

# 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.

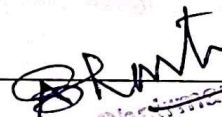
1. R. D. Singh  
2. M. K. Singh  
3. S. K. Singh  
4. M. K. Singh  
5. M. K. Singh

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**

<b>PART- A: Introduction</b>			
Program: Bachelor in Life Sciences (Certificate / Diploma / Degree/Honors)		Semester - I	Session: 2024-2025
1	Course Code	BOSC -01 T	
2	Course Title	Elementary Botany	
3	Course Type	Discipline Specific course (DSC)	
4	Pre-requisite (if, any)	As per program	
5	Course Learning Outcomes (CLO)	At the end of this course, the students will be able to > Understand the Basics of Botany and its branches. > Get acquainted with complex interrelationship between organisms and environment. > Develop a comprehensive understanding of the identification, cultivation, and processing of medicinal plants, and their chemical constituents. > Utilize plants resources for livelihood.	
6	Credit Value	3 Credits	Credit = 15 Hours - learning & Observation
7	Total Marks	Max. Marks: 100	Min Passing Marks: 40
<b>PART -B: Content of the Course</b>			
Total No. of Teaching-learning Periods (01 Hr. per period) - 45 Periods (45 Hours)			
Unit	Topics (Course contents)		No. of Period
I	<b>Basics of Plant Science:</b> Differences and resemblances between; living and nonliving plants and animals, plant and animal cell. Concept of prokaryotes and eukaryotes. Important features of thallophyta, Bryophyta, Pteridophyta, Gymnosperm and Angiosperm. Structure and function of a typical flowering plant.		12
II	<b>Branches of botany:</b> General idea, features, and significance; Anatomy, Cytology, Economic Botany, Ethnobotany, Forestry, Genetics, Histology, Microbiology, Paleobotany, Phytochemistry, Phytopathology, Plant biotechnology, Plant breeding, Plant ecology, Plant morphology, Plant physiology, Plant Taxonomy, etc.		11
III	<b>Plants for human welfare:</b> Plant Resources for Rural livelihood – Mahua, Tendu 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	<b>Ancient Indian Botany:</b> Indigenous Medicinal Sciences; Definition and Scope-Ayurveda: History, origin, panchamahabhutas, saptadhatu and tridosha concepts, Rasayana, plants used in ayurvedic treatments, Siddha: Origin of Siddha medicinal systems, Basis of Siddha system, plants used in Siddha medicine. Unani: History, concept. Charaksamhita. Ancient and modern Botanists and their contributions.-Charak, Jagdish Chandra Bose, B.P.Pal, Desikachary, K.C. Mehta M.S. Swaminathan etc.		11
Keywords	Prokaryotes, Ethnobotany, Taxonomy, Ayurveda		
Signature of Convener & Members (CBoS):			

  
 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.
- ⑧ S. K.
- ⑨ A. S. Pan
- ⑩ V. S. C.



## 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](http://www.svayam.ac.in)
- [www.ignou.ac.in](http://www.ignou.ac.in)
- [www.ezyankosh.ac.in](http://www.ezyankosh.ac.in)
- [www.iftm.ac.in](http://www.iftm.ac.in)
- [www.eskllindia.org](http://www.eskllindia.org)
- [www.esllksha.mp.gov.in](http://www.esllksha.mp.gov.in)
- [www.vlab.co.in](http://www.vlab.co.in)
- [www.internshala.com](http://www.internshala.com)
- [www.ndl.itkpp.ac.in](http://www.ndl.itkpp.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://eaidnbmmnnibpcnjpcgicfndmkaj/https://wpbis.ccs.iisc.ac.in/biodiversity/sahyadri/documents/botany_history.pdf)
- <https://vedpuran.files.wordpress.com/2016/07/charak samhita natri devajigupt-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. Swain  
② Nandkumar  
③ Anand  
④ M. S.  
⑤ Anand  
⑥ M. S.

⑦ R.  
⑧ Anand  
⑨ Anand  
⑩ M. S.

Anand  
Chairman  
Studies .....  
Nandkumar Patel  
Bhaya, Raigarh (C.G.)

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

<b>PART- A: Introduction</b>			
Program: Bachelor in Life Sciences (Certificate / Diploma / Degree/ Honors)		Semester - I	Session: 2024-2025
1	Course Code	BOSC -01	
2	Course Title	Lab. Course -01 (Elementary Botany)	
3	Course Type	Laboratory course	
4	Pre-requisite (if, any)	As per program	
5	Course Learning Outcomes (CLO)	At the end of this course, the students will be able to > Understand structure of plant cell, prokaryotic cell and eukaryotic cell. > Identify pteridophytes of college campus. > Learn about the different types of plant tissues. > Learn about Ayurvedic system of medicine.	
6	Credit Value	1 Credits	Credit =30 Hours Laboratory or Field learning/Training
7	Total Marks	Max. Marks: 50	Min Passing Marks: 20
<b>PART -B: Content of the Course</b>			
Total No. of learning-Training/performance Periods: 30 Periods (30 Hours)			
Module	Topics (Course contents)		No. of Period
Lab./Field Training/ Experiment Contents of Course	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

Brath  
 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–**

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- [www.swavam.ac.in](http://www.swavam.ac.in)
- [www.ignou.ac.in](http://www.ignou.ac.in)
- [www.egvankosh.ac.in](http://www.egvankosh.ac.in)
- [www.iitm.ac.in](http://www.iitm.ac.in)
- [www.eskillindia.org](http://www.eskillindia.org)
- [www.eshiksha.mp.gov.in](http://www.eshiksha.mp.gov.in)
- [www.vlab.co.in](http://www.vlab.co.in)
- [www.internshala.com](http://www.internshala.com)
- [www.ndl.iitkgp.ac.in](http://www.ndl.iitkgp.ac.in)

**Online Resources–**

- e-Resources / e-books and e-learning portals
- <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5871155/>
- <https://cms.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 &amp; Members of CBoS:

① R. Sivan  
② Munch  
③ Indira  
④ M.  
⑤ A.  
⑥ H.  
⑦ d.

⑧ G.  
⑨ A.  
⑩ V.

**BR**  
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

**Chairman**  
 Dr. S. K. Patil  
 Head, Botany Department  
 P. O. Box No. 10, Raigarh (C.G.)



### Text Books, Reference Books and Others

### Text Books, Reference Books and Others

**Text Books Recommended –**

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

**Reference books:**

1. Webster, J., Weber, R. (2007). Introduction to Fungi, 3rd edition. Cambridge, U.K.: Cambridge University Press.
2. Pelzar, 1963. Microbiology, Tata McGraw Hill, New Delhi
3. Rangaswamy, G. 2009, Disease of Crop Plants in India, Prentice Hall of India, New Delhi.
4. Microbiology Fundamental and Applications (hindi) (pb) 9. ISBN: 9788188826230 Edition: 03Year : 2016Author : Dr. Purohit SS , Dr. Deo Publisher : Student Edition Language : Hindi
5. Modern Microbiology (hindi) (hb) ISBN: 9788177543599Edition : 1Year : 2018Author : Dr. Purohit SS , Dr. Singh T Publisher : Agrobios (India)
6. Plant pathology by R.S. Mehrotra, Tata McGraw-Hill Publication

### Online Resources—

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

### Online Resources—

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

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

***Name and Signature of Convener & Members of CBoS:***

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

<b>PART- A: Introduction</b>			
Program: Bachelor in Life Sciences (Certificate / Diploma / Degree/Honors)		Semester - II	Session: 2024-2025
1	Course Code	BOSC- 02	
2	Course Title	Lab. Course –02 (Microbes and Thallophyta)	
3	Course Type	Laboratory course	
4	Pre-requisite (if, any)	As per program	
5	Course Learning Outcomes (CLO)	<ol style="list-style-type: none"> <li>1. Understand the Viruses, Bacteria, Phycology, Mycology and Plant pathology</li> <li>2. Learn microbial techniques which will be beneficial for agriculture and industry.</li> <li>3. Learn life cycles of selected genera of different groups</li> <li>4. Understand etiology of plant diseases</li> <li>5. Apply their knowledge in the crop fields to eradicate or avoid the diseases</li> </ol>	
6	Credit Value	1 Credits	Credit =30 Hours Laboratory or Field learning/Training
7	Total Marks	Max. Marks: 50	Min Passing Marks: 20
<b>PART -B: Content of the Course</b>			
Total No. of learning-Training/performance Periods: 30 Periods (30 Hours)			
Module	Topics (Course contents)		No. of Period
Lab./Field Training/ Experiment Contents of Course	<ol style="list-style-type: none"> <li>1. Collection of viral/ Bactrial /fungal infected plants</li> <li>2. Study of plant disease symptoms caused by viral/ Bactrial /fungal/ Mycoplasma</li> <li>3. <b>BACTERIAL IDENTIFICATION:</b> Isolation of bacteria Staining techniques: Gram's, staining</li> <li>4. Study / Slide preparation of available Cyanobacteria</li> <li>5. <b>PHYCOLOGY:</b> Study / Slide preparation and Staining of algae –<i>Volvox</i>, <i>Oedogonium</i> and <i>Chara</i>; <i>Vaucheria</i>; <i>Ectocarpus</i> <i>Polysiphonia</i></li> <li>6. <b>MYCOLOGY:</b> 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</li> </ol>		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

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**Chairman**  
 S. K. Das

S. K. Das  
 S. K. Das  
 S. K. Das



## 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](http://www.swayam.ac.in)
- > [www.ignou.ac.in](http://www.ignou.ac.in)
- > [www.evyankosh.ac.in](http://www.evyankosh.ac.in)
- > [www.iitm.ac.in](http://www.iitm.ac.in)
- > [www.eskillindia.org](http://www.eskillindia.org)
- > [www.eschiksha.mp.gov.in](http://www.eschiksha.mp.gov.in)
- > [www.vlab.co.in](http://www.vlab.co.in)
- > [www.internshala.com](http://www.internshala.com)
- > [www.ndl.iitkgp.ac.in](http://www.ndl.iitkgp.ac.in)

➤ e-Resources / e-books and e-learning portals  
<https://community.plantae.org/tags/moocfuturelearn.com/courses/teaching-biology-inspiring-students-with-plants-in-science>  
<https://microbiology.society.org/publication/education-outreach-resources/basic-practical-microbiology-a-manual.html>  
<https://microbiologysonline.org/file/7926d7789d8a2f7b2075109f68c3175e.pdf>  
<http://allaboutalgae.com/benefits/>  
<https://repository.cimmyt.org/xmlui/bitstream/handle/10883/3219/64331.pdf>  
<https://www.mooc-list.com/tags/microbiology/>  
<http://www.agrifis.ir/sites/default/files/A%20text%20book%20of%20practical%20botany%201%20%7BAshok%20Bendre%7D%20%5B8>  
<https://171339239%5D%20%281984%29.pdf>

**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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**Chairman**  
Studies .....  
S. R. Raigam (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)	<p><b>After completion of this course, the students will be able to –</b></p> <ul style="list-style-type: none"> <li>➤ Understand the value of herbs, herbal medicine and use of herbal medicine.</li> <li>➤ Know about botanical medicine professionals in the complementary and alternative medicine (CAM)</li> <li>➤ Demonstrate the knowledge of the toxicity of plant and essential oil ingredients.</li> <li>➤ Understand the possibility for allergic and unpleasant reactions to herbal products and the impact of herbal quality on potential toxicity.</li> <li>➤ Use the herbal plants in their daily life</li> <li>➤ Adopt the value of herbal medicine to save their health.</li> </ul>	
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	<p><b>Introduction:</b> Elementary knowledge of Herbal plant and Concept of Herb as medicine.</p> <p>Concept of ethno-medicine, folk medicines, ethno-ecology, ethnic communities of the India &amp; the Chhattisgarh. Concept of Herbal garden. Collection of ethnic information.</p> <p><b>Observation/In Practices - Survey and familiarization with herbs &amp; local herbal plants</b></p>	08
II	<p><b>Importance of medicinal plants:</b> Importance of Herbal / Medicinal plant in human health care – health and balanced diet (Role of proteins, carbohydrates, lipids and vitamins). Common plants &amp; plant parts providing metals and vitamins.</p> <p><b>Observation/In Practices - Survey and familiarization with local herbal medicinal plants</b></p>	07
III	<p><b>Tribal medicine and Traditional knowledge:</b> 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.</p> <p><b>Collection /Identification of Herbal plants commonly used by villagers of the state –</b></p> <ul style="list-style-type: none"> <li>• Centella asiatica,</li> <li>• Aloe vera,</li> <li>• Solanum nigrum,</li> <li>• Achyranthus aspera,</li> <li>• Withania somnifera,</li> <li>• Papaver somniferum,</li> <li>• Strychnos nux-vomica,</li> <li>• Atropa belladonna;</li> </ul>	08
IV	<p><b>Plants in day to day life:</b> 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.</p> <p><b>Collection /Identification of Herbal plants commonly used in daily life - Tulsi, Garlic, Ginger, Turmeric, Ajwain, Methi, Flax, Tea and Coffee.</b></p>	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](http://www.swayam.ac.in)
- > [www.ignou.ac.in](http://www.ignou.ac.in)
- > [www.evyankosh.ac.in](http://www.evyankosh.ac.in)
- > [www.iitm.ac.in](http://www.iitm.ac.in)
- > [www.eskillindia.org](http://www.eskillindia.org)
- > [www.eschiksha.mp.gov.in](http://www.eschiksha.mp.gov.in)
- > [www.vlab.co.in](http://www.vlab.co.in)
- > [www.internshala.com](http://www.internshala.com)
- > [www.ndl.iitknp.ac.in](http://www.ndl.iitknp.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.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

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10. R. S. Rao

R. S. Rao

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

<b>PART- A: Introduction</b>			
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)	<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
<b>PART -B: Content of the Course</b>			
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. <b>Concept &amp; Types of Garden:</b> 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. <b>Garden plants:</b> 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. <b>Floriculture:</b> 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		
<b>Signature of Convener &amp; Members (CBoS)</b> <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;">           1.             2.             3.             4.             5.  </div> <div style="width: 45%;">           6.             7.             8.             9.             10.  </div> </div> <div style="text-align: right; margin-top: 20px; font-size: 1.2em;"> </div>			



## 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](http://www.smyam.ac.in)
- [www.ignou.ac.in](http://www.ignou.ac.in)
- [www.egyankosh.ac.in](http://www.egyankosh.ac.in)
- [www.itm.ac.in](http://www.itm.ac.in)
- [www.eskillindia.org](http://www.eskillindia.org)
- [www.eshtksha.mpp.gov.in](http://www.eshtksha.mpp.gov.in)
- [www.1lab.co.in](http://www.1lab.co.in)
- [www.internshala.com](http://www.internshala.com)
- [www.ndl.ftknp.ac.in](http://www.ndl.ftknp.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=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://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://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://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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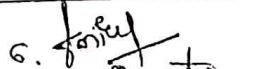
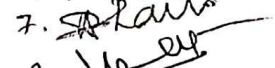



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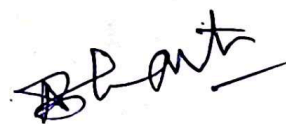
**FOUR YEAR UNDERGRADUATE PROGRAM (2024 -2028)**  
**DEPT. OF BOTANY: VALUE ADDITION COURSE**  
**COURSE CURRICULUM (2024-25)**

<b>PART-A: Introduction</b>			
<b>Program: Undergraduate</b> (Certificate / Diploma / Degree/Honors)		<b>Semester - I/III/V</b>	<b>Session: 2024-2025</b>
1	Course Code	<b>BOVAC – 02</b>	
2	Course Title	<b>Academic Research &amp; Report Writing</b>	
3	Course Type	<b>Value Addition Course (VAC)</b>	
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> <ul style="list-style-type: none"> <li>➤ Understand the academic research and its scope &amp; prospects.</li> <li>➤ Know the Importance of Report writing in academic and Research and Necessity of report writing for achievement of academic &amp; research goals</li> <li>➤ Demonstrates the knowledge of the toxicity of plant and essential oil ingredients.</li> <li>➤ Understand the kinds &amp; characteristics of academic and research reports / presentation and its prospective application.</li> <li>➤ Use the tools and techniques of academic research and report writing</li> <li>➤ Adopt the skill of research designing and report/ paper /thesis writing</li> </ul>	
6	Credit Value	<b>2 Credits</b>	<b>Credit = 15 Hours - learning &amp; Observation</b>
7	Total Marks	<b>Max. Marks: 50</b>	<b>Min Passing Marks: 20</b>
<b>PART -B: Content of the Course</b>			
<b>Total No. of Teaching-learning Periods (01 Hr. per period) - 30 Periods (30 Hours)</b>			
<b>Module</b>	<b>Topics (Course contents): Learning and Practices</b>		<b>No. of Hrs</b>
<b>I</b>	<b>Introduction:</b> 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.-		<b>08 Hours</b>
<b>II</b>	<b>Research paper / Review writing:</b> 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)		<b>07 Hours</b>
<b>III</b>	<b>Report/ Dissertation / Thesis Writing</b> - 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)		<b>07 Hours</b>
<b>IV</b>	<b>Tools, Techniques &amp; Presentation--</b> 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)		<b>08 Hours</b>
<b>Keywords</b>	<b>Academic Research, Research report, Project, Thesis/ Dissertation/ Review writing</b>		

**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](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

<b>Continuous Internal Assessment (CIA):</b> (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
<b>End Semester Exam (ESE):</b>	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)**

<b>PART-A: Introduction</b>			
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

<b>PART -B: Content of the Course</b>		
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	<b>Introduction:</b> 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	<b>Floral ornaments &amp; Flower arrangements:</b> 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	<b>Flower decoration:</b> 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	<b>Creative decorations:</b> 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://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://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://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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## 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](http://www.swayam.ac.in)
- [www.ignou.ac.in](http://www.ignou.ac.in)
- [www.egyankosh.ac.in](http://www.egyankosh.ac.in)
- [www.iitm.ac.in](http://www.iitm.ac.in)
- [www.eskillindia.org](http://www.eskillindia.org)
- [www.eshiksha.mpp.gov.in](http://www.eshiksha.mpp.gov.in)
- [www.vlab.co.in](http://www.vlab.co.in)
- [www.internshala.com](http://www.internshala.com)
- [www.ndl.iitkgp.ac.in](http://www.ndl.iitkgp.ac.in)

#### Online Resources–

- <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.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 CBs:

1. R. Sivar

2. R. Sivar

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R. Sivar



# 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>Phytopaleontology and Evolutionary Botany</i>
BOSC -03P	<i>Lab. Course-03 (Archegoniate and Fossils)</i>	BOSE -03P	<i>Lab. Course -03 (Phytopaleontology 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 &amp; 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 &amp; Gene Technology)</i>
GE -01 & 02		VAC	
BOGE -01T	<i>Elementary Botany</i>	BOVAC-01	<i>Herbal Plant &amp; Human Health</i>
BOGE -01P	<i>Lab. Course -01 (Elementary Botany)</i>		<b>SEC</b>
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  
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**Chairman**  
 of Studies .....  
 Nandkumar Patel  
 Raigadh, Raigarh (C.C.)



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

<b>PART- A: Introduction</b>			
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)	<ul style="list-style-type: none"> <li>➤ students will be familiar with amphibians and reptiles plants</li> <li>➤ progressive evolution in plants</li> <li>➤ relics of past plants</li> <li>➤ diversity in plants</li> <li>➤ development of seeds.</li> </ul>	
6	Credit Value	3 Credits	Credit = 15 Hours - learning & Observation
7	Total Marks	Max. Marks: 100	Min Passing Marks: 40
<b>PART -B: Content of the Course</b>			
Total No. of Teaching-learning Periods (01 Hr. per period) - 45 Periods (45 Hours)			
Unit	Topics (Course contents)	No. of Period	
I	<b>Bryophyta:</b> 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	<b>Pteridophytes:</b> 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	<b>Gymnosperm :</b> 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	<b>Fossil:</b> 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	
<b>Keywords</b> Archegonia, seedless, heterospory, fossils			
<b>Signature of Convener &amp; Members (CBoS) :</b>			

① R. Singh  
② R. Singh  
③ R. Singh  
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⑩ R. Singh

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

Chairman  
Studies .....  
R. Singh



Text Books, Reference Books and Others
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1. Puri, P. (1980) Bryophy

- Text Books Recommended –**

- ### Online Resources—

- ### Online Resources—

<https://study.com/learn/lesson/bryophytes-characters-characteristics-examples.html>

➤ [https://bio.libretexts.org/Bookshelves/Introductory and General Biology/Book%3AGeneral Biology \(Boundless\)/26%3A Seed Plants/26.02%3A Gymnosperms/26.2A%3A Characteristics of Gymnosperms](https://bio.libretexts.org/Bookshelves/Introductory_and_General_Biology/Book%3AGeneralBiology(Boundless)/26%3ASeedPlants/26.02%3AGymnosperms/26.2A%3ACharacteristicsofGymnosperms)

➤ [https://www.google.com/search?q=fossils&scasv=09379ecd0b6efd91&rhl=1C1CHBD\\_enIN1091IN1093&sxsrf=ACQVn09ytlzqZRGwbyhdxc-plsOZFEXGRnmfcw%3A1713546819943&ei=Q6YIzvefOde5vr0PtMuvqAg&q=fossils&gs\\_l=Exnd3MId2l6LXNlcAiB2Zvc3NpbHhIMgAgAMgoQABIAIBBixAxhDGloFMgoQLhiABBDHGloFMgoUQAIBiABDIFEEAAyAgQyBRAAGIAEMMoQABoABBBHDGloFMgoUQAIBiABDIFEEAAyAgQyBRAAGIAEMMoQAIBiABEjhhKIAAwPIUCAB4AJABAJGbgwKgAYclngEFMC4ILK4AQHIAQD4AOGYAggeAukLwgIKECMYgAQYJxiKBcICBBajGCICAhEQLLhiABBixAxIRaxiDARjiHAicCCBAAGIAEGLEDwglKEAAyAgAQYFBIHApDAJIHBTauMiv40oAFSvwWw&client=gws-wiz-serp](https://www.google.com/search?q=fossils&scasv=09379ecd0b6efd91&rhl=1C1CHBD_enIN1091IN1093&sxsrf=ACQVn09ytlzqZRGwbyhdxc-plsOZFEXGRnmfcw%3A1713546819943&ei=Q6YIzvefOde5vr0PtMuvqAg&q=fossils&gs_l=Exnd3MId2l6LXNlcAiB2Zvc3NpbHhIMgAgAMgoQABIAIBBixAxhDGloFMgoQLhiABBDHGloFMgoUQAIBiABDIFEEAAyAgQyBRAAGIAEMMoQABoABBBHDGloFMgoUQAIBiABDIFEEAAyAgQyBRAAGIAEMMoQAIBiABEjhhKIAAwPIUCAB4AJABAJGbgwKgAYclngEFMC4ILK4AQHIAQD4AOGYAggeAukLwgIKECMYgAQYJxiKBcICBBajGCICAhEQLLhiABBixAxIRaxiDARjiHAicCCBAAGIAEGLEDwglKEAAyAgAQYFBIHApDAJIHBTauMiv40oAFSvwWw&client=gws-wiz-serp)

➤ [https://www.google.com/search?q=fossils&scasv=09379ecd0b6efd91&rhl=1C1CHBD\\_enIN1091IN1093&sxsrf=ACQVn09ytlzqZRGwbyhdxc-plsOZFEXGRnmfcw%3A1713546819943&ei=Q6YIzvefOde5vr0PtMuvqAg&q=fossils&gs\\_l=Exnd3MId2l6LXNlcAiB2Zvc3NpbHhIMgAgAMgoQABIAIBBixAxhDGloFMgoQLhiABBDHGloFMgoUQAIBiABDIFEEAAyAgQyBRAAGIAEMMoQABoABBBHDGloFMgoUQAIBiABDIFEEAAyAgQyBRAAGIAEMMoQAIBiABEjhhKIAAwPIUCAB4AJABAJGbgwKgAYclngEFMC4ILK4AQHIAQD4AOGYAggeAukLwgIKECMYgAQYJxiKBcICBBajGCICAhEQLLhiABBixAxIRaxiDARjiHAicCCBAAGIAEGLEDwglKEAAyAgAQYFBIHApDAJIHBTauMiv40oAFSvwWw&client=gws-wiz-serp](https://www.google.com/search?q=fossils&scasv=09379ecd0b6efd91&rhl=1C1CHBD_enIN1091IN1093&sxsrf=ACQVn09ytlzqZRGwbyhdxc-plsOZFEXGRnmfcw%3A1713546819943&ei=Q6YIzvefOde5vr0PtMuvqAg&q=fossils&gs_l=Exnd3MId2l6LXNlcAiB2Zvc3NpbHhIMgAgAMgoQABIAIBBixAxhDGloFMgoQLhiABBDHGloFMgoUQAIBiABDIFEEAAyAgQyBRAAGIAEMMoQABoABBBHDGloFMgoUQAIBiABDIFEEAAyAgQyBRAAGIAEMMoQAIBiABEjhhKIAAwPIUCAB4AJABAJGbgwKgAYclngEFMC4ILK4AQHIAQD4AOGYAggeAukLwgIKECMYgAQYJxiKBcICBBajGCICAhEQLLhiABBixAxIRaxiDARjiHAicCCBAAGIAEGLEDwglKEAAyAgAQYFBIHApDAJIHBTauMiv40oAFSvwWw&client=gws-wiz-serp)

➤ [https://www.google.com/search?q=pteridophytes&scasv=09379ecd0b6efd91&rhl=1C1CHBD\\_enIN1091IN1093&sxsrf=ACQVn0-V0lp175QZ3sbhKrflRXtXBGPdZyVA%3A1713546628592&ei=hKUIzVf19q-juMIpkR-DkAY&q=pter&gs\\_l=Exnd3MId2l6LXNlcAiBH80ZXIqAggAMg0QABiABBBixAxhDGloFMgoQABiABBDHGloFMgoQABiABBDHGloFMgoUQAIBiABDIFEEAAyAgQYQXiKBtTINEC4YgAQYsQMYYQxiKBtTIFEC4YgAQYChAAgiaEGEMYigUVChAAgiaEGEMYijv1ihQAFOvxCnAAeAcQAQOCYAfoBoAGIBgoBBTAuMi4vuAEbvAEA-AEBmAlEOALgBsICChAjGIAEGCCYigXCAGQQIXgnwglKEC4YgAQYQxiKBHzgDAJIHBTauMi4voAfOSg&client=gws-wiz-serp](https://www.google.com/search?q=pteridophytes&scasv=09379ecd0b6efd91&rhl=1C1CHBD_enIN1091IN1093&sxsrf=ACQVn0-V0lp175QZ3sbhKrflRXtXBGPdZyVA%3A1713546628592&ei=hKUIzVf19q-juMIpkR-DkAY&q=pter&gs_l=Exnd3MId2l6LXNlcAiBH80ZXIqAggAMg0QABiABBBixAxhDGloFMgoQABiABBDHGloFMgoQABiABBDHGloFMgoUQAIBiABDIFEEAAyAgQYQXiKBtTINEC4YgAQYsQMYYQxiKBtTIFEC4YgAQYChAAgiaEGEMYigUVChAAgiaEGEMYijv1ihQAFOvxCnAAeAcQAQOCYAfoBoAGIBgoBBTAuMi4vuAEbvAEA-AEBmAlEOALgBsICChAjGIAEGCCYigXCAGQQIXgnwglKEC4YgAQYQxiKBHzgDAJIHBTauMi4voAfOSg&client=gws-wiz-serp)

➤ [https://bio.libretexts.org/Bookshelves/Introductory and General Biology/Book%3AGeneral Biology \(Bound less\)/26%3A Seed Plants/26.02%3A Gymnosperms/26.2A%3A Characteristics of Gymnosperms](https://bio.libretexts.org/Bookshelves/Introductory_and_General_Biology/Book%3AGeneralBiology(Boundless)/26%3ASeedPlants/26.02%3AGymnosperms/26.2A%3ACharacteristicsofGymnosperms)

**Suggested Continuous Evaluation Methods:**

**Continuous Internal Assessment (CIA): 30 Marks**

Continuous Internal	Internal Test / Quiz-(2): 20 +20
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<b>Continuous Internal Assessment (CIA):30</b> <b>(By Course Teacher)</b>	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
<b>End Semester Exam (ESE): 70</b>	<b>Two section – A &amp; B</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:**

BoS: NP  
अध्ययन नं. 125  
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विश्वविद्यालय, रायगढ़ (छ.ग.)



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

<b>PART- A: Introduction</b>			
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
<b>PART -B: Content of the Course</b>			
Total No. of learning-Training/performance Periods: 30 Periods (30 Hours)			
Module	Topics (Course contents)		No. of Period
Lab./Field Training/ Experiment Contents of Course	<b>Bryophyta:</b> 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> . <b>Pteridophyta:</b> 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> . <b>Gymnosperms:</b> 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. <b>Fossil:</b> 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  
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 अध्यक्ष महोदय  
 शहीद नंदकुमार पटेल  
 विश्वविद्यालय, (ग. 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](http://www.swayam.ac.in)
- > [www.ignou.ac.in](http://www.ignou.ac.in)
- > [www.egvankosh.ac.in](http://www.egvankosh.ac.in)
- > [www.iitm.ac.in](http://www.iitm.ac.in)
- > [www.eskillindia.org](http://www.eskillindia.org)
- > [www.eskiksha.mp.gov.in](http://www.eskiksha.mp.gov.in)
- > [www.vlab.co.in](http://www.vlab.co.in)
- > [www.internshala.com](http://www.internshala.com)
- > [www.ndl.iitkgp.ac.in](http://www.ndl.iitkgp.ac.in)

#### Online Resources–

- > e-Resources / e-books and e-learning portals
- 1. <https://cfaidnbmnnnibpcajpcgclefindmka/jhttps://egvankosh.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 R. Prasad  
③ R. Prasad  
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R. Prasad



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

<b>PART- A: Introduction</b>			
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

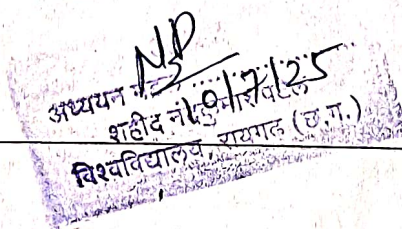
**PART -B: Content of the Course**

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.1) (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.1) (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](http://www.swayam.ac.in)
- [www.ignou.ac.in](http://www.ignou.ac.in)
- [www.egvankosh.ac.in](http://www.egvankosh.ac.in)
- [www.iitm.ac.in](http://www.iitm.ac.in)
- [www.eskillindia.org](http://www.eskillindia.org)
- [www.eschiksha.mp.gov.in](http://www.eschiksha.mp.gov.in)
- [www.vlab.co.in](http://www.vlab.co.in)
- [www.internshala.com](http://www.internshala.com)
- [www.ndl.iitkgp.ac.in](http://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.  
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विश्वविद्यालय, रायगढ़ (उ.प्र.)

R. R. R.

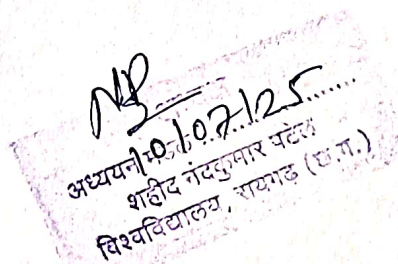


**FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)**  
**DEPARTMENT OF BOTANY**  
**COURSE CURRICULUM**

<b>PART- A: Introduction</b>			
<b>Program: Bachelor in Life Sciences</b> (Diploma / Degree/ Honors)		<b>Semester - IV</b>	<b>Session: 2024-2025</b>
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
<b>PART -B: Content of the Course</b>			
Total No. of learning-Training/performance Periods: 30 Periods (30 Hours)			
Module	Topics (Course contents)		No. of Period
Lab./Field Training/ Experiment Contents of Course	<ul style="list-style-type: none"> <li>• Description of local plants of the syllabus in semitechnical language, floral formula and floral diagrams should be drawn.</li> <li>• Preparation of herbarium of local flora.</li> <li>• Anatomy of primary and secondary growth in monocots and dicots stem using hand sections or permanent slides.</li> <li>• Anatomy of root, primary and secondary structure.</li> <li>• Study of placentation.</li> <li>• Study of types of ovule in permanent slide.</li> <li>• Isolation of globular, heart shape and torpedo embryo.</li> <li>• Study of pollination by insects.</li> </ul>		30
Keywords	Herbarium, Monocot, Placentation, Pollination		

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

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 अध्यक्ष  
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 विश्वविद्यालय, रायगड (छ.प्र.)

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## 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](http://www.swayam.ac.in)
- > [www.ignou.ac.in](http://www.ignou.ac.in)
- > [www.cgvakosh.ac.in](http://www.cgvakosh.ac.in)
- > [www.iitm.ac.in](http://www.iitm.ac.in)
- > [www.eskillindia.org](http://www.eskillindia.org)
- > [www.esiksha.mp.gov.in](http://www.esiksha.mp.gov.in)
- > [www.vlab.co.in](http://www.vlab.co.in)
- > [www.internshala.com](http://www.internshala.com)
- > [www.ndl.iitkgp.ac.in](http://www.ndl.iitkgp.ac.in)

#### Online Resources–

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

<https://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](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. ...
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विश्वविद्यालय, रायगढ़ (म.प्र.)

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# FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)

## DEPARTMENT OF BOTANY COURSE CURRICULUM

<b>PART- A: Introduction</b>			
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
<b>PART -B: Content of the Course</b>			
Total No. of Teaching-learning Periods (01 Hr. per period) - 45 Periods (45 Hours)			
Unit	Topics (Course contents)		No. of Period
I	<b>Natural resources</b> > 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	<b>Land and freshwater resources</b> > 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	<b>Biological Resources</b> > 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	<b>Contemporary practices in resource management</b> > 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  
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10/10/25

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://efaidnbmnnnibpcajpeglclefindmkaj/https://egvankosh.ac.in/bitstream/123456789/66166/2/Unit4.pdf>
- [https://efaidnbmnnnibpcajpeglclefindmkaj/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.](https://efaidnbmnnnibpcajpeglclefindmkaj/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](http://www.swayam.ac.in)
- [www.ignou.ac.in](http://www.ignou.ac.in)
- [www.egvankosh.ac.in](http://www.egvankosh.ac.in)
- [www.iitm.ac.in](http://www.iitm.ac.in)
- [www.eskillindia.org](http://www.eskillindia.org)
- [www.eshiksha.mp.gov.in](http://www.eshiksha.mp.gov.in)
- [www.vlab.co.in](http://www.vlab.co.in)
- [www.internshala.com](http://www.internshala.com)
- [www.ndl.iitkgp.ac.in](http://www.ndl.iitkgp.ac.in)

### 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 Prof. Dr. S. K. Singh  
② Prof. Dr. S. K. Singh  
③ Prof. Dr. S. K. Singh  
④ Prof. Dr. S. K. Singh  
⑤ Prof. Dr. S. K. Singh  
⑥ Prof. Dr. S. K. Singh

⑦ Prof. Dr. S. K. Singh  
⑧ Prof. Dr. S. K. Singh  
⑨ Prof. Dr. S. K. Singh  
⑩ Prof. Dr. S. K. Singh

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विश्वविद्यालय, दिल्ली



# FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)

## DEPARTMENT OF BOTANY

### COURSE CURRICULUM

<b>PART- A: Introduction</b>			
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)	<p>at the end of then of the sesn</p> <ul style="list-style-type: none"> <li>○ To understand natural resources and their sustainable utilization.</li> <li>○ Acquire knowledge on land, water, energy, and forest resources.</li> <li>○ Students will learn about the practices of natural resource management.</li> <li>○ Acquire knowledge on the international and national efforts of natural resource management.</li> </ul>	
6	Credit Value	1 Credits	Credit =30 Hours Laboratory or Field learning/Training
7	Total Marks	Max. Marks:— 50	Min Passing Marks: 20
<b>PART -B: Content of the Course</b>			
Total No. of learning-Training/performance Periods: 30 Periods (30 Hours)			
Module	Topics (Course contents)		No. of Period
Lab/Field Training/ Experiment Contents of Course	<ol style="list-style-type: none"> <li>1) To compare protected and unprotected grassland stands using community coefficients</li> <li>2) To estimate IVI of the species in a woodland using point centered quarter method.</li> <li>3) To find out important grassland species using chi square test.</li> <li>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.</li> <li>5) To determine diversity indices (Shannon Wiener, concentration of dominance, species richness, equability and B diversity.</li> <li>6) Field survey of a part of town or city to make the students aware of the diversity of plants in urban ecosystems.</li> <li>7) Estimation of solid waste generated by a domestic system (biodegradable and non biodegradable) and its impact on land degradation.</li> <li>8) Collection of data on forest covers of specific area.</li> <li>9) Measurement of dominance of woody species by DBH (diameter at breast height) method.</li> <li>10) Calculation and analysis of ecological footprint.</li> <li>11) Ecological modeling.</li> </ol>		30
Keywords	Community coefficient, IVI, diversity indices		

Signature of Convener & Members (CBOS) :

① Officer  
② Head  
③ Mr

④ Dr  
⑤ Dr  
⑥ Dr

⑦ Dr  
⑧ Dr  
⑨ Dr  
⑩ Dr

10/10/25  
अध्यक्ष  
श्रीधर नंदन  
विश्वविद्यालय, रायचूर (छ.प्र.)

Dr



**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](http://www.swayam.ac.in)
- [www.ignou.ac.in](http://www.ignou.ac.in)
- [www.egyankosh.ac.in](http://www.egyankosh.ac.in)
- [www.iitm.ac.in](http://www.iitm.ac.in)
- [www.eskillindia.org](http://www.eskillindia.org)
- [www.eshiksha.mp.gov.in](http://www.eshiksha.mp.gov.in)
- [www.vlab.co.in](http://www.vlab.co.in)
- [www.internshala.com](http://www.internshala.com)
- [www.ndl.iitkgp.ac.in](http://www.ndl.iitkgp.ac.in)

**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 &amp; Members of CBoS:

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

⑦ M. Shree  
⑧ M. Shree  
⑨ M. Shree  
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M. Shree

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सिद्धविद्यालय, रायगढ़ (उ.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	<b>Microbiology:</b> ❖ 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	<b>Plant pathology:</b> ❖ 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 <sup>st</sup> 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	<b>Techniques of Studying Plant Diseases:</b> ❖ Field Studies, Collection of samples and its preservation. ❖ <b>Sterilization technique-</b> Standard Methods of sterilization - Physical methods, Chemical methods, Radiation methods, ❖ <b>Isolation technique:</b> 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. ❖ <b>Staining Technique:</b> Nature and Types of stains, ❖ <b>Preservation :</b> methods of preservation of culture	11	
IV	<b>Host Parasite Relation:</b> ❖ 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](http://www.swayam.ac.in)
- [www.ignou.ac.in](http://www.ignou.ac.in)
- [www.egvankosh.ac.in](http://www.egvankosh.ac.in)
- [www.iitm.ac.in](http://www.iitm.ac.in)
- [www.eskillindia.org](http://www.eskillindia.org)
- [www.eshiksha.mp.gov.in](http://www.eshiksha.mp.gov.in)
- [www.vlab.co.in](http://www.vlab.co.in)
- [www.internshala.com](http://www.internshala.com)
- [www.ndl.iitkgp.ac.in](http://www.ndl.iitkgp.ac.in)

#### Online Resources-

- e-Resources / e-books and e-learning portals
- 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.
- ④ R. Prasad
- ⑤ R. Prasad
- ⑥ R. Prasad

- ⑦ R. Prasad
- ⑧ R. Prasad
- ⑨ R. Prasad
- ⑩ R. Prasad

R. Prasad

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# FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)

## DEPARTMENT OF BOTANY COURSE CURRICULUM

<b>PART- A: Introduction</b>			
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)	<p>At the end of this course, the students will be able to get</p> <ul style="list-style-type: none"> <li>➤ Basic idea of microbes.</li> <li>➤ Culture of microbes in the laboratory</li> <li>➤ How disease occurs by microbes</li> <li>➤ Basic idea of host parasite interrelationship</li> <li>➤ Control measure of pathogen by different biological sources.</li> </ul>	
6	Credit Value	1 Credits	Credit =30 Hours Laboratory or Field learning/Training
7	Total Marks	Max. Marks: 50	Min Passing Marks: 20
<b>PART -B: Content of the Course</b>			
Total No. of learning-Training/performance Periods: 30 Periods (30 Hours)			
Module	Topics (Course contents)		No. of Period
Lab./Field Training/ Experiment Contents of Course	<ul style="list-style-type: none"> <li>❖ Calibration of microscope.</li> <li>❖ Study of symptoms of various plants disease caused by viruses, bacteria and fungi.</li> <li>❖ Sterilization of glass wares by detergent, chromic acid and dry sterilization</li> <li>❖ Preparation and sterilization of culture media NAM, PDA, to culture bacteria and fungi respectively.</li> <li>❖ Isolation of micro-organism from soil, water and air by using standard inoculation technique.</li> <li>❖ Identification of the isolated fungi by slide preparation.</li> <li>❖ Micrometry – measurement of length and width of spore/ conidia of the isolated /given fungi.</li> <li>❖ Preparation of camera lucida diagram of the isolated / given fungi.</li> <li>❖ Cultural charecteristics the the cultured bacteria.</li> <li>❖ Gram staining of Bacteria</li> <li>❖ 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.</li> <li>❖ Demonstration of the effect of various bio-pesticides (essential oils, neem, turmeric and garlic) against microbe/pathogens</li> <li>❖ Preparation of herbarium of different plant diseases of local area</li> </ul>		30
Keywords	Disease, symptoms, medium, pathogenesis		

Signature of Convener & Members (CBOS) :

① Phd  
② Phd  
③ Phd  
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विश्वविद्यालय, रायगढ़ (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](https://admin/uploads/3/PG%20M.Sc.%20Botony%2034631%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  
③ R. R. Rao  
④ R. R. Rao  
⑤ R. R. Rao  
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⑩ R. R. Rao

R. R. Rao

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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/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)	<p><b>After completion of this course, the students will be able to –</b></p> <p>➤ Understand the value of herbs, herbal medicine and use of herbal medicine.</p> <p>➤ Know about botanical medicine professionals in the complementary and alternative medicine (CAM)</p> <p>➤ Demonstrates the knowledge of the toxicity of plant and essential oil ingredients.</p> <p>➤ Understand the possibility for allergic and unpleasant reactions to herbal products and the impact of herbal quality on potential toxicity.</p> <p>➤ Use the herbal plants in their daily life</p> <p>➤ Adopt the value of herbal medicine to save their health.</p>	
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 &amp; 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> <ul style="list-style-type: none"><li>• <i>Centella asiatica,</i></li><li>• <i>Aloe vera,</i></li><li>• <i>Solanum nigrum,</i></li><li>• <i>Achyranthus aspera,</i></li><li>• <i>Withania somnifera,</i></li><li>• <i>Papaver somniferum,</i></li><li>• <i>Strychnos nux-vomica,</i></li><li>• <i>Atropa belladonna;</i></li></ul>		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: Herbal medicine, Folk medicine, Ethno-medicine, Tribal medicine			
Signature of Convener & Members (CBoS)			

Signature of Convener & Members (CBOS)

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राष्ट्रीय संशोधन प्रयोगशाला (CDRI)



## 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](http://www.swayam.ac.in)
- [www.ignou.ac.in](http://www.ignou.ac.in)
- [www.egyankosh.ac.in](http://www.egyankosh.ac.in)
- [www.iitm.ac.in](http://www.iitm.ac.in)
- [www.eskillindia.org](http://www.eskillindia.org)
- [www.eshiksha.mp.gov.in](http://www.eshiksha.mp.gov.in)
- [www.vlab.co.in](http://www.vlab.co.in)
- [www.internshala.com](http://www.internshala.com)
- [www.ndl.iitkgp.ac.in](http://www.ndl.iitkgp.ac.in)

#### Online Resources–

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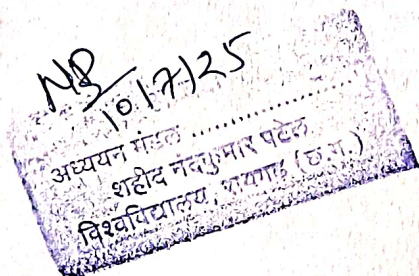
End Semester Exam (ESE):	Two section – A & B. Section A: Q1. Objective – 05 x1= 05 Mark; Q2. Short answer type- 5x2 =10 Marks Section B: Descriptive answer type qts., 1 out of 2 from each unit- 4x05 =20 Marks
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Name and Signature of Convener & Members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

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
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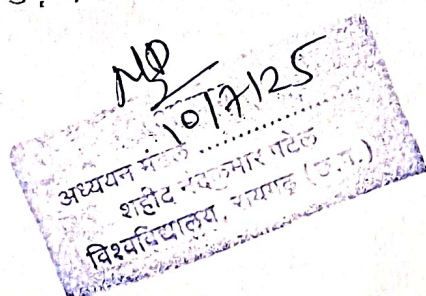
R. S. Rao





**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. <b>Concept &amp; Types of Garden:</b> 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. <b>Garden plants:</b> 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. <b>Floriculture:</b> 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](http://www.swayam.ac.in)
- > [www.ignou.ac.in](http://www.ignou.ac.in)
- > [www.egvankosh.ac.in](http://www.egvankosh.ac.in)
- > [www.iitm.ac.in](http://www.iitm.ac.in)
- > [www.eskillindia.org](http://www.eskillindia.org)
- > [www.eshiksha.mip.gov.in](http://www.eshiksha.mip.gov.in)
- > [www.vlab.co.in](http://www.vlab.co.in)
- > [www.internshala.com](http://www.internshala.com)
- > [www.ndl.iitkgp.ac.in](http://www.ndl.iitkgp.ac.in)

#### Online Resources–

- > e-Resources / e-books and e-learning portals
- > <https://indiaagronet.com/horticulture/CONTENTS/LANDSCAPE.htm>
- > [https://www.youtube.com/watch?v=ZUIh6ZFO48c&ab\\_channel=MountainGardens](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://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

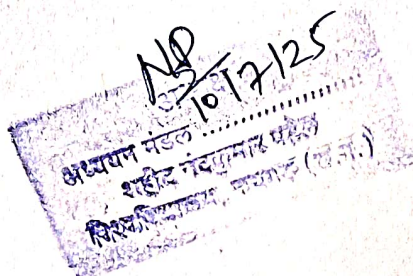
End Semester Exam (ESE): 35 Marks

Continuous Internal Assessment (CIA): 15 (By Course Coordinator)	Internal Test / Quiz-(2): 10 & 10 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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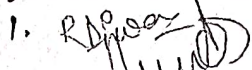
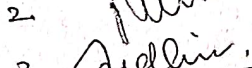
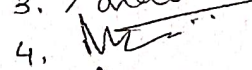




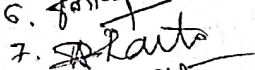
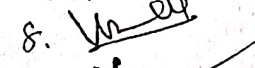
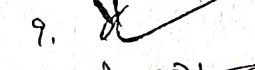




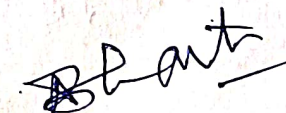
**FOUR YEAR UNDERGRADUATE PROGRAM (2024-2028)**  
**DEPT. OF BOTANY: VALUE ADDITION COURSE**  
**COURSE CURRICULUM (2024-25)**

<b>PART-A: Introduction</b>			
<b>Program: Undergraduate</b> (Certificate / Diploma / Degree/Honors)		<b>Semester - I/III/V</b>	<b>Session: 2024-2025</b>
1	Course Code	<b>BOVAC – 02</b>	
2	Course Title	<b>Academic Research &amp; Report Writing</b>	
3	Course Type	<b>Value Addition Course (VAC)</b>	
4	Pre-requisite(if,any)	As per Government norms / Institutional scheme	
5	Course Learning Outcomes (CLO)	<p><i>After completion of this course, the students will be able to -</i></p> <ul style="list-style-type: none"> <li>➤ Understand the academic research and its scope &amp; prospects.</li> <li>➤ Know the Importance of Report writing in academic and Research and Necessity of report writing for achievement of academic &amp; research goals</li> <li>➤ Demonstrates the knowledge of the toxicity of plant and essential oil ingredients.</li> <li>➤ Understand the kinds &amp; characteristics of academic and research reports / presentation and its prospective application.</li> <li>➤ Use the tools and techniques of academic research and report writing</li> <li>➤ Adopt the skill of research designing and report/ paper / thesis writing</li> </ul>	
6	Credit Value	<b>2 Credits</b>	<b>Credit = 15 Hours - learning &amp; Observation</b>
7	Total Marks	<b>Max. Marks: 50</b>	<b>Min Passing Marks: 20</b>
<b>PART -B: Content of the Course</b>			
<b>Total No. of Teaching-learning Periods (01 Hr. per period) - 30 Periods (30 Hours)</b>			
<b>Module</b>	<b>Topics (Course contents): Learning and Practices</b>		<b>No. of Hrs</b>
<b>I</b>	<b>Introduction:</b> 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.		<b>08 Hours</b>
<b>II</b>	<b>Research paper / Review writing:</b> 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)		<b>07 Hours</b>
<b>III</b>	<b>Report/ Dissertation / Thesis Writing</b> - 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)		<b>07 Hours</b>
<b>IV</b>	<b>Tools, Techniques &amp; Presentation--</b> 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)		<b>08 Hours</b>
<b>Keywords</b>	<b>Academic Research, Research report, Project, Thesis/ Dissertation/ Review writing</b>		

**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 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](https://www.researchgate.net/publication/275654158_HAND_BOOK_FOR_WRITING_RESEARCH_PAPER)

## PART-D: Assessment and Evaluation

### Suggested Continuous Evaluation Methods:

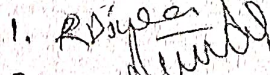
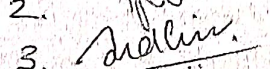
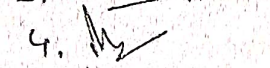


Maximum Marks: 50 Marks


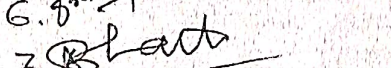
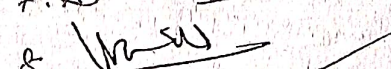

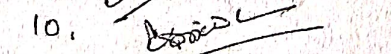
Continuous Internal Assessment (CIA): 15 Marks

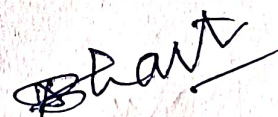
End Semester Exam (ESE): 35 Marks

<b>Continuous Internal Assessment (CIA): (By Course Teacher)</b>	Internal Test / Quiz-(2): <b>10 &amp; 10</b>	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against 15 Marks
	Assignment/Seminar +Attendance - 05 Total Marks - <b>15</b>	
<b>End Semester Exam (ESE):</b>	<b>Two section – A &amp; B</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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विश्वविद्यालय, रायपुर (छ.ग.)



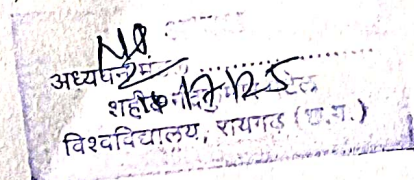
**FOUR YEAR UNDERGRADUATE PROGRAM (2024 -2028)**  
**DEPT. OF BOTANY: SKILL ENHANCEMENT COURSE**  
**COURSE CURRICULUM (2024-25)**

<b>PART-A: Introduction</b>			
Program: Undergraduate (Certificate / Diploma / Degree/Honors)		Semester - II/IV	Session: 2024-2025
1	Course Code	<b>BOSEC-02</b>	
2	Course Title	<b>Flower Decoration</b>	
3	Course Type	<b>Skill Enhance Course (SEC)</b>	
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

<b>PART -B: Content of the Course</b>		
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
<b>I</b>	<b>Introduction:</b> 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
<b>II</b>	<b>Floral ornaments &amp; Flower arrangements:</b> 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
<b>III</b>	<b>Flower decoration:</b> 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
<b>IV</b>	<b>Creative decorations:</b> 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://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://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://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 नवीन  
विश्वविद्यालय, रायपुर (छ.ग.)



# FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)

## DEPARTMENT OF BOTANY

### COURSE CURRICULUM

<b>PART- A: Introduction</b>			
Program: Bachelor in Life Sciences (Diploma / Degree/Honors)		Semester – III/IV/V/VI/VII/VIII	Session: 2024-2025
1	Course Code	<b>BOGE -01 T</b>	
2	Course Title	<b>Elementary Botany</b>	
3	Course Type	<b>Generic elective (GE)</b>	
4	Pre-requisite (if, any)	<b>As per program</b>	
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	<b>3 Credits</b>	<b>Credit = 15 Hours - learning &amp; Observation</b>
7	Total Marks	Max. Marks: 100	Min Passing Marks: 40
<b>PART -B: Content of the Course</b>			
Total No. of Teaching-learning Periods (01 Hr. per period) - 45 Periods (45 Hours)			
Unit	Topics (Course contents)		No. of Period
I	<b>Basics of Plant Science:</b> Differences and resemblances between; living and nonliving plants and animals, plant and animal cell. Concept of prokaryotes and eukaryotes. Important features of thallophyta, Bryophyta, Pteridophyta, Gymnosperm and Angiosperm. Structure and function of a typical flowering plant.		12
II	<b>Branches of botany:</b> General idea, features, and significance; Anatomy, Cytology, Economic Botany, Ethnobotany, Forestry, Genetics, Histology, Microbiology, Paleobotany, Phytochemistry, Phytopathology, Plant biotechnology, Plant breeding, Plant ecology, Plant morphology, Plant physiology, Plant Taxonomy, etc,		11
III	<b>Plants for human welfare:</b> Plant Resources for Rural livelihood – Mahua, Tendu 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	<b>Ancient Indian Botany:</b> Indigenous Medicinal Sciences; Definition and Scope-Ayurveda: History, origin, panchamahabhutas, saptadhatu and tridosha concepts, Rasayana, plants used in ayurvedic treatments, Siddha: Origin of Siddha medicinal systems, Basis of Siddha system, plants used in Siddha medicine. Unani: History, concept. Charaksamhita. Ancient and modern Botanists and their contributions.-Charak, Jagdish Chandra Bose, B.P.Pal, Desikachary, K.C. Mehta M.S. Swaminathan etc.		11
Keywords	<i>Prokaryotes, Ethnobotany, Taxonomy, Ayurveda</i>		

Signature of Convener & Members (CBoS) :

1. *Rajeev*  
 2. *Munish*  
 3. *Sachin*  
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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](http://www.swayam.ac.in)
- [www.ignou.ac.in](http://www.ignou.ac.in)
- [www.egyankosh.ac.in](http://www.egyankosh.ac.in)
- [www.iitm.ac.in](http://www.iitm.ac.in)
- [www.eskillindia.org](http://www.eskillindia.org)
- [www.eshiksha.mp.gov.in](http://www.eshiksha.mp.gov.in)
- [www.vlab.co.in](http://www.vlab.co.in)
- [www.internshala.com](http://www.internshala.com)
- [www.ndl.iitkgp.ac.in](http://www.ndl.iitkgp.ac.in)

#### Online Resources–

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

- <https://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://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:

1. R. Singh
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शहीद नंदकुमार पटेल  
विश्वविद्यालय, रायगड (छ.ग.)



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

**DEPARTMENT OF BOTANY**

**COURSE CURRICULUM**

<b>PART- A: Introduction</b>			
<b>Program:</b> Bachelor in Life Sciences (Diploma / Degree/ Honors)		<b>Semester –</b> III, IV, V, VI, VII, VIII	<b>Session:</b> 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)

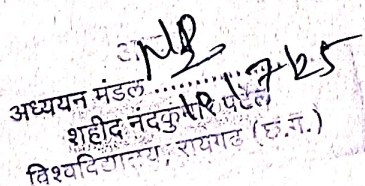
Module	Topics (Course contents)	No. of Period
Lab/Field Training/ Experiment Contents of Course	1. Microscopic study of plant cell. 2. Microscopic study of prokaryotic (Bacteria) and eukaryotic cell (algae and fungi). 3. Study of thallus structure of <i>Riccia</i> and <i>Marchantia</i> . 4. Identification 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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 विश्वविद्यालय, सायबाड (उ.ज.)



## 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](http://www.swavam.ac.in)
- [www.ignou.ac.in](http://www.ignou.ac.in)
- [www.egyankosh.ac.in](http://www.egyankosh.ac.in)
- [www.iitm.ac.in](http://www.iitm.ac.in)
- [www.eskillindia.org](http://www.eskillindia.org)
- [www.eshiksha.mp.gov.in](http://www.eshiksha.mp.gov.in)
- [www.vlab.co.in](http://www.vlab.co.in)
- [www.internshala.com](http://www.internshala.com)
- [www.ndl.iitkgp.ac.in](http://www.ndl.iitkgp.ac.in)

### Online Resources–

- e-Resources / e-books and e-learning portals
- <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5871155/>
- <https://cms.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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विश्वविद्यालय, रायचूर (उ.प्र.)



# FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)

## DEPARTMENT OF BOTANY

### COURSE CURRICULUM

<b>PART- A: Introduction</b>			
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
<b>PART -B: Content of the Course</b>			
Total No. of Teaching-learning Periods (01 Hr. per period) - 45 Periods (45 Hours)			
Unit	Topics (Course contents)		No. of Period
I	Viruses: - general characteristics, nature, structure and nomenclature, Bacteriophages and TMV; Lytic and Lysogenic cycles, transmission and replication of viruses, Symptoms of viral diseases on plants, important plant diseases, viroid, prions. Actinomycetes: general characteristics, Structure, reproduction and economic importance. Mycoplasma, Phytoplasma; general characteristics, structure, reproduction and their economic uses.		12
II	Bacteria: History, general character, classification and morphology, Gram positive and Gram-negative bacteria, structure of bacteria shape, size flagella and ultra structure of bacterial cell; Bacterial Growth curve, factors affecting growth of microbes; sporulation, reproduction, recombination in bacteria- Transformation Conjugation and Transduction, and Economic importance. Cyanobacteria: General characteristics, morphology, Heterocyst, cell structure of Cyanobacteria, reproduction and economic importance of Bacteria.		11
III	Phycology: General characteristic features of Algae. Algae in diversified habitat, Salient features, occurrence, classification and range of thallus organization. Prominent pigments found in Algae. Reproduction classification, general character and life cycle of -Volvox, Oedogonium, Chara, Vaucheria, Ectocarpus and Polysiphonia. Economic importance of algae - Role of algae in soil fertility, algae as biofertilizer, blue green algae and nitrogen fixation. Symbiosis; algal products - Agar, biofuel		11
IV	Mycology, Mushroom Cultivation, Lichenology & Mycorrhiza: General characteristic features of Fungi, Economic importance and Classification of Fungi, Nutrition, Heterothallism, Physiological specialization, Heterokaryosis & Parasexuality in Fungi. Fungi as biocontrol agent. Classification, general character and life cycle of -Mucor, Phytophthora, Penicillium, Peziza, Ustilago, Puccinia, Agaricus; Colletotrichum, Alternaria. Edible Mushroom- Button and Oyster mushroom and their cultivation. General account of lichens. General account of Mycorrhiza.		11
Keywords	Mycoplasma, Transduction, Biofertilizer, Parasexuality.		
Signature of Convener & Members (CBOS):			
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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](http://www.swavam.ac.in)
- > [www.ignou.ac.in](http://www.ignou.ac.in)
- > [www.egyankosh.ac.in](http://www.egyankosh.ac.in)
- > [www.iitm.ac.in](http://www.iitm.ac.in)
- > [www.eskillindia.org](http://www.eskillindia.org)
- > [www.eshiksha.mp.gov.in](http://www.eshiksha.mp.gov.in)
- > [www.vlab.co.in](http://www.vlab.co.in)
- > [www.internshala.com](http://www.internshala.com)
- > [www.ndl.iitkgp.ac.in](http://www.ndl.iitkgp.ac.in)

#### Online Resources–

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

1. <https://www.classcentral.com/tag/microbiology>
2. <https://www.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](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.)