ICAR labs and a recognized botanical gardens or a museum. 5) To determine diversity indices (Shannon Wiener, concentration of dominance, species richness, equability and B diversity. 6) Field survey of a part of town or city to make the students aware of the diversity of plants in urban ecosystems. 7) Estimation of solid waste generated by a domestic system (biodegradable and non biodegradable) and its impact on land degradation. 8) Collection of data on forest covers of specific area. 9) Measurement of dominance of woody species by DBH (diameter at breast height) method. 10) Calculation and analysis of ecological footprint. 11) Ecological modeling.		30
Keywords	Community coefficient, IVI, diversity indices		

Signature of Convener & Members (CBOS) :

① Officer
② Head
③ Mr

④ Mr

⑤ Mr

⑥ Mr

⑦ Mr

⑧ Mr

⑨ Mr

⑩ Mr

Mr. Jhalin

Mr. Anir

Mr. N

Mr. V. S.

10/10/25
अध्यक्ष, शिक्षण विभाग, रायगढ़ (छ.ग.)

Mr. Prant

PART-C: Learning Resources**Text Books, Reference Books and Others****Text Books Recommended –**

1. A Handbook of Human Resource Management Practice
2. Environmental and Natural Resource Economics_ A Contemporary Approach
3. Sustainable Management of Natural Resources_ Mathematical Models and Methods (Environmental Science and Engineering Environmental Science)

Online Resources–**> e-Resources / e-books and e-learning portals**

- 1) <https://shorturl.at/uIMTW>
- 2) <https://shorturl.at/yFJM3>

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

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:

① R. Shree
② R. Shree
③ M. Shree
④ M. Shree
⑤ M. Shree
⑥ M. Shree

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⑧ M. Shree
⑨ M. Shree
⑩ M. Shree

M. Shree

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सिद्धविद्यालय, रायपुर (छ.प्र.)

FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)

DEPARTMENT OF BOTANY COURSE CURRICULUM

PART- A: Introduction			
Program: Bachelor in Life Science (Diploma / Degree/Honors)		Semester - IV	Session: 2024-2025
1	Course Code	BOSE- 02 T	
2	Course Title	Microbiology and Phytopathology	
3	Course Type	Discipline specific Elective (DSE)	
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 get ➤ Basic idea of different microbes present in biotic and abiotic environment. ➤ Knowledge of principle concept and methods in the field of Microbiology and Phytopathology ➤ Idea of living, non living and environmental causes of plant diseases. ➤ Knowledge of different technique to isolate microbes study their cultural characteristics. ➤ How disease occurs by microbes, their identification and control measures.	
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	Microbiology: ❖ General account, distribution and classification of microorganism. ❖ Major microbes of air soil water and food ❖ Isolation and cultivation of microorganism ❖ Important tools and techniques used in microbiological studies.	12	
II	Plant pathology: ❖ Nature and concept of diseases in plants, ❖ History and development of plant pathology, contribution of Indian plant pathologist in India and abroad, pathology and trends in 21 st century ❖ Symptom of parasitic and non-parasitic diseases, ❖ Classification of plant diseases. ❖ Important plant diseases caused by different Pathogens ❖ Plant quarantine ❖ HR and hypersensitivity	11	
III	Techniques of Studying Plant Diseases: ❖ Field Studies, Collection of samples and its preservation. ❖ Sterilization technique- Standard Methods of sterilization - Physical methods, Chemical methods, Radiation methods, ❖ Isolation technique: Preparation of different media for growth of pathogen by using standard inoculation techniques like- plate streak, serial dilution and pour plate methods to obtain a pure culture. ❖ Staining Technique: Nature and Types of stains, ❖ Preservation : methods of preservation of culture	11	
IV	Host Parasite Relation: ❖ Terms and concept ❖ Disease cycle and environmental relations ❖ Plant disease dissemination ❖ Role of enzymes and toxins in pathogenesis and mode of infection, ❖ Inoculums and Inoculums potential ❖ Koch's postulates ❖ Defense mechanism in plant against pathogens, ❖ Prevention and control of plant diseases	11	
Key words	Microorganism, Disease, Pathogens , Culture		
Signature of Convener & Members (CBoS) :			

① Review
② Review
③ Mr
④ Mr
⑤ Mr
⑥ Mr
⑦ Mr

MR
30/07/25
अध्यक्ष महोदय
राष्ट्रीय प्रयोगशाला, रायपुर (C.B.O.S.)

⑦ Mr
⑧ Mr
⑨ Mr
⑩ Mr

Mr

PART-C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended -

1. Bridges, P. (1998) Molecular Variability Of Fungal Pathogens. CAB
2. Bilgrami, K. S. and Dubey, H. C. (1985) Plant Pathology, Vikas Publ. House, Sahibabad U.P.
3. Ali, s. s. and Kulshereshta, p. (1986) plant pathology, adeeb educational, Raipur.
4. Singh, R. S. (1980) Plant Pathology, Oxford IBH Publ. Co, New Delhi.
5. Malhotra R. Plant Pathology Publisher: McGraw Hill Education India

Reference Books Recommended-

1. Agrios, G. N. (1997) Plant Pathology, Academic Press, London

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://www.sciencedirect.com/topics/agricultural-and-biological-sciences/plant-pathology#:~:text=Plant%20pathology%20is%20a%20science,parasitic%20microorganis%20that%20cause%20disease>
- 2. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4600171/>
- 3. <https://bnrc.springeropen.com/articles/10.1186/s42269-021-00627-6>
- 4. <https://www.sciencedirect.com/science/article/abs/pii/S0065308X08604339>
- 5. <https://www.researchgate.net/publication/371501301> Fundamentals of Plant Pathology

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

Name and Signature of Convener & Members of CBoS:

- ① R. Prasad
- ② R. Prasad
- ③ H. S.
- ④ R. Prasad
- ⑤ R. Prasad
- ⑥ R. Prasad

- ⑦ R. Prasad
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- ⑩ R. Prasad

R. Prasad

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विश्वविद्यालय, रायपुर (स.ग.)

FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)

DEPARTMENT OF BOTANY COURSE CURRICULUM

PART- A: Introduction			
Program: Bachelor in Science (Diploma / Degree/ Honors)		Semester - IV	Session: 2024-2025
1	Course Code	BOSE-02 P	
2	Course Title	Lab course 02 (Microbiology and Phytopathology)	
3	Course Type	Discipline specific Elective (DSE)	
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 get ➤ Basic idea of microbes. ➤ Culture of microbes in the laboratory ➤ How disease occurs by microbes ➤ Basic idea of host parasite interrelationship ➤ Control measure of pathogen by different biological sources.	
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	❖ Calibration of microscope. ❖ Study of symptoms of various plants disease caused by viruses, bacteria and fungi. ❖ Sterilization of glass wares by detergent, chromic acid and dry sterilization ❖ Preparation and sterilization of culture media NAM, PDA, to culture bacteria and fungi respectively. ❖ Isolation of micro-organism from soil, water and air by using standard inoculation technique. ❖ Identification of the isolated fungi by slide preparation. ❖ Micrometry – measurement of length and width of spore/ conidia of the isolated /given fungi. ❖ Preparation of camera lucida diagram of the isolated / given fungi. ❖ Cultural charecteristics the the cultured bacteria. ❖ Gram staining of Bacteria ❖ Host parasite relationship- slide preparation of infected / diseased portion of the host to study host parasite relationship by smearing and section cutting methods isolated from local field. ❖ Demonstration of the effect of various bio-pesticides (essential oils, neem, turmeric and garlic) against microbe/pathogens ❖ Preparation of herbarium of different plant diseases of local area		30
Keywords	Disease, symptoms, medium, pathogenesis		

Signature of Convener & Members (CBOS) :

① *[Signature]*
 ② *[Signature]*
 ③ *[Signature]*
 ④ *[Signature]*
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⑥ *[Signature]*
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 10/07/25
 अध्यक्ष मंडल
 शहीद मंदकुमार पटेल
 विनोदियालय, रावराह (उ.प्र.)

PART-C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended –

1. Experiments In Microbiology, Plant Pathology And Biotechnology By K. R. Anuja. Publisher New Age International

Online Resources–

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

1. <https://www.sciencedirect.com/topics/agricultural-and-biological-sciences/plant-pathology#:~:text=Plant%20pathology%20is%20a%20science,parasitic%20microorganisms%20that%20cause%20disease.>
2. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4600171/>
3. <https://bnrc.springeropen.com/articles/10.1186/s42269-021-00627-6>
4. <https://www.sciencedirect.com/science/article/abs/pii/S0065308X08604339>
- 1) <https://www.researchgate.net/publication/371501301> Fundamentals of Plant Pathology

Online Resources–

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

- <https://efaidnbmnnnibpcajpcglefindmkaj/https://mis.alagappauniversity.ac.in/siteAdmin/dde->
- <https://admin/uploads/3/PG M.Sc. Botony 34631%20MICROBIOLOGY%20AND%20PLANT%20PATHOLOGY.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:

① R. R. Rao
② R. R. Rao
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R. R. Rao

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10/07/25
अध्ययन मंडल
शहीद नंदकुमार मंडल
विश्वविद्यालय, नयागढ़ (छ.ग.)

FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)

DEPARTMENT OF BOTANY COURSE CURRICULUM

PART- A: Introduction			
Program: Bachelor in Life sciences (Certificate / Diploma / Degree)		Semester - I/II/III/IV	Session: 2024-2025
1	Course Code	BOVAC-01	
2	Course Title	Herbal Plant & Human Health	
3	Course Type	Value Addition Course (BOVAC-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 value of herbs, herbal medicine and use of herbal medicine. ➤ Know about botanical medicine professionals in the complementary and alternative medicine (CAM) ➤ Demonstrates the knowledge of the toxicity of plant and essential oil ingredients. ➤ Understand the possibility for allergic and unpleasant reactions to herbal products and the impact of herbal quality on potential toxicity. ➤ Use the herbal plants in their daily life ➤ Adopt the value of herbal medicine to save their health.	
6	Credit Value	2 Credits	Credit = 15 Hours - learning & Observation
7	Total Marks	Max. Marks: 50	Min Passing Marks: 20
PART -B: Content of the Course			
Total No. of Teaching-learning Periods (01 Hr. per period) - 30 Periods (30 Hours)			
Unit	Topics (Course contents)	No. of Period	
I	Introduction: Elementary knowledge of Herbal plant and Concept of Herb as medicine. Concept of ethno-medicine, folk medicines, ethno-ecology, ethnic communities of the India & the Chhattisgarh. Concept of Herbal garden. Collection of ethnic information. <i>Observation/In Practices - Survey and familiarization with herbs & local herbal plants</i>	08	
II	Importance of medicinal plants: Importance of Herbal / Medicinal plant in human health care – health and balanced diet (Role of proteins, carbohydrates, lipids and vitamins). Common plants & plant parts providing metals and vitamins. <i>Observation/In Practices - Survey and familiarization with local herbal medicinal plants</i>	07	
III	Tribal medicine and Traditional knowledge: Introduction, Concept of Tribal medicine, methods of disease diagnosis and treatment – common Plants in folk religion. Traditional knowledge and utility of some medicinal plants in Chhattisgarh. <i>Collection /Identification of Herbal plants commonly used by villagers of the state –</i> • <i>Centella asiatica,</i> • <i>Aloe vera,</i> • <i>Solanum nigrum,</i> • <i>Achyranthus aspera,</i> • <i>Withania somnifera,</i> • <i>Papaver somniferum,</i> • <i>Strychnos nux-vomica,</i> • <i>Atropa belladonna;</i>	08	
IV	Plants in day to day life: Nutritive and medicinal value of common herbal fruits and vegetables of daily use. Precautions during use of herbal medicinal products. Basic idea of contribution of national research laboratories like CDRI, CIMAP, NBRI, etc. <i>Collection /Identification of Herbal plants commonly used in daily life - Tulsi, Garlic, Ginger, Turmeric, Ajwain, Methi, Flax, Tea and Coffee.</i>	08	
Keywords		<i>Herbal medicine, Folk medicine, Ethno-medicine, Tribal medicine</i>	

Signature of Convener & Members (CBoS)

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PART-C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended –

1. Kumar, N.C. (1993). An Introduction to Medical botany and Pharmacognosy. Emkay Publications, New Delhi.
2. Rao, A.P. (1999). Herbs that heal. Diamond Pocket Books (P) Ltd., New Delhi.
3. Iris F. F. Benzie and Sissi Wachtel-Galor. Herbal Medicine, 2nd edition Biomolecular and Clinical Aspects, CRC Press/Taylor & Francis; 2011.
4. Fabrizio Donovan (2020) Medicinal Herbs: The Ultimate Guide to Natural Healing, Learn The Benefits of Herbs and Use the Nature's Most Powerful Medicinal Plants in Making Your Own AZ Remedies to Treat Diseases, Author's Republic.
5. Stargrove Mitchell Bebel ND, Herb, Nutrient, and Drug Interactions, Publisher: Elsevier – Health Sciences Division
6. Iris F. F. Benzie (Editor), Herbal Medicine (Oxidative Stress and Disease) 2nd Edition,

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–

- <https://pubmed.ncbi.nlm.nih.gov/22593937/>
- <https://crimsonpublishers.com/acam/pdf/ACAM.000551.pdf>
- https://www.researchgate.net/publication/329823398_Medicinal_Plants_Used_in_the_Treatment_of_Mental_and_Neurological_Disorders_in_Ghana
- <https://www.sciencedirect.com/science/article/abs/pii/S0378874115003013>
- <https://core.ac.uk/download/pdf/143841457.pdf>
- <https://practicalselfreliance.com/medicinal-plants/>
- <https://practicalselfreliance.com/medicinal-plants/>
- <https://www.pdfdrive.com/medicinal-plants-books.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): (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
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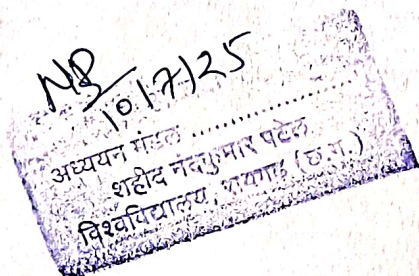
End Semester Exam (ESE):	Two section – A & B. Section A: Q1. Objective – 05 x1= 05 Mark; Q2. Short answer type- 5x2 =10 Marks Section B: Descriptive answer type qts., 1 out of 2 from each unit- 4x05 =20 Marks
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Name and Signature of Convener & Members of CBOS:

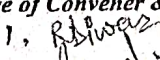
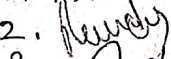
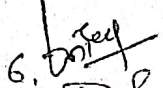
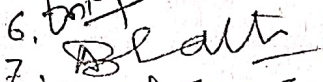
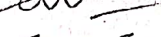
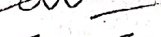
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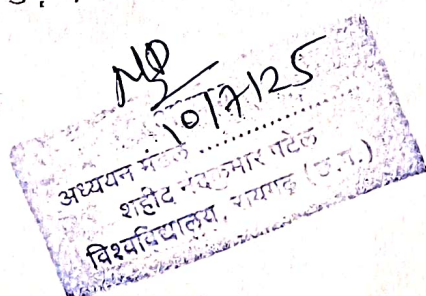
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R. S. Rao



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

PART- A: Introduction			
Program: Bachelor in Life Sciences(Certificate / Diploma / Degree)		Semester - II/IV/V/VI	Session: 2024-2025
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)			
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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.mip.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=ZUIh6ZFO48c&ab_channel=MountainGardens
- <https://www.youtube.com/watch?v=EE0eQO6n9iA>
- <https://www.teachmint.com/tfile/studymaterial/bse/j1063fog/11styleofgardeningpdf/0dba825bd66d-4180-afe1-28950aa42454>
- [https://k8449r.weebly.com/uploads/3/0/7/3/30731055/types of gardens \[compatibility model\] pdf-signed.pdf](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

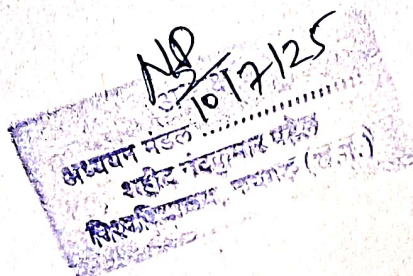
End Semester Exam (ESE): 35 Marks

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
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

Name and Signature of Convener & Members of CBoS:

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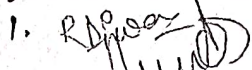
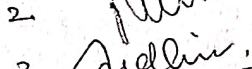
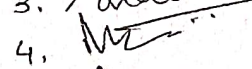
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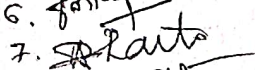
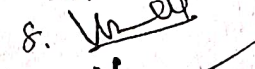
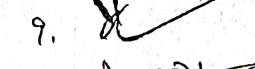
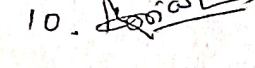


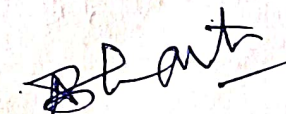
FOUR YEAR UNDERGRADUATE PROGRAM (2024-2028)
DEPT. OF BOTANY: VALUE ADDITION COURSE
COURSE CURRICULUM (2024-25)

PART-A: Introduction			
Program: Undergraduate (Certificate / Diploma / Degree/Honors)		Semester - I/III/V	Session: 2024-2025
1	Course Code	BOVAC – 02	
2	Course Title	Academic Research & Report Writing	
3	Course Type	Value Addition Course (VAC)	
4	Pre-requisite(if,any)	As per Government norms / Institutional scheme	
5	Course Learning Outcomes (CLO)	<i>After completion of this course, the students will be able to -</i> ➤ Understand the academic research and its scope & prospects. ➤ Know the Importance of Report writing in academic and Research and Necessity of report writing for achievement of academic & research goals ➤ Demonstrates the knowledge of the toxicity of plant and essential oil ingredients. ➤ Understand the kinds & characteristics of academic and research reports / presentation and its prospective application. ➤ Use the tools and techniques of academic research and report writing ➤ Adopt the skill of research designing and report/ paper / thesis writing	
6	Credit Value	2 Credits	Credit = 15 Hours - learning & Observation
7	Total Marks	Max. Marks: 50	Min Passing Marks: 20
PART -B: Content of the Course			
Total No. of Teaching-learning Periods (01 Hr. per period) - 30 Periods (30 Hours)			
Module	Topics (Course contents): Learning and Practices		No. of Hrs
I	Introduction: Concept of - Academic Research and Research Project, Component of a concept Paper for academic research, Research-Characteristics, Type, Formulation & Design, Format, Scope, Motivation & Prospects. Popular Scheme & Organization in India promoting Research - INSPIRE, NSF, MEF, DBT, DST, DNES, STARD, ICAR, ICMR, CSIR, INSA.		08 Hours
II	Research paper / Review writing: Steps of writing a research report. Types of Research paper, Structure of Research papers, Research paper formats, Abstract writing, Methodology, Results and Discussion, Different formats referencing, Ways of communicating a research papers, (Assignments)		07 Hours
III	Report/ Dissertation / Thesis Writing - Structure of a thesis , Scope of the work, Literature review, Experimental / Computational details, Preliminary studies, Result and Discussion, Figures & Table Preparation, Conclusion and Future works, Bibliography, Appendixes (Assignments)		07 Hours
IV	Tools, Techniques & Presentation-- Various word processors - MS Office- Word, Excel & PowerPoint, Libre-office, Latex etc. Making effective presentations using Power Point and Beamer. Basic idea of Data collection, Tabulation & Presentation. Plagiarism detection tools (Assignments)		08 Hours
Keywords	Academic Research, Research report, Project, Thesis/ Dissertation/ Review writing		

Signature of Convener & Members of CBOS:

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अध्ययन मंडल
शहीद नंद
विश्वविद्यालय, रायपुर (उ.प्र.)

PART-C

BVAC – 02 (Academic Research & Report Writing)

Learning Resources: Text Books, Reference Books and Others

Text Books Recommended –

- Technical Report Writing and Research Methodology by Dr Naushad Alam Dr Quadri Javeed Ahmad Peer Dr Banarsi Lal, Write & Print Publications
- Research Writing A Complete Guide (PB) by Srinivasan R, How Academics
- GUIDE TO REPORT WRITING by Netzley, Snow, PEARSON INDIA
- A Student Guide to Writing Research Reports, Papers, Theses and Dissertations By Cathal Ó Siochrú; ISBN 9780367621049. Published 2022 by Routledge
- <https://www.goodreads.com/shelf/show/report-writing>

Online Resources–

- e-Resources / e-books and e-learning portals
 - <https://www.questionpro.com/blog/research-reports/>
 - <https://egyankosh.ac.in/bitstream/123456789/39238/1/Unit-5.pdf>
 - <https://www.studocu.com/in/document/vishvesvaraya-technological-university/research-methodology/general-format-of-a-research-report/33791300>
 - <https://students.unimelb.edu.au/academic-skills/resources/report-writing/research-reports>
- ❖ Use of following sites
- <https://www.wiley.com/en-ie/Student+Research+and+Report+Writing:+From+Topic+Selection+to+the+Complete+Paper-p-9781118963913>
- https://www.researchgate.net/publication/275654158_HAND_BOOK_FOR_WRITING_RESEARCH_PAPER

PART-D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

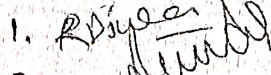
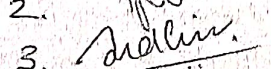
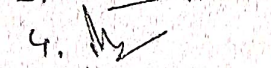
Maximum Marks: 50 Marks

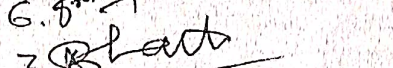
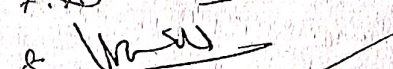
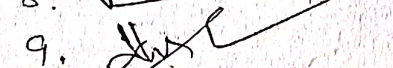
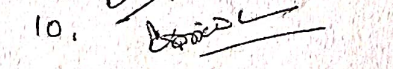
Continuous Internal Assessment (CIA): 15 Marks

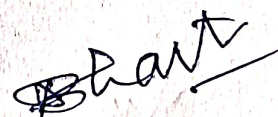
End Semester Exam (ESE): 35 Marks

Continuous Internal Assessment (CIA): (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):	Two section – A & B Section A: Q1. Objective – 05 x1= 05 Mark; Q2. Short answer type- 5x2 =10 Marks Section B: Descriptive answer type qts., 1out of 2 from each unit- 4x05 =20 Marks	

Signature of Convener & Members of CBOS:

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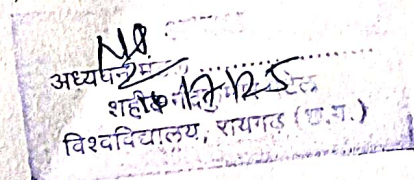
FOUR YEAR UNDERGRADUATE PROGRAM (2024 -2028)
DEPT. OF BOTANY: SKILL ENHANCEMENT COURSE
COURSE CURRICULUM (2024-25)

PART-A: Introduction			
Program: Undergraduate (Certificate / Diploma / Degree/Honors)		Semester - II/IV	Session: 2024-2025
1	Course Code	BOSEC-02	
2	Course Title	Flower Decoration	
3	Course Type	Skill Enhance Course (SEC)	
4	Pre-requisite (if, any)	As per Government norms / Institutional scheme	
5	Course Learning Outcomes(CLO)	<i>After completion of this course, the students will be able to-</i> ➤ -understand the concept of Flower arrangement & Decoration ➤ -learn the idea, design and style of Flower decoration and its importance ➤ -learn the skill of different types Flower arrangement with local/social application, commercial value and social demand ➤ -adopt the skill of Indian, Western, Japanese and other/local style of flower arrangement / decoration towards level of entrepreneurs' start-up	
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): learning, Observation and Preparation	No. of Hrs
I	Introduction: Basic knowledge of Flowering plants, Ornamental plants, Decorative plants- Shade plants, Ferns, Bonsai, Decorative Flowers, Flower shows. Commercial flowers, Common Ornamental plants and flowers of local area /state. Famous flower Gardens of India. [Learning and Practices]	04Hours Learning and 07 Hours Practices
II	Floral ornaments & Flower arrangements: Garlands, Floral bouquets, Floral rangoli, Flower arrangements – concept, idea , design and style – Western styles, Japanes or Ikebana styles, Common types of Flower arrangement – Elliptical, Vertical, Horizontal Triangular, Crescent, S & Oval shapes and Cascade .flower arrangement. [Learning and Practices]	04Hours Learning and 07HoursPra ctices
III	Flower decoration: Flowers used for decoration; Different idea of flower decoration for Home, Festivals, office, Gallery, Stage, Wall, Table, Gate. Flower Pot / Vas / Bottle decoration. [Learning and Practices]	03 Hours + 07 Hours
IV	Creative decorations: Flower drying and Dry flower decoration, Foliage arrangement; Dry foliage decoration; Flower decoration by Oil Painting, Resin art of Flower decoration Terrarium – concept, design and creation of different forms. Bonsai, Shady foliage, Fern and Water plant/ flower decoration. [Learning and Practices]	04Hours Learning and 09 Hours Practices
Keywords	Floral ornaments, Flower arrangement, Flower decoration	

Signature of Convener & Members of CBOS:

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PART-C**BOSEC-02 (Flower Decoration)****Learning Resources: Text Books, Reference Books and Others****Text Books Recommended****Textbooks:**

1. Floriculture in India, G. S. Randhawa and A. Mukhopadhyay, Allied Publishers Pvt. Ltd.
2. Modern Ikebana: A New Wave in Floral Design Hardcover-2020 by Tom Loxley & Victoria Gaiger
3. On Flowers: Lessons from an Accidental Florist, Illustrated, 2019 by Amy Merrick (Author)
4. Flower School: A Practical Guide to the Art of Flower Arranging, 2020 by Calvert Crary (Author)
5. The Flower Expert: Ideas and Inspiration for a Life With Flowers, 2019 by Fleur McHarg (Author)
6. The Art of Flower Arranging, 1992 by Jan Hall (Author)
7. A Personal Guide to Flower Arranging: Volume 2 Spring and Summer, 2021 by Wendy Markby
8. The Flower Chef: A Modern Guide to Do-It-Yourself Floral Arrangements, 2016 by Carly Cylinder
9. Easy Ikebana: 30 Beautiful Flower Arrangements, 2020 by Shinichi Nagatsuka (Author)

Reference Book:

<https://www.gardensillustrated.com/reviews/the-best-new-floristry-books>

Online Resources-

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

Use of following sites

- <https://en.wikipedia.org/wiki/Ikebana>
- <https://www.artsy.net/article/artsy-editorial-thriving-art-ikebana-japanese-tradition-flower-arranging>
- https://agritech.tnau.ac.in/horticulture/horti_Landscaping_dryflower_tech.html
- <https://library.ihbt.res.in/Institute%20Brochures/dry%20flower.pdf>
- https://static.vikaspedia.in/media/files_en/agriculture/farm-based-enterprises/value-added-products/dry-flower-production-1.pdf
- https://www.researchgate.net/publication/362645798_Dry_Flower_Technology_A_Value_Addition_to_Floriculture_Industry
- <https://in.pinterest.com/smsastry/flower-decoration/>
- <https://in.pinterest.com/galisreelatha/flower-decoration/>
- <https://www.britannica.com/art/floral-decoration>
- <https://homebnc.com/best-creative-flower-decoration-ideas/>

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): (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
End Semester Exam (ESE):	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

Name and Signature of Convener & Members of CBOS:

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अध्ययन मंडल
शहीद जी 01/7/25
विश्वविद्यालय, रायपुर (C.G.)

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
1	Course Code	BOGE -01 T	
2	Course Title	Elementary Botany	
3	Course Type	Generic elective (GE)	
4	Pre-requisite (if, any)	<i>As per program</i>	
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	Basics of Plant Science: 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	Branches of botany: General idea, features, and significance; Anatomy, Cytology, Economic Botany, Ethnobotany, Forestry, Genetics, Histology, Microbiology, Paleobotany, Phytochemistry, Phytopathology, Plant biotechnology, Plant breeding, Plant ecology, Plant morphology, Plant physiology, Plant Taxonomy, etc,		11
III	Plants for human welfare: Plant Resources for Rural livelihood – Mahua, Tendu patta, 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	Ancient Indian Botany: 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	<i>Prokaryotes, Ethnobotany, Taxonomy, Ayurveda</i>		

Signature of Convener & Members (CBOS) :

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 2. *Munish*
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 अध्ययन मंडल
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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
- 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

- <https://extension.oregonstate.edu/collection/botany-basics>
- <https://www.pbs.org/video/botany-basics-iuu2bl/>
- <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/94/3-1-11-206.pdf>
- https://efaidnbmnnnibpcajpcglclefindmkaj/https://wgbis.ces.iisc.ac.in/biodiversity/sahyadri/documents/botany_history.pdf
- <https://vedpuran.files.wordpress.com/2016/07/charaksamhitaatridevajigupt-vol-1.pdf>
- <https://egyankosh.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:

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अध्ययन मंडल
शहीद नंदकुमार पटेल
विश्वविद्यालय, रायगढ़ (छ.ग.)

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
1	Course Code	BOGE -01 P	
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

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. Microscopic study of plant cell. 2. Microscopic study of prokaryotic (Bacteria) and eukaryotic cell (algae and fungi). 3. Study of thallus structure of <i>Riccia</i> and <i>Marchantia</i> . 4. Identification of different plants growing in college campus. 5. Study of a typical flowering plant and it's parts. 6. Study of internal structure of root and stem. 7. Study of parenchyma, collenchyma and sclerenchyma. 8. Study of medicinal plants of college campus. 9. Study of plants used to cure cough and cold, jaundice and skin diseases. 10. Visit to any local ayurvedic hospital / practitioner to understand Ayurveda.	30
Keywords	Prokaryotic, Parenchyma, Jaundice, Ayurveda.	

Signature of Convener & Members (CBoS) :

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अध्ययन मंडल
 शहीद नंदकुमार (उ.न.)
 विश्वविद्यालय, रायगड (उ.न.)

PART-C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended –

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-Resources / e-books and e-learning portals
- www.swavam.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
- <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5871155/>
- <https://cms.botany.org/home/careers-jobs/careers-in-botany/areas-of-specialization-in-botany.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 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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अध्ययन मंडल 17/25
राष्ट्रीय संस्कृत मंडल
विश्वविद्यालय, रायचूर (उ.प्र.)

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
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)			
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.		
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विश्वविद्यालय 17/12/25

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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. Annic 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.swavam.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.cdx.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/Maslrroom-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/disinpactmngmnt/topc/EpidemiologyTemporal/Pages/ManagementStrategics.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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Dr. Ant

अध्यक्ष
विश्वविद्यालय, रायगढ़ (छ.ग.)

शहीद नंदकुमार पटेल विश्वविद्यालय, रायगढ़ (छ.ग.)

(छत्तीसगढ़ विश्वविद्यालय अधिनियम 1973 द्वारा स्थापित राजकीय विश्वविद्यालय)



राष्ट्रीय शिक्षा नीति – 2020
के तहत V एवं VI सेमेस्टर
नवीन पाठ्यक्रम
(सत्र 2026–27)

.....वनस्पति शास्त्र.....

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	Phytobaeontology and Evolutionary Botany
BOSC -03P	Lab. Course-03 (Archegoniate and Fossils)	BOSE -03P	Lab. Course -03 (Phytobaeontology 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)
GE -01 & 02		VAC	
BOGE -01T	Elementary Botany	BOVAC-01	Herbal Plant & Human Health
BOGE -01P	Lab. Course -01 (Elementary Botany)		SEC
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.

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FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)

DEPARTMENT OF BOTANY

COURSE CURRICULUM

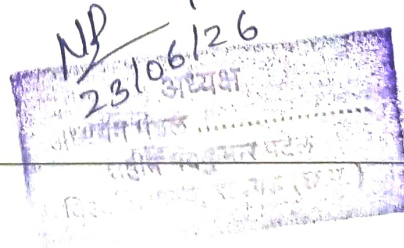
PART- A: Introduction			
Program: Bachelor in Life Sciences (Degree/Honors)		Semester - V	Session: 2024-2025
1	Course Code	BOSC-05 T	
2	Course Title	Cytology & Genetics	
3	Course Type	Discipline Specific course (DSC)	
4	Pre-requisite (if, any)	As per program	
5	Course Learning Outcomes (CLO)	At the end of the course, the students will be able: ➤ Acquire knowledge of cell and its components. ➤ Learn about the structure and function of membrane and cell division ➤ Interpret Mendelian and non Mendelian genetics ➤ Interpret linkage, crossing over and gene interaction	
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	The cell, cell wall, plasma membrane : Cell structure and function; Characteristics of prokaryotic and eukaryotic cells; Structure, function and chemical composition of Plant cell wall. Plasma membrane structure and chemical nature; Membrane transport – Passive, active and facilitated transport, endocytosis and exocytosis. Nucleus: Structure-nuclear envelope, nuclear pore complex, nuclear lamina, molecular organization of chromatin; nucleolus. Cytoskeleton: Role and structure of microtubules, microfilaments and intermediary filament		12
II	Cell organelles, Division of Cell Mitochondria and Chloroplast; Structure and functions. Endoplasmic Reticulum – Structure, and functions, role in protein synthesis. Golgi Apparatus – organization, protein glycosylation, Lysosomes. Cell cycle, mitosis and meiosis; Regulation of cell cycle- checkpoints, role of protein kinases.		11
III	Mendelian genetics, Linkage and Crossing over; Mendelism: History; Principles of inheritance; terminology. Chromosome theory of inheritance; Autosomes and sex chromosomes; Probability and pedigree analysis; Non-Mendelian inheritance: Incomplete dominance and co-dominance. Gene interaction; duplicate, complimentary, supplementary, epistasis. Linkage and crossing over.		11
IV	Extrachromosomal Inheritance, Mutation : Extrachromosomal inheritance: Cytoplasmic inheritance in plants. Mutations; types, Molecular basis of Mutations; Mutagens – physical and chemical. Chromosomal aberration: Deletion, Duplication, Inversion, Translocation, Euploidy and Aneuploidy.		11
Keywords	Cytology, Cell division, Genetics, Mendelian genetics, Mutation		

Signature of Convener & Members (CBoS) :

- ① R. R. Rao
- ② R. R. Rao
- ③ R. R. Rao
- ④ R. R. Rao
- ⑤ R. R. Rao
- ⑥ R. R. Rao
- ⑦ R. R. Rao
- ⑧ R. R. Rao
- ⑨ R. R. Rao
- ⑩ R. R. Rao

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PART-C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended –

1. Cell Biology: Powar C. B. and Dagainawala H. I., Himalay Pub. House, Bombay
2. Cell biology by Karp, G. 2010.
3. Cell and Molecular Biology: Concepts and Experiments. 6th Edition. John Wiley & Sons. Inc.
4. De Robertis, E.D.P. and De Robertis, E.M.F. 2006. Cell and Molecular Biology. 8th edition Lippincott Williams and Wilkins, Philadelphia.
5. Genetics by P. K. Gupta, Rastogi Publication
6. Cytogenetics, Molecular biology and Plant breeding by P. K. Gupta, Rastogi Publication

Reference Books Recommended–

1. Becker, W.M., Kleinsmith, L.J., Hardin. J. and Bertoni, G. P. 2009 The World of of the Cell. 7th edition. Pearson Benjamin Cummings Publishing, San Francisco.
2. L.J. (2012). Becker's World of the Cell, Pearson Education Inc. U.S.A. 8th edition.
3. Hausman, R.E. (2009) The Cell: A Molecular Approach. 5th edition. ASM Press & Sunderland, Washington,
4. D.C.; Sinauer Associates, MA. 9. Becker, W.M., Kleinsmith, L.J., Hardin. J. and Bertoni, G. P. (2009) The World of the Cell. 7th edition. Pearson Benjamin Cummings Publishing, San Francisco

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

- <https://www.cytology-iac.org/educational-resources/virtual-slide-library>
- https://www.asct.com/ASCTWeb/Content/Cytopreparation_Online_Course.aspx
- <https://www.mooc-list.com/tags/genetics>
- <https://www.coursera.org/learn/genetics-evolution>
- <https://www.my-mooc.com/en/mooc/introduction-to-genetics-and-evolution>
- http://rastogipublications.com/index.php?route=product/product&product_id=50
- <https://www.nou.ac.in/sites/default/files/sim/BSCBO>
- <http://ysmubooks.am/uploads/MEDICAL BIOLOGY.pilf>

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	

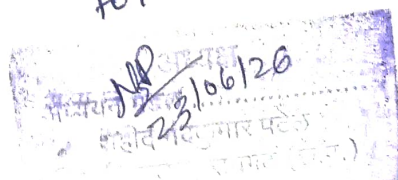
Name and Signature of Convener & Members of CBoS:

① R. P. Das
② S. K. Das
③ S. K. Das
④ S. K. Das
⑤ S. K. Das
⑥ S. K. Das

⑦ S. K. Das
⑧ S. K. Das
⑨ S. K. Das
⑩ S. K. Das

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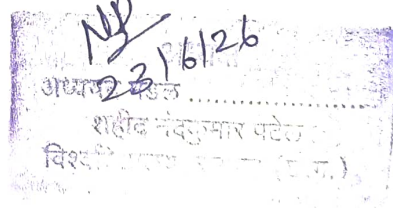


FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)
DEPARTMENT OF BOTANY
COURSE CURRICULUM

PART- A: Introduction			
Program: Bachelor in Life Sciences (Degree/ Honours)		Semester - V	Session: 2024-2025
1	Course Code	BOSC-05	
2	Course Title	Lab. Course -05 (Cytology and Genetics)	
3	Course Type	Laboratory Course	
4	Pre-requisite (if, any)	As per program	
5	Course Learning Outcomes (CLO)	At the end of this course, students will be able to: ➤ Handle the Compound light Microscope and apply microscopy ➤ Achieve elaborate idea about cell staining procedures and mitotic plate observation & analysis ➤ Identify the various stages of cell division karyotype analysis Get practice of genetic crosses and genetic analysis.	
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. Staining technique of cell organelles. 2. Study of different stages of Mitosis. 3. Study of different stages of Meiosis. 4. Study of plant cell structure with the help of epidermal peel mount of Onion/Rhoeo/Crinum. 5. Demonstration of the phenomenon of protoplasmic streaming in <i>Hydrilla</i> leaves. 6. Counting the cells per unit volume with the help of haemocytometer. (Yeast/pollen grains) 7. Exercise on genetics (Mendelian ratio and test cross) 8. Karyotype of chromosomes. 9. Study of polytene and lampbrush chromosomes.		30
Keywords	Mitosis, Mendelian ratio, Karyotype, Chromosome.		

Signature of Convener & Members (CBoS) :

- ① P. S. Jaiswal
- ② A. K. Jaiswal
- ③ A. K. Jaiswal
- ④ A. K. Jaiswal
- ⑤ A. K. Jaiswal
- ⑥ A. K. Jaiswal
- ⑦ A. K. Jaiswal
- ⑧ A. K. Jaiswal
- ⑨ A. K. Jaiswal
- ⑩ A. K. Jaiswal



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PART-C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended –

1. Laboratory Manual of Cyto-technique and Chromosome handling By Sharma A K
2. Manual of Cytology, Ministry of Health & Welfare
3. Cytogenetics By PK Gupta.
4. Cell biology By C. B. Powar

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

- https://ijrbat.in/upload_papers/0410202102153609.%20Basarkar%20UG%20and%20%20Patil-Behere%20KP.pdf
- <https://www2.samford.edu/~djohnso2/44962w/334/mitosis.html>
- <https://www.findel-international.com/product/science/biology/prepared-slides/philip-harris-prepared-microscope-slide-set-meiosis-and-mitosis-set-of-9-slides/e8r06642>

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks: 50 Marks

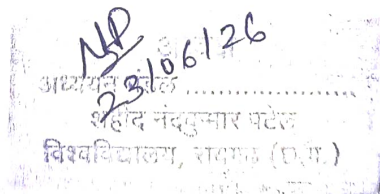
Continuous Internal Assessment (CIA): 15 Marks

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:

- ① Biswas
- ② Bhandari
- ③ Anand
- ④ Anand
- ⑤ Anand
- ⑥ Anand
- ⑦ Anand
- ⑧ Anand
- ⑨ Anand
- ⑩ Anand



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FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)

DEPARTMENT OF BOTANY

COURSE CURRICULUM

PART- A: Introduction			
Program: Bachelor in Life sciences (Degree/Honors)		Semester - VI	Session: 2024-2025
1	Course Code	BOSC-06 T	
2	Course Title	Plant Physiology and Economic 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 understand to ➤ Gain a deep understanding of the fundamental physiological processes in plants, including photosynthesis, respiration, transpiration, and nutrient uptake, and their regulation. ➤ Acquire practical skills in conducting experiments and using various techniques. ➤ Develop a comprehensive understanding of the economic value and utilization of plant resources. ➤ Acquire knowledge and skills to identify and classify economically important plant species.	
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	Plant-water relations & Mineral nutrition Importance of water, water potential and its components; Transpiration and its significance; Factors affecting transpiration; Root pressure and guttation. Essential elements, macro and micronutrients; Criteria of essentiality of elements; Role of essential elements; Symptoms of mineral deficiency in major crops, Transport of ions across cell membrane, active and passive transport.		12
II	Photosynthesis and Lipid Metabolism Historical background, photosynthetic pigments and their role photochemical reactions, PSI, PSII, Q cycle, C ₄ pathways; Crassulacean acid metabolism; Factors affecting CO ₂ reduction. Synthesis and breakdown of triglycerides, β-oxidation, glyoxylate cycle, gluconeogenesis and its role in mobilization of lipids during seed germination, α oxidation		11
III	Respiration and Nitrogen Metabolism Glycolysis, anaerobic respiration, TCA cycle; Oxidative phosphorylation, Glyoxylate, Oxidative Pentose Phosphate Pathway. Electron transport and mechanism of ATP synthesis; C ₃ , C ₄ and CAM pathways of carbon fixation, Photorespiration. Nitrate assimilation, biological nitrogen fixation, Physiology and biochemistry of nitrogen fixation, Ammonia assimilation (GS-GOGAT), reductive amination and transamination, amino acid synthesis.		11
IV	Economic Botany: Origin of Cultivated Plants, Examples of major plant introductions; Crop domestication and loss of genetic diversity; evolution of new crops/varieties, importance of germplasm diversity. Brief account of crops, millets, legumes, spice, Beverages, oils, drug, fiber, and timber yielding plant.		11
Keywords		Osmosis, Transport, Hill reaction, Genetic diversity.	
Signature of Convener & Members (CBoS) :			

① Prof. Dr. ...
 ② ...
 ③ ...
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PART-C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended –

1. Taiz, L., Zeiger, E., Møller, I.M. and Murphy, A (2015). Plant Physiology and Development. Sinauer Associates Inc. USA. 6th edition.
2. B. P. Pandey (2017) Economic Botany. S. Chand Publication, New Delhi.
3. Kochhar, S.L. (2012). Economic Botany in Tropics, MacMillan & Co. New Delhi, India.
4. Bajracharya, D., (1999). Experiments in Plant Physiology- A Laboratory Manual. Narosa Publishing House, New Delhi.

Reference Books Recommended-

1. Wickens, G.E. (2001). Economic Botany: Principles & Practices. Kluwer Academic Publishers, The Netherlands.
2. Chrispeels, M.J. and Sadava, D.E. 1994 Plants, Genes and Agriculture. Jones & Bartlett Publishers.
3. Harborne, J.B. (1973). Phytochemical Methods. John Wiley & Sons. New York.
4. Hopkins, W.G., Huner, N.P., (2009). Introduction to Plant Physiology. John Wiley & Sons, U.S.A. 4th Edition.

Online Resources–

- e-Resources / e-books and e-learning portals
- <https://education.nationalgeographic.org/resource/photosynthesis/>
- <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242210/>
- <https://www.sciencedirect.com/topics/agricultural-and-biological-sciences/nitrogen-metabolism>
- https://en.wikipedia.org/wiki/Lipid_metabolism

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

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
-----------------------------	---

Name and Signature of Convener & Members of CBoS:

- ① R. D. Joshi
- ② R. D. Joshi
- ③ R. D. Joshi
- ④ R. D. Joshi
- ⑤ R. D. Joshi
- ⑥ R. D. Joshi
- ⑦ R. D. Joshi
- ⑧ R. D. Joshi
- ⑨ R. D. Joshi
- ⑩ R. D. Joshi

23/06/26
श्रीवर्धन नंदन
श्रीवर्धन नंदन पटेल
विद्यार्थी संघ (उप.)

R. D. Joshi

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

PART- A: Introduction			
Program: Bachelor in Life Sciences (Degree/ Honors)		Semester - VI	Session: 2024-2025
1	Course Code	BOSC-06	
2	Course Title	Lab. Course -06 (Plant Physiology and Economic Botany)	
3	Course Type	Laboratory course	
4	Pre-requisite (if, any)	As per program	
5	Course Learning Outcomes (CLO)	Acquire practical skills in conducting experiments and using various techniques to measure and analyze plant physiological parameters, enabling students to design and execute experiments in plant physiology research. ○ Acquire knowledge and skills to identify, and classify economically important plant species, and understand their ecological requirements, cultivation techniques, and potential for sustainable utilization. ○ Apply critical thinking and problem-solving skills to analyze and evaluate the impacts of human activities on plant resources, and develop strategies for the conservation, sustainable management, and utilization of plant biodiversity.	
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. Determination of osmosis and plasmolysis. 2. Determination of osmotic potential of plant cell sap by plasmolytic method. 3. Demonstration of the process of transpiration. 4. To find out rate of transpiration by potometer method. 5. To find out stomatal frequency and stomatal index. 6. Chemical separation of photosynthetic pigments. 7. To find out that oxygen evolved during the process of photosynthesis. 8. To study the effect of quality and intensity of light on photosynthesis. 9. To find out the effect of carbon dioxide concentration on the rate of photosynthesis. 10. To find out the Respiratory Quotient of different respiratory substrates by respirometer method. 11. To compare the rate of respiration in different parts of a plant. 12. Study of amylase and catalase enzymes. 13. Morphological features and economic importance of cereals, millets, legumes, oil, spices, drug, fiber, and timber yielding plant.		30
Keywords	Physiology, Economic Botany, Beverages, Enzyme.		

Signature of Convener & Members (CBoS) :

① R. Prasad
 ② R. Prasad
 ③ R. Prasad
 ④ R. Prasad
 ⑤ R. Prasad

⑥ R. Prasad
 ⑦ R. Prasad
 ⑧ R. Prasad
 ⑨ R. Prasad
 ⑩ R. Prasad

ND 106/26
 अध्यक्ष
 शैक्षिक विभाग, बी.एस.सी.
 विद्यापीठ, नागपुर (महाराष्ट्र)

R. Prasad

PART-C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended –

1. . Bajracharya, D., (1999). Experiments in Plant Physiology- A Laboratory Manual. Narosa Publishing House, New Delhi.
2. Kochhar, S.L. (2012). Economic Botany in Tropics, MacMillan & Co. New Delhi, India.
3. Wickens, G.E. (2001). Economic Botany: Principles & Practices. Kluwer Academic

Reference Books Recommended –

1. Taiz, L., Zeiger, E., Møller, I.M. and Murphy, A (2015). Plant Physiology and Development. Sinauer Associates Inc. USA. 6th edition.
2. Hopkins, W.G., Huner, N.P., (2009). Introduction to Plant Physiology. John Wiley & Sons, U.S.A. 4th Edition.

Online Resources–

- e-Resources / e-books and e-learning portals
- www.swayam.ac.in
- www.ignou.ac.in
- www.cgyanankosh.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://education.nationalgeographic.org/resource/photosynthesis/>
- <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242210/>
- <https://www.sciencedirect.com/topics/agricultural-and-biological-sciences/nitrogen-metabolism>
- https://en.wikipedia.org/wiki/Lipid_metabolism

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	
End Semester Exam (ESE): 35	Total Marks - 15	Managed by Course teacher as per lab. status
	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	

Name and Signature of Convener & Members of CBoS:

- ① R. R. Rao
- ② R. R. Rao
- ③ R. R. Rao
- ④ R. R. Rao
- ⑤ R. R. Rao
- ⑥ R. R. Rao
- ⑦ R. R. Rao
- ⑧ R. R. Rao
- ⑨ R. R. Rao
- ⑩ R. R. Rao

NP
23/06/26
शहद नंदकुमार पटेल
विश्वविद्यालय, रायपुर (उ.प्र.)

R. R. Rao

DEPARTMENT OF BOTANY
COURSE CURRICULUM

Signature of Convener & Members (CBoS) :

[illegible]

PART-C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended –

1. Vashishtha, B. R. (2005) Pteridophytes S. Chand and Co., Delhi.
2. Vashishtha, B. R. (2005) Bryophytes S. Chand and Co., Delhi.
3. Parihar, N.S. (1991). An introduction to Embryophyta. Vol. I. Bryophyta. Central Book Depot, Allahabad.
4. Rashid A (1999) An Introduction to Pteridophyta, Vikas Publishing House Pvt. Ltd. New Delhi.
5. Sharma OP (1990) Textbook of Pteridophyta. MacMillan India Ltd. Delhi.
6. Vashishtha BR, Sinha AK and Kumar A (2010) Botany for Degree Students – Pteridophyta, S. Chand and Company,
7. Vashishtha BR, Sinha AK and Kumar A (2010) Botany for Degree Students – Gymnosperms, S. Chand and
8. Parihar NS (1976) Biology and Morphology of Pteridophytes. Central Book Depot.
9. Bhatnagar SP (1996) Gymnosperms, New Age International Publisher.
10. Pandey BP (2010) College Botany Vol II S. Chand and Company, New Delhi .

Reference Books Recommended –

1. Kumar, H. D. (1988) introductory Phycology, Affiliated East-West Press Ltd., New Delhi.
2. Morris, I (1986) An Introduction to Algae, Cambridge Univ. Press, UK.
3. Puri, P. (1980) Bryophytes, Atma Ram and Sons, Delhi.
4. Sporne, K. K. (1991) The Morphology of Pteridophytes, B. I. Publishing Pvt. Ltd. Bombay.
5. Stewart, W. N. and Ruthwell, G. W. (1993) Paleobotany and the Evolution of Plants. Cambridge Univ. Press, UK.
6. Principles of Paleontology Edition 3 Paperback–1 January 2006 by Arnold Miller, Michael Foote Publishers - W.H.Freeman & Co Ltd

Online Resources–

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

1. <https://efaidnbmnnnibpcajpcglclefindmkaj/https://egvankosh.ac.in/bitstream/123456789/6961/1/Unit-9.pdf>
2. <https://www.encyclopedia.com/science/encyclopedias-almanacs-transcripts-and-maps/fossil-and-fossilization>
3. <https://palaeobotany.org>

➤ 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.eskiksha.mp.gov.in
- www.vlab.co.in
- www.internshala.com
- www.ndl.iitkgp.ac.in

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:

① Ramesh
② Ramesh
③ Ramesh

④ Ramesh
⑤ Ramesh
⑥ Ramesh

⑦ Ramesh
⑧ Ramesh
⑨ Ramesh
⑩ Ramesh

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23/06/26
अध्यक्ष मंडल
शहीद मेमोरियल पार्क
रिजिस्ट्रार

FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)

DEPARTMENT OF BOTANY

COURSE CURRICULUM

PART- A: Introduction			
Program: Bachelor in Life Science (Degree/ honors)		Semester - V	Session: 2024-2025
1	Course Code	BOSE-03 P	
2	Course Title	Lab. Course -03 (Phytopaleontology and Evolutionary Botany)	
3	Course Type	Laboratory course	
4	Pre-requisite (if, any)	As per program	
5	Course Learning Outcomes (CLO)	1. Understand evolutionary trends of plant development and diversification. 2. Study remnant of past and its natural conservation. 3. Phylogenetic relationship with the help of paleontological evidences 4. Understand role of fossil as an educational tool promoting science literacy an appreciation for earth's rich biological heritage.	
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) Study of important fossil of pteridophytes from prepared slides and specimens 2) Study of important fossil of gymnosperms from prepared slides and specimens 3) Study of important fossil of algae, fungi, bryophytes and angiosperms from prepared slides and specimens 4) Local trip to coal mines or fossil area for collection of fossil specimens and prepare study reports.		30
Keywords	1) Fossil, slides and specimens		

Signature of Convener & Members (CBoS) :

① Ramesh

② Suresh

③ H

④ S

⑤ A

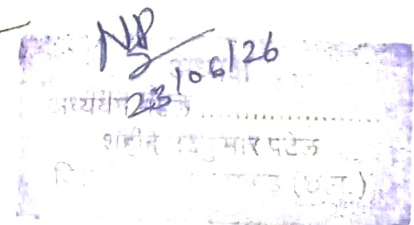
⑥ B

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PART-C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended –

1. Principles of Paleontology Edition 3 Paperback–1 January 2006 by Arnold Miller, Michael Foote Publishers - W.H.Freeman & Co Lt
2. The Practical Fossil Finder (Practical Handbook) Hardcover – 1 October 1991 by Steve Parker (Author) Publishers Facts On File Inc

Online Resources–

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

1. <https://efaidnbmnnnibpcajpcglclefindmkaj/https://egyankosh.ac.in/bitstream/123456789/69611/1/Unit-9.pdf>
2. <https://www.encyclopedia.com/science/encyclopedias-almanacs-transcripts-and-maps/fossil-and-fossilization>
3. <https://palaeobotany.org>

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

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
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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
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Name and Signature of Convener & Members of CBoS:

① P. Prasad
② K. S. Reddy
③ M. S. Reddy
④ S. R. Reddy
⑤ S. R. Reddy

⑦ S. R. Reddy
⑧ S. R. Reddy
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⑩ S. R. Reddy

NP
23/06/26

S. R. Reddy

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

PART- A: Introduction			
Program: Bachelor in Life Science (Degree/Honors)		Semester - VI	Session: 2024-2025
1	Course Code	BOSE-04 T	
2	Course Title	Ethnobotany and Medicinal plants	
3	Course Type	Discipline Specific Elective (DSE)	
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 • Develop a comprehensive understanding of the identification, cultivation, and processing of medicinal plants, and their chemical constituents responsible for therapeutic properties, enabling the evaluation of their potential for drug development and healthcare applications. • Explore the integration of traditional medicine practices, ethnobotany, and pharmacological principles in the study of medicinal plants, enabling the critical evaluation of their efficacy, safety, and cultural significance in different healthcare systems.	
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	Ethnobotany: • Introduction, concept, scope and objectives; • Ethnobotany as an interdisciplinary science. • The relevance of ethnobotany in the present context; • Major and minor ethnic groups or Tribals of India, and their life styles. • Plants used by the tribals: • a) Food plants b) intoxicants and beverages c) Resins and oils and miscellaneous uses. • Role of ethnobotany in sustainable development		12
II	Role of ethnobotany in modern Medicine: • Medico-ethnobotanical sources in India; • Significance of the locally available plants in ethno botanical practices (along with their habitat and morphology • Role of ethnic groups in conservation of plant genetic resources. • Endangered taxa and forest management (participatory in Chhattisgarh). • Role of plant drugs in pharmaceutical industries • Quality, safety and efficacy of herbal medicines.		11
III	Medicinal Plants: • History, Scope and Importance of Medicinal Plants. • Indigenous Medicinal Sciences; Definition and Scope- • Traditional system of medicine in India- concept principles and importance of Ayurveda, Shidha, Yunani and Homeopathy • Concept of Herbalism and its significance • Phytomedicines and herbal raw materials , • local health traditions and traditional medicine		11
IV	Conservation and Propagation of medicinal plants: • Medicinal plants Conservation – issues and approaches • IUCN criteria - Red list criteria; • <i>In situ</i> conservation: Biosphere reserves, sacred groves, National Parks; <i>Ex situ</i> conservation: Botanical Gardens, • Ethnomedicinal plant Gardens. • Propagation of Medicinal Plants: Objectives of the nursery, its classification, important components of a nursery, sowing, pricking, use of green house for nursery production, propagation through cuttings, layering, grafting and budding		11
Keywords	Ethnobotany, conservation, Medicinal Plants, Tribals		

Signature of Convener & Members (CBoS) :

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PART-C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

1. S.K. Jain, Manual of Ethnobotany, Scientific Publishers, Jodhpur, 1995.
2. S.K. Jain (ed.) Glimpses of Indian Ethnobotany, Oxford and IBH, New Delhi – 1981 Lone et al., Palaeo ethnobotany
3. S.K. Jain (ed.) 1989. Methods and approaches in ethnobotany. Society of ethnobotanists, Lucknow, India.
4. S.K. Jain, 1990. Contributions of Indian ethnobotany. Scientific publishers, Jodhpur.

Reference Books Recommended:

1. Colton C.M. 1997. Ethnobotany – Principles and applications. John Wiley and sons – Chichester
2. Rama Rao, N and A.N. Henry (1996). The Ethnobotany of Eastern Ghats in Andhra Pradesh, India. Botanical Survey of India. Howrah
3. Rajiv K. Sinha – Ethnobotany The Renaissance of Traditional Herbal Medicine – INA –SHREE Publishers, Jaipur-1996
4. Trivedi P C, 2006. Medicinal Plants: Ethnobotanical Approach, Agrobios, India.
5. Purohit and Vyas, 2008. Medicinal Plant Cultivation: A Scientific Approach, 2nd edn. Agrobios, India. Approach, 2nd edn. Agrobios, India.
6. Medicinal Plants of India" by C.P. Khare
7. "Handbook of Medicinal Plants" by L.D. Kapoor Rogers, P.P., Jalal, K.F. and Boyd, J.A. (2008). An Introduction to Sustainable Development. Prentice Hall of India Private Limited, New Delhi.

Online Resources–

- e-Resources / e-books and e-learning portals
- <https://www.fs.usda.gov/wildflowers/ethnobotany/index.shtml>
- https://www.researchgate.net/publication/333017295_Role_of_ethnobotany_in_modern_medicines_with_special_reference_to_Rauvolfia_serpentina_Trichopus_zevlandicus_Artemisia_sp_and_Withania_somnifera
- <https://www.sciencedirect.com/science/article/abs/pii/S0738081X18300415>
- https://www.mdpi.com/journal/diversity/special_issues/ethnobotany_biodiversity

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

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 CBs:

① R. B. S. S.
② B. S. S.
③ K. S. S.
④ S. S. S.

⑤ S. S. S.
⑥ S. S. S.
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FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)

DEPARTMENT OF BOTANY

COURSE CURRICULUM

PART- A: Introduction			
Program: Bachelor in Life Science (Degree/ honors)		Semester - VI	Session: 2024-2025
1	Course Code	BOSE-04 P	
2	Course Title	Lab. Course 04 (Ethnobotany and Medicinal plants)	
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 get ➤ Acquire practical skills about the connection between plants and human society. ➤ Acquire knowledge of ethnobotanical research methods. ➤ Apply critical thinking and problem-solving skills of traditional plant uses. ➤ Idea about protection and conservation of medicinal and ethnobotanical plants. ➤ Documentation of cultural knowledge about healing.	
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

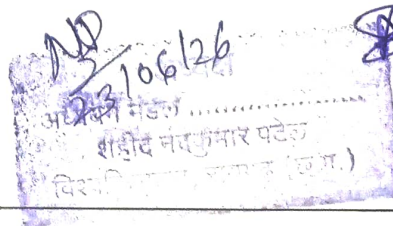
Total No. of learning-Training/performance Periods: 30 Periods (30 Hours)

Module	Topics (Course contents)	No. of Period
Lab./Field Training/ Experiment Contents of Course	1. Identify and collect medicinal plant specimens from various habitats. Documentation for relevant information such as plant parts used, traditional uses, and ecological characteristics. 2. Preparation of herbarium of the collected plants 3. To study the distribution of tribals / ethnic peoples of a selected area. 4. Collection of locally used plants of ethnobotanically important plants 5. To study morphological description and identification of various medicinal plants. 6. Engage with local communities and traditional healers to document their knowledge of medicinal plants. Record their uses, preparation methods, and cultural significance, emphasizing the importance of preserving traditional knowledge. 7. To study common name, botanical name, important varieties and commercially important parts of medicinal and aromatic plants. 8. To study different methods of plant extraction to obtain bioactive compounds 9. Phytochemical and secondary metabolites analysis to determine the chemical potential therapeutic properties of collected specimens of local area. 10. Tribal knowledge towards disease diagnosis, treatment for different medicinal plants and its cultivation and conservation. 11. To find out antimicrobial potential of medicinal plant extracts.	30
Keywords	1. Therapeutic, antimicrobial, medicinal plants. herbarium	

Signature of Convener & Members (CBOS) :

① R. Praveen
② R. Praveen
③ R. Praveen
④ R. Praveen
⑤ R. Praveen
⑥ R. Praveen

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PART-C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended –

1. S.K. Jain, Manual of Ethnobotany, Scientific Publishers, Jodhpur, 1995.
2. Jain, S. K. and V. Mudgal. 1999. A Handbook of Ethnobotany. Bishen Singh Mahendra Pal Singh, Dehradun

Reference Books Recommended –

1. "Handbook of Medicinal Plants" by L.D. Kapoor.
2. "Indian Medicinal Plants: An Illustrated Dictionary" by C.P. Khare.

Online Resources–

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

- 1) <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9526633/>
- 2) <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9922502/>
- 3) <https://bnrc.springeropen.com/articles/10.1186/s42269-022-00770-8>
- 4) <https://cmjournal.biomedcentral.com/articles/10.1186/s13020-016-0108-7>

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

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:

① R. Shree
② R. Shree
③ R. Shree
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R. Shree

FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)

DEPARTMENT OF BOTANY COURSE CURRICULUM

PART- A: Introduction

Program: Bachelor in Life sciences (Certificate / Diploma / Degree)		Semester - I/III/V	Session: 2024-2025
1	Course Code	BOVAC-01	
2	Course Title	Herbal Plant & Human Health	
3	Course Type	Value Addition Course (BOVAC-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 value of herbs, herbal medicine and use of herbal medicine. ➤ Know about botanical medicine professionals in the complementary and alternative medicine (CAM) ➤ Demonstrates the knowledge of the toxicity of plant and essential oil ingredients, ➤ Understand the possibility for allergic and unpleasant reactions to herbal products and the impact of herbal quality on potential toxicity. ➤ Use the herbal plants in their daily life ➤ Adopt the value of herbal medicine to save their health.	
6	Credit Value	2 Credits	Credit = 15 Hours - learning & Observation
7	Total Marks	Max. Marks: 50	Min Passing Marks: 20

PART -B: Content of the Course

Total No. of Teaching-learning Periods (01 Hr. per period) - 30 Periods (30 Hours)		
Unit	Topics (Course contents)	No. of Period
I	Introduction: Elementary knowledge of Herbal plant and Concept of Herb as medicine. Concept of ethno-medicine, folk medicines, ethno-ecology, ethnic communities of the India & the Chhattisgarh. Concept of Herbal garden. Collection of ethnic information. Observation/In Practices - Survey and familiarization with herbs & local herbal plants	08
II	Importance of medicinal plants: Importance of Herbal / Medicinal plant in human health care – health and balanced diet (Role of proteins, carbohydrates, lipids and vitamins). Common plants & plant parts providing metals and vitamins. Observation/In Practices - Survey and familiarization with local herbal medicinal plants	07
III	Tribal medicine and Traditional knowledge: Introduction, Concept of Tribal medicine, methods of disease diagnosis and treatment – common Plants in folk religion. Traditional knowledge and utility of some medicinal plants in Chhattisgarh. Collection /Identification of Herbal plants commonly used by villagers of the state – • Centella asiatica, • Aloe vera, • Solanum nigrum, • Achyranthus aspera, • Withania somnifera, • Papaver somniferum, • Strychnos nux-vomica, • Atropa belladonna;	08
IV	Plants in day to day life: Nutritive and medicinal value of common herbal fruits and vegetables of daily use. Precautions during use of herbal medicinal products. Basic idea of contribution of national research laboratories like CDRI, CIMAP, NBRI, etc. Collection /Identification of Herbal plants commonly used in daily life - Tulsi, Garlic, Ginger, Turmeric, Ajwain, Methi, Flax, Tea and Coffee.	08
Keywords Herbal medicine, Folk medicine, Ethno-medicine, Tribal medicine		

Signature of Convener & Members (CBoS)

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PART-C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended –

1. Kumar, N.C. (1993). An Introduction to Medical botany and Pharmacognosy. Emkay Publications, New Delhi.
2. Rao, A.P. (1999). Herbs that heal. Diamond Pocket Books (P) Ltd., New Delhi.
3. Iris F. F. Benzie and Sissi Wachtel-Galor. Herbal Medicine, 2nd edition Biomolecular and Clinical Aspects, CRC Press/Taylor & Francis; 2011
4. Fabrizio Donovan (2020) Medicinal Herbs: The Ultimate Guide to Natural Healing, Learn The Benefits of Herbs and Use the Nature's Most Powerful Medicinal Plants in Making Your Own AZ Remedies to Treat Diseases, Author's Republic.
5. Stargrove Mitchell Bebel ND, Herb, Nutrient, and Drug Interactions, Publisher: Elsevier – Health Sciences Division
6. Iris F. F. Benzie (Editor), Herbal Medicine (Oxidative Stress and Disease) 2nd Edition,

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–

- <https://pubmed.ncbi.nlm.nih.gov/22593937/>
- <https://crimsonpublishers.com/acam/pdf/ACAM.000551.pdf>
- https://www.researchgate.net/publication/329823398_Medicinal_Plants_Used_in_the_Treatment_of_Mental_and_Neurological_Disorders_in_Ghana
- <https://www.sciencedirect.com/science/article/abs/pii/S0378874115003013>
- <https://core.ac.uk/download/pdf/143841457.pdf>
- <https://practicalselfreliance.com/medicinal-plants/>
- <https://practicalselfreliance.com/medicinal-plants/>
- <https://www.pdfdrive.com/medicinal-plants-books.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): (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):	Two section – A & B Section A: Q1. Objective – 05 x1= 05 Mark ; Q2. Short answer type- 5x2 =10 Marks Section B: Descriptive answer type qts., 1out of 2 from each unit- 4x05 =20 Marks	

Name and Signature of Convener & Members of CBOS:

1. R. Prasad

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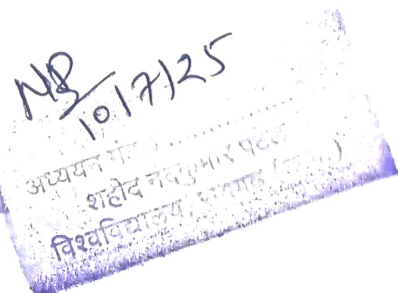
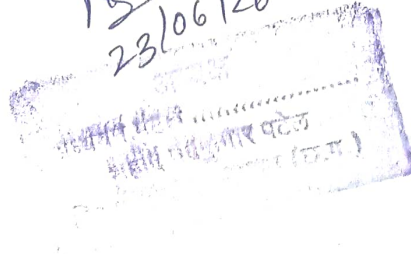
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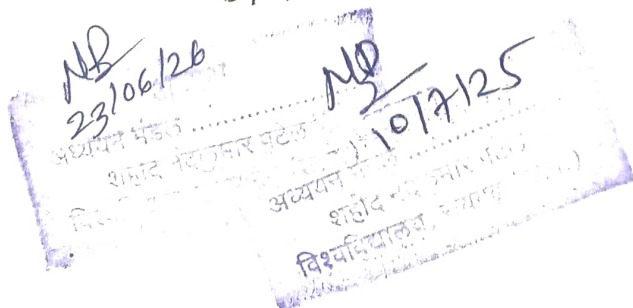
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R. Prasad

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

PART- A: Introduction			
Program: Bachelor in Life Sciences(Certificate / Diploma / Degree)		Semester - II/IV/V/VI	Session: 2024-2025
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)	<i>After completion of this course, the students will be able to -</i> > 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. 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.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

- <https://indiaagronet.com/horticulture/CONTENTS/LANDSCAPE.htm>
- https://www.youtube.com/watch?v=ZUIh6ZFO48c&ab_channel=MountainGardens
- <https://www.youtube.com/watch?v=EE0oQO6n9iA>
- <https://www.teachmint.com/tfile/studymaterial/bsc/j1063fog/11styleofgardeningpdf/0dba825bd66d-4180-afe1-28950aa42454>
- [https://k8449r.weebly.com/uploads/3/0/7/3/30731055/types of gardens \[compatibility model\] pdf-signed.pdf](https://k8449r.weebly.com/uploads/3/0/7/3/30731055/types%20of%20gardens%20compatibility%20model%20pdf-signed.pdf)
- <https://www.egyankosh.ac.in/bitstream/123456789/73050/1/Unit-2.pdf>
- [https://www.academia.edu/40140208/A HANDBOOK ON FLORICULTURE And Landscape](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://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	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 Coordinator as per skilling
	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		

Name and Signature of Convener & Members of CBoS:

1. *Ramesh*
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अध्यक्ष
सहसंचालक
सहसंचालक (उप.)

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सहसंचालक
सहसंचालक (उप.)

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FOUR YEAR UNDERGRADUATE PROGRAM (2024 -2028)
DEPT. OF BOTANY: VALUE ADDITION COURSE
COURSE CURRICULUM (2024-25)

PART-A: Introduction			
Program: Undergraduate (Certificate / Diploma / Degree/Honors)		Semester - I/III/V	Session: 2024-2025
1	Course Code	BOVAC – 02	
2	Course Title	Academic Research & Report Writing	
3	Course Type	Value Addition Course (VAC)	
4	Pre-requisite(if,any)	As per Government norms / Institutional scheme	
5	Course Learning Outcomes (CLO)	After completion of this course, the students will be able to - ➤ Understand the academic research and its scope & prospects. ➤ Know the Importance of Report writing in academic and Research and Necessity of report writing for achievement of academic & research goals ➤ Demonstrates the knowledge of the toxicity of plant and essential oil ingredients. ➤ Understand the kinds & characteristics of academic and research reports / presentation and its prospective application. ➤ Use the tools and techniques of academic research and report writing ➤ Adopt the skill of research designing and report/ paper / thesis writing	
6	Credit Value	2 Credits	Credit = 15 Hours - learning & Observation
7	Total Marks	Max. Marks: 50	Min Passing Marks: 20
PART -B: Content of the Course			
Total No. of Teaching-learning Periods (01 Hr. per period) - 30 Periods (30 Hours)			
Module	Topics (Course contents): Learning and Practices		No. of Hrs
I	Introduction: Concept of - Academic Research and Research Project, Component of a concept Paper for academic research, Research-Characteristics, Type, Formulation & Design, Format, Scope, Motivation & Prospects. Popular Scheme & Organization in India promoting Research - INSPIRE, NSF, MEF, DBT, DST, DNES, STARD, ICAR, ICMR, CSIR, INSA.		08 Hours
II	Research paper / Review writing: Steps of writing a research report. Types of Research paper, Structure of Research papers, Research paper formats, Abstract writing, Methodology, Results and Discussion, Different formats referencing, Ways of communicating a research papers, (Assignments)		07 Hours
III	Report/ Dissertation / Thesis Writing - Structure of a thesis , Scope of the work, Literature review, Experimental / Computational details, Preliminary studies, Result and Discussion, Figures & Table Preparation, Conclusion and Future works, Bibliography, Appendixes (Assignments)		07 Hours
IV	Tools, Techniques & Presentation-- Various word processors - MS Office- Word, Excel & PowerPoint, Libre-office, Latex etc. Making effective presentations using Power Point and Beamer. Basic idea of Data collection, Tabulation & Presentation. Plagiarism detection tools (Assignments)		08 Hours
Keywords	Academic Research, Research report, Project, Thesis/ Dissertation/ Review writing		

Signature of Convener & Members of CBOS:

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PART-C

BVAC – 02 (Academic Research & Report Writing)

Learning Resources: Text Books, Reference Books and Others

Text Books Recommended –

- Technical Report Writing and Research Methodology by Dr Naushad Alam Dr Quadri Javeed Ahmad Peer Dr Banarsi Lal, Write & Print Publications
- Research Writing A Complete Guide (PB) by Srinivasan R, How Academics
- GUIDE TO REPORT WRITING by Netzley, Snow, PEARSON INDIA
- A Student Guide to Writing Research Reports, Papers, Theses and Dissertations By Cathal Ó Siochru; ISBN 9780367621049. Published 2022 by Routledge
- <https://www.goodreads.com/shelf/show/report-writing>

Online Resources–

- e-Resources / e-books and e-learning portals
 - <https://www.questionpro.com/blog/research-reports/>
 - <https://egyankosh.ac.in/bitstream/123456789/39238/1/Unit-5.pdf>
 - <https://www.studocu.com/in/document/visvesvaraya-technological-university/research-methodology/general-format-of-a-research-report/33791300>
 - <https://students.unimelb.edu.au/academic-skills/resources/report-writing/research-reports>

❖ Use of following sites

- <https://www.wiley.com/en->
[ie/Student+Research+and+Report+Writing:+From+Topic+Selection+to+the+Complete+Paper-p-9781118963913](https://www.wiley.com/en-)
- <https://www.researchgate.net/publication/275654158> HAND BOOK FOR WRITING RESEARCH PAPER

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): (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):	Two section – A & B Section A: Q1. Objective – 05 x1= 05 Mark ; Q2. Short answer type- 5x2 =10 Marks Section B: Descriptive answer type qts., 1out of 2 from each unit- 4x05 =20 Marks	

Signature of Convener & Members of CBOS:

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23/06/26
अध्ययन मंडल
शहीद नंदलाल पटेल
विश्वविद्यालय, रायपुर (छ.ग.)

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अध्ययन मंडल
शहीद नंदलाल पटेल
विश्वविद्यालय, रायपुर (छ.ग.)

FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)

DEPARTMENT OF BOTANY

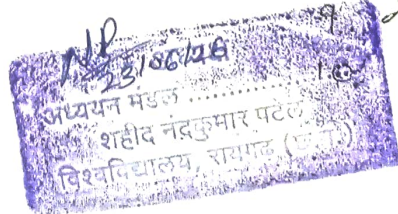
COURSE CURRICULUM

PART- A: Introduction			
Program: Bachelor in Life Sciences (Diploma / Degree/Honors)		Semester – III/IV/V/VI/VII/VIII	Session: 2024-2025
1	Course Code	BOGE -01 T	
2	Course Title	Elementary Botany	
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 ➤ 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	Basics of Plant Science: 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	Branches of botany: General idea, features, and significance; Anatomy, Cytology, Economic Botany, Ethnobotany, Forestry, Genetics, Histology, Microbiology, Paleobotany, Phytochemistry, Phytopathology, Plant biotechnology, Plant breeding, Plant ecology, Plant morphology, Plant physiology, Plant Taxonomy, etc,		11
III	Plants for human welfare: Plant Resources for Rural livelihood – Mahua, Tendu patta, 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	Ancient Indian Botany: 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 (CBs) :

1. *Rajeev*
2. *Munish*
3. *Radhika*
4. *H*
5. *H*

6. *Beeg*
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अध्ययन मंडल
शहीद नंदकुमार पटेल

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
- 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

- <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/94/3-1-11-206.pdf>
- https://efaidnbmnnnibpcajpcglclefindmkaj/https://wgbis.ces.iisc.ac.in/biodiversity/sahyadri/documents/botany_history.pdf
- <https://vedpuran.files.wordpress.com/2016/07/charaksamhitaatrivedajigupt-vol-1.pdf>
- <https://egyankosh.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

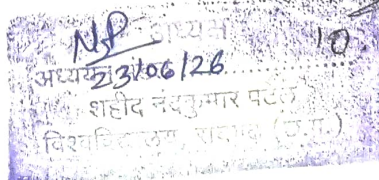
End Semester Exam (ESE): 70

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:

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अध्ययन 10/17/25
शहीद नंदकुमार पट्ट
विश्वविद्यालय, रायगढ़ (छ.प्र.)

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
1	Course Code	BOGE -01 P	
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
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. Microscopic study of plant cell. 2. Microscopic study of prokaryotic (Bacteria) and eukaryotic cell (algae and fungi). 3. Study of thallus structure of <i>Riccia</i> and <i>Marchantia</i> . 4. Identification of different plants growing in college campus. 5. Study of a typical flowering plant and it's parts. 6. Study of internal structure of root and stem. 7. Study of parenchyma, collenchyma and sclerenchyma. 8. Study of medicinal plants of college campus. 9. Study of plants used to cure cough and cold, jaundice and skin diseases. 10. Visit to any local ayurvedic hospital / practitioner to understand Ayurveda.		30
Keywords	Prokaryotic, Parenchyma, Jaundice, Ayurveda.		

Signature of Convener & Members (CBoS) :

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अध्यक्ष मंडल
 शहीद नंदकुमार
 विश्वविद्यालय, रायपुर (छ.ग.)

अध्यक्ष
 23/06/2024
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PART-C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended –

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-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
- <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5871155/>
- <https://cms.botanv.org/home/careers-jobs/careers-in-botany/areas-of-specialization-in-botany.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 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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अध्ययन मंडल
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विश्वविद्यालय, रायपुर (छ.ग.)
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23/06/26
अध्ययन मंडल
शहीद नंदन
विश्वविद्यालय, रायपुर (छ.ग.)

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
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)			
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.		
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23/06/26
अध्यक्ष मंडल
शहीद नंदलाल परेल
विश्वविद्यालय, अमरावती (म.प्र.)

अध्यक्ष मंडल
NP
10/7/25
विश्वविद्यालय

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://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/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/disinfectantmgmnt/topc/EpidemiologyTemporal/Pages/ManagementStrategics.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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अध्यक्ष
26/7/25
विश्वविद्यालय, गुरुगढ़

23/06/26

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
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. 2. 3. 4. 5. 6. 7. 8. 9. 10.			

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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.eschiksha.mp.gov.in
➤ www.vlab.co.in
➤ www.internshala.com
➤ www.ndl.iitkgp.ac.in

Online Resources—

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%207BAshok%20Bendre%207D%20%205B8>
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

Continuous Internal Assessment (CIA):	25 Marks
End Semester Exam (ESE):	35 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:

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शहीद नरसिंह पटेल
विश्वविद्यालय, जयगढ़ (छ.प्र.)

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