FOUR YEAR UNDERGRADUATE PROGRAM (NEP-2020) Program: Bachelor in Life Science (2024 -28)

DISCIPLINE - BOTANY

Session - 2024 -25

		011 - 2024 - 20		
	DSC -01 to 08		DSE -01 to 12	
Code	Title	Code	Title	
BOSC -01T Elen	nentary 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 Micr	robes 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 Arch	regoniate and Fossils	B OSE -03T	Phytopaleontology and Evolutionary Botany	
BOSC -03P Lab.	Course-03 (Archegoniate and Fossils)		Lab. Course -03 (Phytopaleontology and Evolutionary Botany)	
BOSC -04T Angi	iosperms	BOSE -04T	Ethnobotany and Medicinal plants	
BOSC -04P Lab.	Course - 04 (Angiosperms)	BOSE -04P	Lab. Course-04 (Ethnobotany & Medicinal plants)	
BOSC -05T Cyto	logy and Genetics	B OSE -05T	Biosystematics and Biodiversity	
BOSC -05P Lab.	Course -05 (Cytology and Genetics)	BOSE -05P	Lab. Course -05 (Biosystematics and Biodiversity)	
BOSC -06T Plan	at Physiology and Economic Botany	BOSE -06T	Plant breeding and Seed technology	
		BOSE -06P	Lab. Course -06 (Plant breeding and Seed technology)	
BOSC -07T Ecolo	ogy and Phytogeography	BOSE -07T	Instrumentation and biochemical technology	
	Course -07 (Ecology and	BOSE -07P	Lab. Course -07 (Instrumentation and	
	ogeography)		biochemical technology)	
BOSC -08T Mole	ecular biology and Biostatistics	BOSE -08T	Growth and Stress Physiology	
BOSC -08P Lab.		BOSE -08P	Lab. Course -08 (Growth and Stress Physiology)	
			Plant biotechnology and crop improvement	
	=	BOSE -09P	Lab. Course -09 (Plant biotechnology and	
	'i		crop improvement) Applied Botany and Intellectual property right (IPR)	
		BOSE -10P	Lab. Cours.: -10 (Applied Botany and IPR)	
		BOSE -11T	Biochemistry and Enzymology	
	ĺ	BOSE -11P	Lab. Course -11 (Biochemistry and Enzymology)	
	i	BOSE -12T	Bioinformatics and Gene Technology	
		BOSE -12P	Lab. Course-12 (Bioinformatics & Gene Technology)	
	GE-01 & 02		VAC	
BOGE -01T Elem	ientary Botany	BOVAC-01	Herbal Plant & Human Health	
	Course -01 (Elementary Botany)	2 3 3: 72	SEC	
		BOSEC-01	Gardening and Floriculture	
	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 endenuc 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
- Explain Biodiversity, climate change and plant pathology.
- 4. Apply Biotechnology, Ecology, Genetics and Plant b reeding techniques in plant sciences
- 5. Apply knowledge of Medicinal and Economic botany in day to day life.
- 6. Apply the knowledge to develop the sustainable and eco-friendly technology.

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	T- A: I	ntroduction			
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	am: Bachelor in icate/Diploma/De		Semester - I	Session: 2024-20	025
1 Course Code		BOSC -01 T	(
2 Co	ourse Title	Elementary Botan	y		
Course Type Discipline Specific course (DSC)					
4 Pr	e-requisite (if, any)	As per program	1		
, Co	ourse Learning. utcomes (CLO)	At the end of this co Understand the Get acquainted environment. Develop a comp processing of m	orehensive understanding edicinal plants, and their o	its branches. Intionship between organion of the identification, cultivation.	
6 Cr	redit Value	> Utilize plants reso 3 Credits		s - learning & Observat	ion
_	otal Marks	Max. Marks:	100		10
Tonics (Course contents)			No. o		
	Paleobotany, Phyto Plant ecology, Plant	chemistry, Phytopa morphology, Plant	physiology, Plant Taxor	hnology, Plant breeding, nomy, etc,	11
	Bamboo and Firewood Ethnobotany, ethnom diseases- Cough and of	od.Ethnobotany in Inc edicinal plants and etl cold, Jaundice, Infertil	dia: Methods to study Et hnoecology. Application of ity, Diabetes, Blood presso		11
IV	Ancient Indian Botany: Indigenous Medicinal Sciences; Definition and Scope-Ayurveda: History, origin, panchamahabhutas, saptadhatu and tridosha concepts, Rasayana, plants used in ayurvedic treatments, Siddha: Origin of Siddha medicinal systems, Basis of Siddha system, plants used in Siddha medicine. Unani: History, concept. Charaksamhita. Ancient and modern Botanists and their contributionsCharak, Jagdish Chandra Bose, B.P.Pal, Desikachary, K.C. Mehta M.S. Swaminathan etc.			11	
Keywords	Prokamoton	Ethnobotany, Taxono	my Avuryeda		

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Character Studies

Studies

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PART-CI Learning Resources Text Books, Reference Books and Others Part Books Recommended = College Botany Gauguli Kar and dutta , HIMALAYA Publishers "Handbook of Medicinal Plants" by L.D. Rapoor "Indian Medicinal Plants: An Illustrated Dictionary" by C.P. Khare "Medicinal Plants in India: Conservation and Sustainable Utilization in the Emerging Global Scenario" "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.Shatma Reference Books Recommended -1. Charak Samhita 2. Medicinal Plants of India" by C.P. Khare Online Resourcese-books and e-learning portals www.swayam.ac.in www.ignou.ac.in www.egyankosh.ac.bi www.itm.ac.in www.eskillindia.org www.eshilisha.mp.gov.in www.vlab.co.ln www.internshala.com www.ndl.ittkgp.nc.in Online Resourcese-Resources / e-books and e-learning portals https://extension.oregonstate.edu/collection/botany-busles https://www.pbs.org/yidco/botuny-basics-iuu2bl/ https://efaidubmmmibpeajpeglelefindmkaj/https://www2.ca.uky.edu/agcomm/pubs/ho/ho2 6/ho96.pdf https://www.botanytoday.com/branches-of-botany/ https://efaidnbmnnnibpenjpeglelefindmkaj/https://www.unanijournal.com/articles/94/3-1-11-206.pdf https://efaidnbmnnnibpcajpcglelefindmkaj/https://wgbis.ces.iisc.ac.in/blodlversity/suhyadri /documents/botany_history.pdf https://yedpuran.files.wordpress.com/2016/07/charaksamhitaatridevajjgupt-yol-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 Internal Test / Quiz-(2): 20 +20 Better marks out of the two Test / Quiz Assignment / Seminar -Assessment (CIA): 30 10 + obtained marks in Assignment shall be Total Marks -30 (By Course Teacher) considered against 30 Marks **End Semester Exam** Two section - A & B Section A: Q1. Objective - 10 x1= 10 Mark; Q2. Short answer type- 5x4 =20 Marks (ESE): 70 Section B: Descriptive answer type qts., lout of 2 from each unit-4x10=40 Marks Name and Signature of Convener & Members of CBoS:

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ad Nandkumar Patel aya, Raigarh (C.C

			COURS	CURRICULUM		
P	ART	- A: I	ntroduction	1		
Program: Bachelor i (Certificate / Diploma / D.				Semester - I	Session: 2024-2	025
1		se Code	BOSC -01			
2	Cour	se Title	Lab. Course -01	(Elementary Botany)		
3	Cour	se Type	Laboratory cour	se		
4	Pre-r	requisite (if, any)	As per program	1		
5	Course Learning		 At the end of this course, the students will be able to Understand structure of plant cell, prokaryotic cell and éukaryotic cell. Identify pteridophytes of college campus. Learn about the different types of plant tissues. Learn about Ayurvedic system of medicine. 			
6	Cred	lit Value	1 Credits	Credit =30 Hours Labo	ratory or Field learning/I	raining
7	Tota	l Marks	Max. Marks:	50	Min Passing Marks:	20
PA	RT -		nt of the Co			
		Total No.	of learning-Train	ing/performance Perio	ds: 30 Periods (30 Hours)	
M	odule		To	pics (Course conten	ts)	No. of Period
Lab/Field 1. Microscopic study of plant cell. 2. Microscopic study of prokaryotic (Bacteria) and eukaryotic cell (algae and fungi). 3. Study of thallus structure of Riccia and Marchantia. 4. Identification of different plants growing in college campus.					30	
Ke	words	Prokaryotic, Pares	nchyma, Jaundice, A	lyurveda.		

Signature of Convener & Members (CBoS):

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B) dooral

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Learning Resources PART-C:

Text Books, Reference Books and Others

Text Books Recommended -

Text Books Recommended -

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

Reference Books Recommended -

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

Online Resources-

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

Online Resources-

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

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks:

15 Marks Continuous Internal Assessment (CIA):

End Semester Exam (ESE): 35 Marks

10 & 10 Continuous Internal Internal Test / Quiz-(2): Assessment (CIA): 15 | Assignment/Seminar + Attendance - 05 15

Better marks out of the two Test / Quiz + obtained marks in Assignment shall be

(By Course Teacher) **End Semester** Exam (ESE): 35

Total Marks -Laboratory / Field Skill Performance: On spot Assessment A. Performed the Task based on lab. work

considered against 15 Marks Managed by Course teacher - 20 Marks

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

- 05 Marks

Name and Signature of Convener & Members of CBoS:

andkumar Patal

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

		Cours	E CURRICULUM	-	
PART	- A: Int	roduction			
Certifica	n: Bachelor in L ne/Diploma/Degre	ife Sciences	Semester - II	Session: 2024-2	025
Co	ourse Code	BOSC -02 T			
	ourse Title	Microbes and T	hallophyta		
	ourse Type	Discipline Speci	fic course (DSC)		
4 Pr	re-requisite (if, 211y)	As per progra	m		
, C	ourse Learning. utcomes (CLO)	At the end of this 1. Understar 2. Identify e 3. Learn abo	course, the students will be ad about the Microbes and the dible mushrooms and learn c out bio-fertilizers and their us ad life cycles of different algo-	eir Importance. ultivation techniques. es.	
	redit Value	3 Credits		s - learning & Ohservat	ion
	otal Marks	Max. Marks:	100		10
ART -		of the Cou			
	Total No. of Teachi	ing-learning Pe	riods (01 Hr. per period)	- 45 Periods (45 Hours)
Unit		To	pics (Course contents	;)	No. of
II	on plants, importa "Structure, reproduction characteristics, struction Bacteria: History, genegative bacteria, structural Bacterial Growth on recombination in bacterial structural importance. Cyanoba	nt plant diseases, ion and economic ture, reproduction cheral character, elucture of bacteria arve, factors affeacteria. Transform interia: General conteria:	, viroid, prions.Actinomyce importance. Mycoplasma and their economic uses. lassification and morphology shape, size flagella and ultracting growth of microbes; lation Conjugation and Tracharacteristics, morphology February 1981.		
Ш	Phycology: General features, occurrence, of Algae. Reproduction Chara, Vaucheria, Ecsoil fertility, algae as products - Agar, biof	characteristic fea classification and re- classification, ge tocarpusandPolysign biofertilizer, bluttel	ange of thallus organization. In neral character and life cycl phonia. Economic importance te green algae and nitrogen in	diversified habitat, Salient Prominent pigments found in e of -Volvox, Oedogonium, e of algae - Role of algae in fixation. Symbiosis; algal	
IV	Physiological specialic Classification, general Ustilago, Puccinia, A	conomic importance ization, Heterokary al character and legaricus; Colletotri	e and Classification of Fung osis &Parasexuality in Fung ife cycle of -Mucor Phyto	phthoraPenicillium, Peziza.	11
Keywords	Mycoplasma, Transa		er, Parasexuality.		
Signature	of Convener & Men	nbers (CBoS):			
Jis,	3 6 TY	auto			

PART-C: **Learning Resources** Text Books, Reference Books and Others Text Books Recommended -Kumar, H.D. (1999). Introductory Phycology. Affiliated East-West. Press Pvt. Ltd. Delhi. 2nd edition Tortora, G.J., Funke, B.R., Case, C.L. (2010). Microbiology: An Introduction, Pearson Benjamin Cummings U.S.A. 10th edition. O.S.A. 10th edition. Sethi, I.K. and Walia, S.K. (2011). Text book of Fungi & Their Allies, MacMillan Publishers Pvt. Ltd., Delhi. Aggarwal, S. K. 2009. Foundation Course in Biology, A one books Pvt. Ltd., New Delhi. Aneja, K. R. 1993. Experiments in Microbiology, Pathology and Tissue Culture, VishwaPrakushan, NewDelhi. Annie Ragland, 2012. Algae and Bryophytes, Saras Publication, Kanyakumari, India. Basu, A. N. 1993. Essentials of Plant Viruses, Vectors and Plant diseases, New Age International, New Delhi. Chara. G. 1. 1984. A text back of Algae. Pactori publications. Magnif. Judia. Chopra. G. L. 1984. A text book of Algae, Rastogi publications, Meerut, India. Dubey, R. C. and Maheshwari. D K. 2012. Practical Microbiology, S. Chand & Company, Pvt. Ltd., NewDelhi. Dubey, R. C. and Maneshwatt. D.K. 2012. Practical Interodiology, S. Cuand & Company, 1. J. 2012. Practical Interodiology, S. Cuand & Company, 1. J. 2012. Printer Research Press, London. 11. Sharma, P.D. (2011). Plant Pathology. Mcerut, U.P.: Rastogi Publication. Pandey B.P. 2001. College Botany Volume 1, S Chand & Company Pvt.Ltd, New Delhi. Reference books: Webster, J., Weber, R. (2007). Introduction to Fungi, 3rd edition. Cambridge, U.K.: Cambridge University Press. Pelzar, 1963. Microbiology, Tata McGraw Hill, New Delhi Rangaswamy, G. 2009, Disease of Crop Plants in India, Prientice Hall of India, New Delhi. Microbiology Fundamental and Applications (hindi) (pb) 9. ISBN: 9788188826230 Edition: 03Year: 2016Author: Dr. Purohit SS, Dr. Deo Publisher: Student Edition Language: Hindi Modern Microbiology (hindi) (hb) ISBN: 9788177543599Edition: 1Year: 2018Author: Dr. Purohit SS, Dr. Singh T Publisher: Agrobios (India) Plant pathology by R.S. Mehrotra, Tata McGraw-Hill Publication Online Resourcese-Resources / e-learning portals www.swavam.ac.in www.ignou.ac.in www.egyankosh.ac.in www.iitm.ac.in www.eskillindia.org www.eshiksha.mp.gov.in www.vlab.co.in www.internshala.com www.ndl.iitkgp.ac.in Online Resourcese-Resources / e-books and e-learning portals 1. https://www.classcentral.com/tag/microbiology https://www.edx.org/learn/microbiology 3. https://www.mooc-list.com/tags/microbiology https://www.udemy.com/topic/microbiology/ https://ucmp.berkeley.edu/bacteria/bacteria.html https://www.livescience.com/53272-what-is-a-virus.html https://gclambathach.in/lms/Economic%20inportance%20of%20Algne.pdf https://www.slideshare.net/sardar1109/algae-notes-1 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 5. https://www.apsnet.org/edcenter/disimpactunngmut/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 Internal Test / Quiz-(2): 20 +20 Better marks out of the two Test / Quiz Assignment / Seminar -Assessment 10 + obtained marks in Assignment shall be r Patel considered against 30 Minks and 10 considered against 30 Minks Total Marks -(CIA):30 aya, Raigarh (C.G (By Course Teacher) **End Semester** Two section - A & B Section A: Q1. Objective - 10 x1= 10 Mark; Q2. Short answer type- 5x4 = 20 Marks Exam (ESE): 70 Section B: Descriptive answer type qts., lout of 2 from each unit-4x10=40 Marks

Name and Signature of Convener & Members of CBoS:

			COURS	E CORRICOLOM		
PAR	RT- A	A: Int	roduction	1		
Program: Bachelor in l (Certificate / Diploma / Degr			ife Sciences	Semester - II	Session: 2024-2	025
		se Code	BOSC- 02	2		
				2 (Microbes and Thallopl	hyta)	
`		se Type	Laboratory cou			
5 Course Learning. Outcomes (CLO)			Understar pathology Learn mi and indus Learn life	nd the Viruses, Bacteria, y icrobial techniques which stry. c cycles of selected genera and etiology of plant disease ir knowledge in the crop	will be beneficial for ag of different groups es p fields to eradicate or a	gricultu ivoid tl
5	Cred	it Value	1 Credits	Credit =30 Hours Labor	atory or Field learning/l	raining
7		Marks	Max. Marks:	50	Min Passing Marks:	20
AR	RT -B: Content of the Course					
	Total No. of learning-Training/performance Periods: 30 Periods (30 Hours)				No. of	
Mod	iule		· T	opics (Course content	rs)	Perioc
Exper Cont	Field ning/ iment tents ourse	 Study of particles Mycople BACTER Isolation Staining to Staining the Study Staining to Dedogon MYCOL Study Stay Stay Stay Stay Stay Stay Stay Sta	plant disease sympasma RIAL IDENTIFI of bacteria echniques: Gram dide preparation o LOGY: Study / S dium and Chara; I OGY: de preparation an dide preparation an dide preparation an dide preparation and	's, staining f available Cyanobacteria lide preparation and Stainin Vaucheria; Ectocarpus Poly ad . Staining of fungi. Muco go, Puccinia; Agaricus, col	actrial /fungal/ ng of algae –Volvox, vsiphonia v;Phytophthora,	30
Keyı	words	infected	plants, VAM, alg	gae, fungi		
		Convener & Me	1	gae, tungi		

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

Pandey S.K. (2012). Quick Concept of Botany. Publisher LAP LAMBERT Academic Publishing GmbH & Co. KG, Germany (ISBN: 978-3-8484-3104-5).

Dubey, R. C. and Maheshwari, D.K. 2012. Practical Microbiology, S. Chand & Company, Pvt. Ltd., New Delhi.

4. Pandey. B.P. 2014 Modern Practical Botany, (Vol-I) S. Chand and Company Pvt. Ltd., New Delhi.

Online Resources-

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

Online Resources-

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

- 1. https://community.plantae.org/tags/moocfuturelearn.com/courses/teaching-biology-inspiringstudents-with-plants-in-science
- 2. https://microbiologysociety.org/publication/education-outreach-resources/basic-practical- microbiology-a-manual.html
- 3. https://microbiologyonline.org/file/7926d7789d8a2f7b2075109f68c3175e.pdf

4. http://allaboutalgae.com/benefits/

5. https://repository.cimmyt.org/xmlui/bitstream/handle/10883/3219/64331.pdf

6. https://www.mooc-list.com/tags/microbiology\

http://www.agrifs.ir/sites/default/files/A%20text%20book%20of%20practical%20botany%20 1%20%7BAshok%20Bendre%7D%20%5B8

https://171339239%5D%20%281984%29.pdf

PART -D: Assessment and Evaluation Suggested Continuous Evaluation Methods: Maximum Marks: 50 Marks Continuous Internal Assessment (CIA): 15 Marks End Semester Exam (ESE): Continuous Internal Internal Test / Quiz-(2): 10 & 10 Better marks out of the two Test / Quiz Assessment (CIA): 15 Assignment/Seminar +Attendance - 05 + obtained marks in Assignment shall be (By Course Teacher) Total Marks -15 considered against 15 Marks **End Semester** Laboratory / Field Skill Performance: On spot Assessment Managed by A. Performed the Task based on lab. work Exam (ESE): 35 Course teacher - 20 Marks B. Spotting based on tools & technology (written) - 10 Marks as per lab. status C. Viva-voce (based on principle/technology) - 05 Marks

Name and Signature of Convener & Members of CBoS:

FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)

DEPARTMENT OF BOTANY COURSE CURRI

PA	RT	-A:	The state of the s	E CURRICU	TANY	
1110		- A:	Introduction	- CHILLOU	LUM	
20	grar	n: Bachelo	Introduction or in Life sciences	and a desirable	A second and the second	many of the control o
Cel	tifica	te / Diploma	Daniel Sciences	Semester.		The same of the same of
	Con	rse Code	Siec)	1/111//	Session: 2024-2	025
	Con	rse Title	NOVAC-01	- CALCULATION AND AND AND AND AND AND AND AND AND AN	The state which is no such their cross-social state and excellent and	Committee of Spines and Spines of Spines
Con Plant & Dames II						and the second second second second
Pro word 1 Addition Course (DOVA Con)						
((f, any) As per program						
Course Learning, Outcomes (CLO)		arning, acomes	Know about botanic medicine (CAM) Demonstrates the let	e of aerbs, herbal n Al medicine projess nowledge of the toxi sibility for allergic (erbal quality on not	tudents will be able to — nedicine and use of herbal med ionals in the complementary a city of plant and essential oil is and impleasant reactions to be ential toxicity.	ngredients.
-	-		Adopt the value of l	harbal madieine to s	ave their health	
6	Cı	redit Value	2 Credits	Credit = 15 Ho	urs - learning & Observa	tion
7	To	otal Marks		50 Min 1	Passing Marks: 20	A STATE OF THE PARTY OF THE PAR
PA	ART	-B: Co	ontent of the Co	urso		-
_	(make	Total No.	of Teaching-learning	Periods (01 Hr. p	per period) - 30 Periods (3	0 Hours) No. of Perio
U	nit		Tonic	s (Course cont	ents)	No. of Perio
	1	medicine. Concept of eti	Latelana to Canada at Man	nes, ethno-ecology,	ethnic communities of the	08
	11	Observation/I Importance of care — health Common plan Observation/	n Practices - Survey and f I medicinal plants: Import and balanced diet (Rola	ance of Herbal / Mo of proteins, carbol	edicinal plant in human health hydrates, lipids and vitamins).	07
	III	medicine, m religion. Tra Chhattisgari Collection /Ii	ditional knowledge and h. dentification of Herbal platella asiatica, e vera, anum nigrum, hyranthus aspera, thania somnifera, aver somniferum, ychnos nux—vomica, ropa belladonna; lay to day life: Nutritive	osis and treatmen utility of some me unts commonly used and medicinal values as during use of he	t – common Plants in Tolk	08 dc 08
		I	Aiwain Methi F	lax. Tea and Coffe	е.	To the state of
	Keyn	vords Her	bal medicine, Folk medici	ne, Ethno-medicine	, Tribal medicine	
			vener & Members (CBoS		1 rul	

Signature of Convener & Members (CBoS)

Noor)

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

- 1. Kumar, N.C. (1993). An Introduction to Medical botany and Pharmacognesy. Emkay Publications, New Delbi.
- 2. Rao, A.P. (1999). Herbs that heal. Diamond Pocket Books (P) Lnd., New Delhi
- 3. Iris F. F. Benzie and Sissa Wachtel-Galey. Herbal Medicine, 2nd edition Biomolecular and Clinical Aspects, CRC Press Taylor & Francis, 2011
- 4. Fabrizio Donovan (2000) 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.
- 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
- sing merewayness
- > www.ignou.ac.in
- > www.egrankosh.ac.in
- www.iitm.sc.in
- www.eskillindia.org
- > www.eshiksha.mp.gov.in
- z www.vizb.co.in
- > www.internshala.com
- > www.ndl.iitkgp.ac.in

Online Resources-

- https://pubmed.ncbi.nlm.nih.gov/22593937/
- https://crimsonpublishers.com/acam/pdf/ACAM.000551.pdf https://www.nesearchgate.net/publication/329823388_Medicinal_Flants_Used_in_the_Treatment_of_Ment
- al_and_Neurological_Disorders_in_Ghana https://www.sciencedirect.com/science/article/abs/pii/S0375574115003013
- https://core.ac.uk/download/pdf/143S41457.pdf
- https://practicalselfreliance.com/medicinal-clants/
- https://practicalselfrellance.com/medianal-plants/
- https://www.pdfdnve.com/medicinal-plants-books.html

PART -D: Asses	sment and	-valuation	
Suggested Continuous Maximum Marks: Continuous Internal A End Semester Exam (E Continuous Interna Assessment (CIA): (By Course Teacher)	ssessment (CLA): (SE):	15 Marks 35 Marks z-(2): 10 & 10	Better marks out of the two Test / Quin + obtained marks in Assignment shall b considered against 15 Marks
End Semester	Two section – A Section A: Q1. Obj		lark; Q2. Short answer type- 5x2 =10 Mark lout of 2 from each unit- 4x05 =20 Mark

Name and Signature of Convener & Members of CBoS:

Brank

-		Name and Address of the Owner, where the Owner, which is	Cours	E CURRICULUM		
	of the latest devices in the	Γ- A: I	ntroduction			
Pr Sc	ienco	m: Bachelor h es <i>(Certificate / Dif</i> irse Code	1 Life ploma / Degree) BOSEC-01	Semester -	Session: 2024-20)25
2	-	we a 'Club				
3	-	(1)	Gardening and I			
4	-			ourse (BOSEC 01)		
5	Pre-requisite (if, any) As per program				nd	
	Cre	dit Value	2 Credits (1C + 1C)	= 30 Hours Laborat	ory or Field learning/Franching Min Passing Marks:	20
7	Tot	al Marks	Max. Marks:	50	IVIIII I Abaning	
PA	RT.		Total No.		Periods: aining 30 Periods (30 Hour	No. of
		Theory - 15 Perio	To	pics (Course conten	ts)	Period
Contents Styles of ga Hanging ga /Observatio Carden pl creepers), plants, Flo Practices/ Floricultu		Styles of gain Hanging gar /Observation Carden place creepers), I plants, Flow Practices/ Floriculture Seasonal floramation,	rden; Types of garding & Initeden; Types of garding & Practices ants: Ornamental Pergolas, Edges & wer borders and become re: Present situation owers, Cut flower Gerbera, Gladioli,	on & scope in India. Varias. Flower Crops - Rose, Tuberose, Aster, Lilly,	bylonian garden cry, Arches (climbers and Cacti and Succulents carpet beds [Observation & ious types of flowers — Chrysanthemum, Dahlia and Marigold.	15
Lab./Field 1. Familiarization with different tools and equipments used in gardening work.			d in gardening work. For Garden Fortigation method Weed management Soling, Pulsing, Packing,	30		
Key	words		wer, Floriculture, (nla Ri	· Parks
Sign	nature 1	of Convener & M	embers (CBoS)	6. total	all	

Spirit I

PART-C	Learning Resources
Text Books	Reference Books and Others
Trais Banks &	A The Hooky and Others
I. Randhaus	Name of the state
2. Bhattachard	5. S. and Mukhopadhyay, A. (1986)"Floriculture in India." Allied Publisher (India)
Lauria A	100 S. and Mukhopadhyay, A. (1986) "Floriculture in India." Allied Publisher (India) 100 S. K. (2006) "Advances in Ornamental Horticulture." Vols. I-VI. Pointer Pub. 101 Victor, H. R. (2001) "Elystenture For homostale and Proceedings." A graphics.
4 Sahina Co	and Victor, H. R. (2004) "Floriculture - Fundamentals and Practices." Agrobios. L. and Peter, K. V. (2004) "Floriculture - Fundamentals and Practices." Agrobios.
Online Resou	f. and Peter, K. V. (2001) "Floriculture – Fundamentals and Practices." Agrobios. 1. And Peter, K. V. (2008) "Ornamental Plants for Gardens." New India pub. India.
4 .	r-Resources / e-books and e-learning portals
	2021/12/2011/14/01/14/01/14/01
,	Mun.ignou.ac.in
,,,	hnn.egyankosh.ae.in
38	www.diam.ac.in
	Mww.eskillindia.org
,	www.eshikshn.mp.gov.in
1	hww.ylab.co.in
	num-internshala.com
Nullan Division	<u>unwandkiitkgmasin</u>
Online Resor	ILCG2-
4	e-Resources / e-books and e-learning portals
	A A A A A A A A A A A A A A A A A A A
A	https://www.vontube.com/watch?y=ZUIh6ZFO48c&no_thanner_noonce.
4	https://www.youtube.com/watch?v=EE00QO6n91A
*	https://www.teachmint.com/tille/studymaterial/bse/[1003f0g/118t/fc/01gd/3eedag]
	ba825bdood-4180-atc1-28950aa42454
4	<u>ba825bdo6d-4180-afc1-28950aa42454</u> https://k8449r.w.ccbly.com/upleads/3/0/7/3/30731055/types_of_gardens_fcompatibility
1	model_pdf-signed.pdf
4	https://www.egyankosh.ac.in/bitstream/123456789/73050/1/Unit-2.pdf https://www.egyankosh.ac.in/bitstream/123456789/73050/1/Unit-2.pdf https://www.academia.edu/40140208/A_HANDBOOK_ON_FLORICULTURE_And_La
1	https://k8449r.weebly.com/uploads/3/0/7/3/30731055/landscape_gardenlug.pdf
6	https://homeguldes.stgate.com/gardening-tools-us/s-us/gentum- https://tractorguru.in/blog/floriculture-types-of-flowers-fips-and-importance-of-
	floriculture/
D407 F	D: Assessment and Evaluation
PART-L	Continuous Evaluation Methods:
Maximum	Marks 50 Marks
Maximum	s Internal Assessment (CIA): 15 Marks
Continuous Park Samos	36 Maryles
	Total Market Det / Ouize(2): 10 & 10 Detter marks out of the two
A ceaceman	ot (ClA): 15 [Assignment/Semmar +Attendance - 05] + obtained marks in Assignment
thy Course	Constitutory Holdi Marks
End Sem	h above tory / Right Skill Performance: On spot Assessment
Exam (E	A. Performed the Task based on learned skill - 20 Warks Cool allinest
Exam (E.	SE): 35 B. Spotting based on tools (written) — 10 Marks C. Viva-voce (based on principle/technology) - 05 Marks
Name and Sien	ature 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)

1					
PA	RT-A: Introdu	iction			
P	rogram: Undergr Aficate / Diploma / Dep	raduate	4-2025		
_	Course Code	BOVAC - 02			
2	Course Title	Academic Research & Report Writing			
3	Course Type	Value Addition Course (VAC)			
1	Pre-requisite(if,any)	As not Government norms / Institutional scheme			
5	Course Learning. Outcomes (CLO)	After completion of this course, the students will be able to - > Understand the academic research and its scope & prospects. > Know the Importance of Report writing in academic and Research and Necessity of report writing for achievement of academic & research goals Necessity of report writing for achievement of academic & research goals of the toxicity of plant and essential oil ingredients. > Demonstrates the knowledge of the toxicity of plant and essential oil ingredients. > Understand the kinds & characteristics of academic and research reports presentation and its prospective application. > Use the tools and techniques of academic research and report writing			
6	Credit Value	2 Condita (redit = 13 Hours - Rushing			
7	Total Marks	Max. Marks: 50 Min Passing Marks:	20		
DAR					
I AIN	Total No. of Teac	bing learning Periods (01 Hr. per period) - 30 Terrods (5	No. of Hrs		
Modu			140. 01 1113		
I	Introduction: Concept of - Academic Research and Research Tiplet, Computation				
11	Research paper / Review writing: Steps of writing a research report. Types of Research paper / Review writing: Steps of writing a research report. Types of Research paper, Structure of Research papers, Research paper formats, Abstract writing, paper, Structure of Research papers, Research paper formats, Abstract writing, Methodology, Results and Discussion, Different formats referencing, Ways of				
ш	communicating a research papers, (Assignments) Report/ Dissertation / Thesis Writing - Structure of a thesis, Scope of the work, Literature review, Experimental / Computational details, Preliminary studies, Result and Discussion, Figures & Table Preparation, Conclusion and Future works, Bibliography, 107 Hours				
IV	& PowerPoint, Libra and Beamer. Basic is	& Presentation— Various word processors—The Country of the Presentation and Power Point a-office, Latex etc. Making effective presentations using Power Point dea of Data collection, Tabulation & Presentation. Plagiarism detection	08 Hours		
**		arch, Research report, Project, Thesis/ Dissertation/ Review writing			
Keywor	as Acutemic Reset	1000			

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 O Siochrú; ISBN 9780367621049. Published 2022 by Routledge https://www.goodreads.com/shelf/show/report-writing Online Resourcese-Resources / e-books and e-learning portals https://www.questionpro.com/blog/research-reports/ https://egyankosh.ac.in/bitstream/123456789/39238/1/Unit-5.pdf https://www.studocu.com/in/document/visvesvaraya-technological-university/researchmethodology/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/enie/Student+Research+and+Report+Writing:+From+Topic+Selection+to+the+Complete+Paper-p-➤ https://www.researchgate.net/publication/275654158_HAND_BOOK_FOR_WRITING_RESEARCH_PAPER PART -D: Assessment and Evaluation Suggested Continuous Evaluation Methods: 50 Marks Maximum Marks: 15 Marks Continuous Internal Assessment (CIA): 35 Marks End Semester Exam (ESE): Better marks out of the two Test / Quiz 10 & 10

Signature of Convener & Members of CBOS:

Continuous Internal

Assessment (CIA):

End Semester Exam

(By Course Teacher)

(ESE):

15

Section A: Q1. Objective -05 x1 = 05 Mark; Q2. Short answer type-5x2 = 10 MarksSection B: Descriptive answer type qts., lout of 2 from each unit- 4x05 = 20 Marks

Internal Test / Quiz-(2):

Two section - A & B

Total Marks -

Assignment/Seminar +Attendance - 05

Bhart

+ obtained marks in Assignment shall be

considered against 15 Marks

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

_	COURSE CURRICULUM (2024-25)						
_	PART-A: Introduction						
L		Program: Unde Certificate / Diploma /	rgraduate	Semester - I	I/IV	Session: 2024-2025	
-	2	Course Code	BOSEC-02				
L		Course Title	Flo	ower Decoration	on		
L	3	Course Type	Skill	Skill Enhance Course (SEC)			
	4	Pre-requisite (if, any)	Ac per Go	vernment norms / I	Institutional so	cheme	
	5	Course Learning. Outcomes(CLO)	 → -learn the skill application, → -adopt the skill flower arrange 	oration and its importance gement with local/social emand and other/local style of t of entrepreneurs' start-up			
	6	Credit Value	2 Credits Credit = 30 Hours Laboratory or Field lear			Field learning/Training	
-	7	Total Marks	Max. Marks:	50	Min	Passing Marks: 20	

. 100.00								
PA	ART -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) Theory - 15 Periods (15 Hrs) and Lab. or Field learning/Training 30 Periods (30 Hours) No. of Hrs							
Module	Topics (Course contents), terring, plants, Ornamental plants,	04Hours						
I	Decorative plants- Shade plants, Ferris, Bonsar, Boots and flowers of local shows Commercial flowers, Common Ornamental plants and flowers of local	Learning and 07 Hours Practices						
	area /state. Famous flower Gardens of India. The Floral bouquets, Floral	04Hours						
	rangoli, Flower arrangements – concept, idea, design that of the strength of t							
	Flower decoration: Flowers used for decoration; Different idea of Hower decoration for Home, Festivals, office, Gallery, Stage, Wall, Table, Gate. Flower Pot [Learning and Practices]	07 Hours						
īV	Creative decorations: Flower drying and Dry flower decoration, Foliage arrangement; Dry foliage decoration; Flower decoration by Oil Painting, Resin art of Flower decoration Terrarium – concept, design and creation of different forms. Bonsai, Shady foliage, Fern and Water plant/ flower decoration. [Learning and Practices]							
Keywords	Floral ornaments, Flower arrangement, Flower decoration	activity of						

Signature of Convener & Members of CBOS:

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PART-C

(Flower Decoration) BOSEC-02

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-2020byTom 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 LifeWithFlowers,2019byFleurMcHarg(Author)
- 6. The Art of FlowerArranging, 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: 30Beautiful FlowerArrangements, 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-flowerarranging
- > https://agritech.tnau.ac.in/horticulture/horti Landscaping drvflower tech.html
- https://library.ihbt.res.in/Institute%20Brochures/dry%20flower.pdf
- https://static.vikaspedia.in/media/files en/agriculture/farm-based-enterprises/value-addedproducts/dry-flower-production-1.pdf
- https://www.researchgate.net/publication/362645798 Dry Flower Technology A Value Addition to Floriculture Industry
- > https://in.pinterest.com/smsastry/flower-decoration/
- https://in.pinterest.com/galisreelatha/flower-decoration/
- > https://www.britannica.com/art/floral-decoration
- https://homebnc.com/best-creative-flower-decoration-ideas/

PART -D: Assess	sment and Evaluation	
Suggested Continuous	Evaluation Methods:	
Maximum Marks:	50 Marks	
Continuous Internal As	ssessment (CIA): 15 Marks	
End Semester Exam (E	SE): 35 Marks	
Continuous Internal	Internal Test / Quiz-(2): 10 & 10 Better marks out of the	two Test / Quiz
Assessment (CIA):	Assignment/Seminar +Attendance - 05 + obtained marks in As	signment shall be
(By Course Coordinator)	Total Marks - considered against	st 15 Marks
	15	
End Semester	Laboratory / Field Skill Performance: On spot	Managed by
Exam (ESE):	Assessment	Coordinator as
(200)	A. Performed the Task based on learned skill - 20 Marks	per skilling
	B. Spotting based on tools (written) -10 Marks	
	C. Viva-voce (based on principle/technology) - 05 Marks	20 Fig. 8 May 2

Name and Signature of Convener & Members of CBO.

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 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 Stargrove Mitchell Bebel ND, Herb, Nutrient, and Drug Interactions, Publisher: Elsevier -Iris F. F. Benzie (Editor), Herbal Medicine (Oxidative Stress and Disease) 2nd Edition, Online Resourcese-Resources / e-books and e-learning portals www.swayam.ac.in www.ignou.ac.in www.egyankosh.ac.in www.iitm.ac.in www.eskillindia.org www.eshiksha.mp.gov.in www.vlab.co.in www.internshala.com www.ndl.iitkgp.ac.in Online Resourceshttps://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_Ment al_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: 50 Marks Maximum Marks: 15 Marks Continuous Internal Assessment (CIA): End Semester Exam (ESE): 35 Marks Better marks out of the two Test / Quiz 10 & 10

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

End Semester

Two section - A & B

Exam (ESE):

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

Name and Signature of Convener & Members of CBoS:

BROW

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)

ATRIAN SIKATI

FOUR YEAR UNDERGRADUATE PROGRAM (NEP-2020) Program: Bachelor in Life Science (2024 -28)

DISCIPLINE - BOTANY

Session	- 202	24 - 25
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	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	
BOSC -02P	Lab. Course -02 (Microbes and Thallophyta)	BOSE -02P	Lab. Course -02 (Microbiology and Phytopathology)
BOSC -03T	Archegoniate and Fossils	B OSE -03T	Phytopaleontology and Evolutionary Botany
BOSC -03P	Lab. Course-03 (Archegoniate and Fossils)	BOSE -03P	Lab. Course -03 (Phytopaleontology and Evolutionary Botany)
BOSC -04T	Angiosperms	BOSE -04T	Ethnobotany and Medicinal plants
BOSC -04P	Lab. Course - 04 (Angiosperms)		Lab. Course-04 (Ethnobotany & Medicinal plants)
BOSC -05T	Cytology and Genetics		Biosystematics and Biodiversity
BOSC -05P	Lab. Course -05 (Cytology and Genetics)		Lab. Course -05 (Biosystematics and Biodiversity)
BOSC -06T	Plant Physiology and Economic Botany	BOSE -06T	Plant breeding and Seed technology
B OSC -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	
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 Biostatics)	BOSE -08P	Lab. Course -08 (Growth and Stress Physiology)
alicheuten		BOSE -09T	Plant biotechnology and crop improvement
		BOSE -09P	
		BOSE -10T	Applied Botany and Intellectual property right (IPR)
	마음이 내 내려가 하는 아는 아무리는 나왔어?	BOSE -10P	Lab. Cours:: -10 (Applied Botany and IPR)
16 A 16 A 16 A	[19] : 보고 현실 왕씨 보지는 15 [19] (11,512) : 10	BOSE -11T	Biochemistry and Enzymology
	불로 기가 있을 시민하다는 그 경험을 많은 것이 되어.	BOSE -11P	Lab. Course -11 (Biochemistry and Enzymology)
		BOSE -12T	Bioinformatics and Gene Technology
7		BOSE -12P	Lab. Course-12 (Bioinformatics & Gene Technology
and the state of the state of	GE -01 & 02	n Lagrandings	VAC
	Elementary Botany	BOVAC-01	Herbal Plant & Human Health
	Lab. Course -01 (Elementary Botany)	THE KNY	STATE OF THE SECRETARY STATES OF THE
	Microbes and Thallophyta	BOSEC-01	Gardening and Floriculture
BOGE -02P	Lab. Course -02 (Microbes and Thallophyta)	1255 A 150 13	

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
- Explain Biodiversity, climate change and plant pathology.
- Apply Biotechnology, Ecology, Genetics and Plant breeding techniques in plant sciences
- Apply knowledge of Medicinal and Economic botany in day to day life.
- 6. Apply the knowledge to develop the sustainable and eco-friendly technology.

S.

Chairman Studies d Nandkumar Patel aya, Raigarh (C.C

PA	AR'	T- A: I	ntroduction	The Cartain and the		
Di	plon	am: Bachelor in na/Degree/Honors		Semester - III	Session: 2024-2	025
۱	Co	urse Code	BOSC-03 T	and the state of t		
2	Co	urse Title	Archegoniate and I	Fossils		
3	Co	urse Type	Discipline Specific			
4 .	Pr	e-requisite (if, any	As per program			9.
5	Co	ourse Learning, utcomes (CLO)	> students will be to progressive evolution relies of past plant diversity in plants development of states.	nts s	and reptiles plants	
6	_	redit Value	3 Credits	Credit = 15 Hours	- learning & Observa	tion
7		otal Marks	Max. Marks:	100	Min Passing Marks: 4	10
PA	RT	-B: Conte	nt of the Cou	rse		
	ī	Total No. of Te	aching-learning Pe	riods (01 Hr. per period	i) - 45 Periods (45 Hou	ırs)
Uı	nit	Sterios 1 A.	Toni	cs (Course contents)		No. o
	I	Bryophyta:		es (Course contents)		Perío
	241 22 Juli	Morphology, struct evolution of gamet Riccia, Marchantia	ophytes and sterilizat , Anthoceros and Fur ogical importance of		classification, General account of-	12
		evolution of stele, telome theory and origin of seed habi	t ,	silotum, Lycopodium, Sc	llaginella, Equisetum	11
	m	Gymnosperm: Characteristics of Classification of G Polyembryony in C Distribution of Gy Economic importa General account of Concepts of living	ymnosperm; Gymnosperms and its mnosperm in India; nce of Gymnosperm f Cycas, Pinus, Gnet g fossil (Cycas & Gin	um	d plants,	11
	IV	Fossil: Fossil and fossiliz Geological time ta Brief account of t	he families of Pterio	dospermales –Rhynia, Ca adeoidales Pentoxylales a	slamites.	11
Ke	ywara		ss, heterospory, fossils	a de la companiona de l	The Condition of the Co	
_			Members (CRoS):		National Control of the Control of t	10 (1. 15
2	!-	Dary DARA	the P	1017125	Start	
, , , , ,	i ir		अध्यय शहीर	100	Cluston "Was	Parc

PART-C: **Learning Resources**

Text Books, Reference Books and Others

Text Books Recommended -

- 1. Puri, P. (1980) Bryophytes, Atma Ram and Sons, Delhi.
- Vashishtha, B. R. (2005) Pteridophytes S. Chand and Co., Delhi.
- 3. Bhatnagar, S. P., Moitra, A. (1996) Gymnosperms, New Age International Pvt. Ltd., New Delhi. Text Books Recommended -
 - 4. Sporne, K. K. (1991) The Morphology of Gymnosperm. B. I. Publishing Pvt. Ltd., Bombay.
 - 5. Stewart, W. N. and Ruthwell, G. W. (1993) Paleobotany and the Evolution of Plants. Cambridge
 - 6. Singh, H. (1978) Embryology of Gymnosperms; Encyclopedia of Plant Anatomy X. Gebruder Bortraeger, Berlin.

Online Resources-

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

Online Resources-

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

- https://study.com/learn/lesson/bryophytes-characteristics-examples.html
- https://bio.libretexts.org/Bookshelves/Introductory and General Biology/Book%3A General Biology (Boundless)/26%3A Seed Plants/26.02%3A Gymnospernis/26.2A%3A Characteristics of Gymnosperms
- https://www.google.com/search?q=fossils&sca_esv=09379ecd0b6efd91&rlz=1C1CHBD ytjzqRGwbydxp0sOZFXGRnmfcw%3A1713546819943&ei=Q6YlZvcfOde5vr0PtMuyqAg&oq=fossils&gs_lp=Egxnd3Mtd2l6LXNlcnAiB2

Zvc3NpbHMqaggAMg0QABiABBixAxhDG1oFMg0QLhiABBhDG1oFMgUQABiABDIFEAAYgAQvBRAAG1AEMgoQA <u>BiABBbDGIoFMgUQABiABDIFEAAYgAQyBRAAGIAEMgUQABiABEjhKIAAWPIUcAB4AJABAJgBgwKgAYcLqgEF</u> MC41LjK4AQHIAQD4AQGYAgegAukLwgIKECMYgAQYJxiKBcICBBAjGCfCAhEQLhiABBixAxjRAxiDARjHAcICC BAAGIAEGLEDwgIKEAAYgAQYFBiHApgDAJIHBTAuMy40oAfSWw&sclient=gws-wiz-scrp

https://www.google.com/search?q=fossils&sea_esv=09379ecd0b6efd91&rlz=1C1CHBD_enIN1091IN1093&sxsrf=ACOVn09

pllsOZFXGRnmfew%3A1713546819943&cl=Q6YiZvefOdc5yr0PtMuvqAg&oq=fossils&gs_lp=Egxnd3Mtd2l6LXNlcnAiB2 Zvc3NpbHMqAggaMg@QABIABBixAxhDGIoFMgoQLbiABBhDGIoFMgUQABIABDIFEAAYgAQyBRAAGIAEMgoQA <u>BiabbhDGIoFMgUQABiAbDIFEAAYgAQyBRAAGIAEMgUQABiABEjhKIAAWPIUcAB4AJABAJgBgwKgAYcLqgEF</u> MC41L/K4AQHIAQD4AQGYAgegAukLwg1KECMYgAQYJxlKBclCBBA[GC/CAhEQLhiABBixAxjRAxiDARjHlAelCC BAAGIAEGLEDwg1KEAAYgAQYFBiHApgDAJIHBTAuMy40oAfSWw&sclient=gws-wiz-serp

https://www.google.com/search?q=pteridophytes&sca_esv=09379ecd0b6efd91&rlz=1C1CHBD_enIN1091IN109 3&sxsrf=ACQVn0-V0lp75QZG3sbfKrfltXB0GPdZyA%3A1713546628592&ei=hKUiZuvF19q-juMPkr-DkAY&oq=pter&gs lp=Egxnd3Mtd2l6LXNlcnAiBHB0ZXIqAggAMg0QABiABBixAxhDGIoFMgoQABiABB hDGIoFMgoQABiABBhDGIoFMgoQABiABBhDGIoFMgUQABiABDIKEAAYgAQYQxiKBTINEC4YgAQYS QMYQxiKBTIFEC4YgAQyChAAGIAEGEMYigUyChAAGIAEGEMYigVI ihQAFixCnAAeACQAQCYAfQ BoAGiBqoBBTAuMi4yuAEBvAEA-

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https://bio.libretexts.org/Bookshelves/Introductory and General Biology/Book%3A General Biology (Bound less)/26%3A Seed Plants/26.02%3A Cymnosperms/26.2A%3A Characteristics of Gymnosperms

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks: 100 Marks

Continuous Internal Assessment (CJA): 30 Marks

End Semester Exam (ESE): 70 Marks

Continuous Internal Assessment (CIA):30

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

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

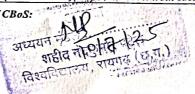
(By Course Teacher) End Semester Exam

(ESE): 70

Two section - A & B

Section A: Q1. Objective - 10 x1= 10 Mark; Q2. Short answer (ype-5x4 = 20 Marks Section B: Descriptive answer type ots shout of 2 from each unit-4x10=40 Marks

Name and Signature of Convener & Members of CBoS:



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PART	- A: In	troduction	E CURRICULUM		
Progra Dinton	m: Bachelor in	Life Sciences	Semester - III	Session: 2024-20	025
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Co	1931.1	The second secon	Archegoniate and Fossil	2	and the same of the same
	urse Type	Laboratory con	PVA	8)	
Pr	e-requisite (if, any)	As per program	111	The state of the s	
5 CO	ourse Learning. utcomes (CLO)	At the end of the	course students will be fames and reptiles plants volution in plants plants and series are series.	amillar	
	redit Value	1 Credits	Credit =30 Hours Labo	oratory or Field learning/I	rainin,
	otal Marks	Max. Marks:	The same of the sa	Min Passing Marks:	20
ART		nt of the Co			
		of learning-Train	ilng/performance Perio	ds: 30 Periods (30 Hours)	-
Modul			'opics (Course conter		No. o
Lab/Fle Trainin Experim Conten of Cour	reproductive properties funaria, Poly Pteridophyta reproductive productive pr	parts of Marcha trichum. : Comparative : parts of Psilotumeris, Ophioglos as: Comparative parts of Cycas, exptomeria, Tax Gnetum. of various gynts — as far pract	e study of the anatomy Ginkgo, Cedrus, Abies codium, Podocarpus, Annospermic plant mate icable conveniently, assil gymnosperms fro	os, Notothylus, of vegetative and inella, Equisetum, of vegetative and s, Picea, Cupressus, algathis, Taxus, erials.	30
	. Archagonia r	enter brienly	tes, pteridophytes		
Keywor	as pacinegonia, v	omer, or yopiny	cos, preridopitytes		

Signature of Convener & Members (CBoS):

(D) Rose

(D) R

PART-C: **Learning Resources**

Text Books, Reference Books and Others

Text Books Recommended -

- 1. The Practical Fossil Finder (Practical Handbook) Hardcover 1 October 1991by 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

Reference Books Recommended -

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

Online Resources-

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

Online Resources-

- > e-Resources / e-books and e-learning portals
- 1. https://efaidnbmnnnibpcajpcglclefindmkaj/https://egyankosh.ac.in/bitstream/123456789/69 611/1/Unit-9.pdf
- https://www.encyclopedia.com/science/encyclopedias-almanacs-transcripts-and-maps/fossil-andfossilization
- https://palaeobotany.org

PART -D: Assessment and Evaluation

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

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

End Semester Exam (ESE): 30 Laboratory / Field Skill Performance: On spot Assessment A. Performed the Task based on lab. work - 20 Marks

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

Name and Signature of Convener & Members of CBoS:

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Prog	RT- A: gram: Bachelor	in Life sciences			girlini.
(Dipl	oma / Degree/Hon	ors)	Semester - IV	Session: 2024-20)25
2	Course Code	BOSC-04 T		The Market Committee of the Committee of	
3	Course Title	Angiosperms			7 64
4	Course Type	Discipline Specif	fic course (DSC)		
	Pre-requisite (if	As per program	m l	We do not be setting to	
5	Course Learnin	At the end of t Understan	the course, the students will be basics of plant identification	oe able : on, classification and nomenc evolution of Angiosperm plan	lature
	Outcomes (CL	tissues wit	initiar with the internal struth its revolutionary concept.	cture of plants and concept of	plant
6	Credit Value	3 Credits	d the reproductive system in	flowering plants.	P 27
7	Total Marks	Max. Marks:	100	rs - learning & Observation Min Passing Marks: 4	
PAF	RT -B: Con	tent of the Cou		Will Fassing Warks: 4	10
1.5	Total No. of	Teaching-learning Pe	eriods (01 Hr. per period	d) - 45 Periods (45 Hours	
Ur	iit .				No. 01
	Plant taxonom	IV: Tymes of starts	pics (Course content	s) logenetic Bentham & Hooke	Perio
	and demerits, N system. Princ publication, pri herbarium and	Andern trends of taxon iples and rules (ICBN/IC neiple of priority and its Botanical gardens of Ind	ony and Hutchinson system of ony and Numerical taxor Nichanks and names, Typin limitations; Herbarium teclia	of classification with its merit nomy.Binomial—nomenclatur fication, author citation, vali hnique, important berbaria, c	12
, , , , , , , , , , , , , , , , , , ,	Euphorbiaceae, Cyperaceae, M essential]	Laminceae, Asteraceae, fusaceae and Poaceae.	Manaccae, Fabaccae (subi . Monocotyledonous famil (Floral features, Floral for	economic importance of family), Apiaceae, Rutaceae, lies -Orchidaceae, Liliaceae, mulaand floral diagram are	11
	organization: S (heartwood and Nyctanthes, Bo	structure and function of d sapwood, annual rings	ad monocot root stem and cambium and secondary gro Abnormal Secondary Gro	meristematic and permanent I leaf.Root and shoot apex owth in root and stem. Wood wth (Dracaena Achyranthes,	11
I	V Embryology: Pollination and Development of Seed structure;	Structure of anther and p d Fertilization, Double of embryo-Dicot and mor appendages and dispersa	nocot embryo. Concept of A l mechanisms.	ovules, Embryo sacs-types, pes, structure and functions pomixes and Polyembryony,	11
		erbarium, Tissue, Fertiliza	ntion	Contraction of the second	15/1/1
Jul Jul		& Members (CBoS):	~~!'3`C``	pd a	处
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del					

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.
- Bhojwani, SS. & Bhatnagar, SP (2011). Embryology of Angiosperms. Vikas Publication House Pvt.Lid. New Delhi 5 edition
- 6. Mauseth. 1.1) (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 Dicgo, CA, USA
- 2. Beck, C.B. (2010). An Introduction to Plant Structure and Development, II edition.
- 3. Mauseth. 1.1) (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). VayuEducation of India.
- 11. Chopra G.L. (2005) Angiosperm, Pradeep Publication, Jalandhar.

Online Resources-

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

Online Resources-

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

https://www.fs.usda.gov/managing-land/wildflowers/pollinators/what-

ispollinationhttps://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:

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ध्ययन मंडल १०७२ १२५ शहीद न्यक्ता प्रदेश काहीद न्यक्ता प्रदेश

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6 Credi 7 Total PART -B: Module Lab./Field Training/	se Learning. omes (CLO) it Value Marks Content	At the end of this Understand th Learn collecti Understand in Understand in Understand a 1 Credits Max. Marks: t of the Cou	course, students will be able to exystematic status of flower ion of local flora, identification ternal structure of different phe pollination and seed dispendent reproduction system in the contract of the	ring plants. ion and herbarium preparation plant parts, resal mechanism. flowering plants. ratory or Field learning/Tr Min Passing Marks:	raining
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7 Total PART -B: Module Lab./Field Training/	Marks Content	Max. Marks:	urse	Min Passing Marks:	
Module Lab./Field Training/	Conten	t of the Co	urse		20
Module Lab./Field Training/				e: 30 Periods (30 Hours)	
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Signature of Convener & Members (CBoS):

(D) New 1999

(D) Alexandra (CBoS):

(E) Alexandra

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., NewDelhi. 2. Bendre, A.M. and Kumar A. (2003). Manual of Practical Botany Vol. II. RastogiPublications, Meerut. 3. Santra S.C. and Chatterjee (2005). College Botany Practical Vol. II New Central Book Agency Pvt. Ltd Online Resources-A e-Resources / e-books and e-learning portals www.swayam.ac.in www.ignou.ac.in www.egvankosh.ac.in www.iitm.ac.in www.eskillindia.org www.eshiksha.mp.gov.in www.vlab.co.in www.internshala.com www.ndl.iitkgp.ac.in Online Resources-> e-Resources / e-books and e-learning portals https://visiblebody.com/learn/biology/monocot-dicot/roots https://www.toppr.com/guides/biology/differences-between/monocot-and-dicot-stem/ https://examupdates.in/plant-anatomy-and-embryology-book/ https://jrs.ac.in/working folder/DOWNLOAD-D-12-180-618C09F700115.pdf PART -D: Assessment and Evaluation Suggested Continuous Evaluation Methods: 50 Marks Maximum Marks: 15 Marks Continuous Internal Assessment (CIA): End Semester Exam (ESE): 35 Marks Better marks out of the two Test / Quiz Continuous Internal Internal Test / Quiz-(2): 10 & 10 Assignment/Seminar +Attendance - 05 + obtained marks in Assignment shall be Assessment (CIA):15 15 (By Course Teacher) Total Marks considered against 15 Marks

Laboratory / Field Skill Performance: On spot Assessment

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

A. Performed the Task based on lab. work

Name and Signature of Convener & Members of CBoS:

End Semester

Exam (ESE): 35

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Course teacher

- 20 Marks

FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)

DEPARTMENT OF BOTANY COURSE CURRICULUM

Pre	Ourom. D.	ntroductio		证的和公司与父母作品的对外共和共强制	Will All	
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	Course Code	BOSE- 01 T	Entre Grand Bridge Co.	10'Markey Commission	1 11 11 11 11 11 11 11 11 11 11 11 11 1	
2	Course Title	Natural resou	rces and manageme			
3	Course Type	Discipline specif	ic Elective (DSE)		e egradably egrada i	
4	Pre-requisite (if, any	As per progra	A CONTRACTOR	<u>r Distriction de l'anni Andréa de l'Antique de l'Antique</u>	Albert 1	
5	Course Learning. Outcomes (CLO)	At the end of this c > Understand no > Knowledge on > Students will	t 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			
6	Credit Value	3 Credits	Credit = 15	Hours - learning & Observation	la de la companya de	
7	Total Marks	Max. Marks:	100	Min Passing Marks: 40		
'AR	T-B: Content of the		Paletin respectively	THE CONTRACTOR OF STREET		
N	Total No. of Teach	ng-learning Period	ls (01 Hr. per period) - 45	Periods (45 Hours)	17/21	
Un	iit.	1016 N. 18 11 11 11	Topics (Course contents)		No. o	
I	Natural resources Definition an Natural resou	rces' conservation Re	ole of an individual in cons		Perio	
1	Natural resources Definition an Natural resources Natural recouratural recouratural recouractions Sustainable undecological, and Land and freshwater	rces' conservation Re rses, Significance, tilization of resources ad socio-cultural activ	ple of an individual in cons	ervation of		
	Natural resources Definition an Natural resour re	rces' conservation Rorses, Significance, tilization of resources ources on and desertification ion and management. ces use and over exploses, use and overutilize and estuarine ecosy.	ole of an individual in consols?: Concept, approaches ecovities. oitation, deforestation zation of surface and ground steins:	ervation of momic,		
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11	Natural resources Definition an Natural recount recount recount recount recount recount recological, and reshwater Land and freshwater Land as a res Soil erosion Soil degradat Forest resour Water resour Wetlands through resources Biodiversity Value of biod Biodiversity Threats; Man Bioprospectin Forests: Cove Major and min Renewable and Contemporary practic National and it Waste manage Natural resources	rees' conservation Rorses, Significance, tilization of resources discources ource and socio-cultural activation of resources ource and desertification ion and management ces use and over explices, use and overutilize and estuarine ecosy eats and management definition and types liversity at global, national an agement strategies; ag. IPR; CBD; Nationer and its significance and its significance and resource management strategies; and non-renewable source management in resource management ional efforts in ment practices	ole of an individual in consists. Concept, approaches ecovities. oitation, deforestation zation of surface and ground steins; estrategies regional levels al Biodiversity Action Plane (with special reference to I access of energy. agement resource management and	ervation of momic, water india);	11	

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PART-C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended -

- Vasudevan, N. (2006). Essentials of Environmental Science, Narosa Publishing House, New Delhi.
- 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://efaidnbmnnnibpcajpcglelefindmkaj/https://egyankosh.ac.in/bitstream/123456 789/66166/2/Unit4.pdf
- https://efaidnbmnnnibpcajpcglclefindmkaj/https://www.ers.usda.gov/webdocs/publications/41964/30289 biological.pdf?v=0#:~:text=16-,What%20Are%20Biological%20Resources%3F,forests%2C%20and%20other%20
- natural%20lands.http://surl.li/spcdd
- https://shorturl.at/ewylP
- https://shorturl.at/cimoF

Online Resources-

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

	nent and Evaluation	AM M. M. SER, L. D. M. COMO
Suggested Continuous Ev	aluation Methods:	
Maximum Marks:	100 Marks	
Continuous Internal Asse	ssment (CIA): 30 Marks	
End Semester Exam (ESE		
Continuous Internal	Internal Test / Quiz-(2): 20 +20	Better marks out of the two Test / Quiz +
Assessment (CIA): 30	Assignment / Seminar - 10	obtained marks in Assignment shall be
(By Course Teacher)	Total Marks - 30	considered against 30 Marks
End Semester Exam	Two section - A & B	t k de je bestja a i optil kred i i to ko
(ESE) · 70		10 Mark; Q2. Short answer type- 5x4 =20 Marks
(ESE). 70	Section B: Descriptive answer type	qts.,1out of 2 from each unit-4x10=40 Marks

Name and Signature of Convener & Members of CBoS:

Officer Officer Officer Officer Officer

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FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)

DEPARTMENT OF BOTANY

COURSE CURRICULUM

15	- A:	Introduction			
(Diplome	a / Degree/ Hon	in Life Science	Semester - III	Session: 2024-2	025
l Cou	rse Code	BOSE -01 P	An decomposit was	Million Committee	
² Cou	rse Title	Lab course -01	(Natural resources a	nd management)	
3 Cou	rse Type	Laboratory cour	se of all poles adding the new	ages to the first of the same part.	, sije
4 Pre	-requisite (if, a	ny) As per program	Para Livator Para C	y Catalan wajar ing	9
Cou	Course Learning. Outcomes (CLO) O To understand natural resources and their sustainable utilization of the session of the session of the session of the sustainable utilization of the session of the sustainable utilization of the session of the session of the sustainable utilization of the session of the sustainable utilization of the sust				ent. ural
6 Cro	edit Value	1 Credits	Credit =30 Hours Labo	ratory or Field learning/I	rainin
	al Marks	Max. Marks:-		Min Passing Marks:	20
PART		tent of the Co			1
y ()	Total N	o. of learning-Train	ing/performance Perio	ds: 30 Periods (30 Hours)	
Module	A A A	Te	opics (Course conten	ts)	No. o
Training Experiment Contents of Course	1) To co	mpare protected and cients timate IVI of the spec	unprotected grassland sta	ands using community	

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.nt/yFJM3 Online Resourcese-Resources / e-books and e-learning portals www.swayam.ac.in www.ignou.ac.in www.egyankosh.ac.in www.iitm.ac.in www.eskillindia.org www.eshiksha.mp.gov.in www.vlab.co.in www.internshala.com www.ndl.iitkgp.ac.in PART -D: Assessment and Evaluation Suggested Continuous Evaluation Methods: Maximum Marks: 50 Marks Continuous Internal Assessment (CIA): 15 Marks End Semester Exam (ESE): 35 Marks Continuous Internal Internal Test / Quiz-(2): 10 & 10 Better marks out of the two Test / Quiz Assessment (CIA): 15 | Assignment/Seminar + Attendance - 05 + obtained marks in Assignment shall be (By Course Teacher) Total Marks considered against 15 Marks

Name and Signature of Convener & Members of CBoS:

End Semester

Exam (ESE): 35

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Drift

A. Performed the Task based on lab. work

Viva-voce (based on principle/technology)

Laboratory / Field Skill Performance: On spot Assessment

Spotting based on tools & technology (written) - 10 Marks

10 Mrch

STORY OF TOWN (S. M.)

BROWN

Managed by

Course teacher

as per lab. status

- 20 Marks

- 05 Marks

FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)

DEPARTMENT OF BOTANY COURSE CURRICULUM

Pr	ogra	am: Bache	clor in	troduction Life Science	· Lander Allendaria	Geographical Communication (Communication)	1 2 1
(Di		Degree/	Honors	Life Science	Semester - IV		
L	Co	urse Code			- ontester - I v	Session: 2024-2	025
2	Co	urse Title		BOSE- 02 T			
3		urse Type		Vicrobiology a	and Phytopathology	Lat And Consider the	
4	Dr	arse Type	11	Dinni-11			* 1
	11	e-requisite	(if, any)	As per prograi	n		
5	Co	ourse Learn itcomes (C	ling	At the end of the Basic idea of School Phylogath Movement Idea of living, Knowledge of Characteristics	nis course, the students different microbes presen principle concept and me ology non living and environme different technique to iso	t in biotic and abiotic environn thods in the field of Microbiolo ental causes of plant diseases. late microbes study their cultur	ogy ral
6	Cı	redit Value	\	3 Credits	ccurs by microbes, their i	dentification and control measure	ires.
7		tal Marks		Max. Marks:	Credit = 15 Ho 100	urs - learning & Observat	ion
PA				it of the Co		Min Passing Marks:	40
÷.	-7.	Total No.	of Tea	ching-learning	Periods (01 TT	eriod) <u> 45 Periods (45 Ho</u>	1
U	nit	40 67 5	1111	- British		eriod) = 45 Periods (45 Ho	
1	2.00	Microbiolog	<u>)</u>	To.	pics (Course conter	its)	No. o Perio
	, his	♣ Gene	eral acco	ount, distribution	and classification of mic	The state of the	1 6110
	II	❖ Isola	tion and	cultivation of mic			12
		Plant HR a	ory and ologist I ptom of sification ortant plate to quarant not be to the property of the pro	parasitic and non n of plant disease ant diseases caus tine ersensitivity	of plant pathology, co ad, pathology and trend -parasitic diseases, s. sed by different Pathoge		11
	III	Techniques Field Ster Cher Isola using plate Stalt	s of Studies rilization mical me ation ted g standa methodaing Ted	dying Plant Disc c, Collection of santechnique State thods, Radiation chnique: Preparard inoculation tects is to obtain a purch chnique: Nature i: methods of pr	imples and its preserval ndard Methods of sterili methods, ation of different media f	ion. zation - Physical methods, or growth of pathogen by ak, serial dilution and pour	11
		 Term Dises Plant Role Inoct Koch 	ns and c ase cycl t diseas of enzy ulums a n's post	oncept e and environme e dissemination mes and toxins i nd inoculums po ulates	n pathogenesis and motential	ode of infection,	11
/		❖ Prev	ention a	nd control of plan	nt diseases		
Kev	word	❖ Prev	ention a	nd control of plar sease, Pathogen		Marie Ma	

Hands Mr

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July -

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 Resourcese-Resources / e-books and e-learning portals www.swayam.ac.in www.ignou.ac.in www.egyankosh.ac.in www.iitm.ac.in www.eskillindia.org www.eshiksha.mp.gov.in www.vlab.co.in www.internshala.com www.ndl.iitkgp.ac.in Online Resources-> e-Resources / e-books and e-learning portals 1. https://www.sciencedirect.com/topics/agricultural-and-biological-sciences/plantpathology#:~:text=Plant%20pathology%20is%20a%20science,parasitic%20microorganis ms%20that%20cause%20disease. 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 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 Internal Test / Quiz-(2): 20 +20 Better marks out of the two Test / Quiz Assessment (CIA): 30 Assignment / Seminar -10 obtained marks in Assignment shall be (By Course Teacher) Total Marks considered against 30 Marks **End Semester Exam** Two section - A & B Section A: Q1. Objective -10 x1 = 10 Mark; Q2. Short answer type-5x4 = 20 Marks(ESE): 70 Section B: Descriptive answer type qts., 1out of 2 from each unit-4x10=40 Marks Name and Signature of Convener & Members of CBoS:

- जायन

मंहलं१०१०२१२९ होद नंदयुगार एटेल क्षालय, महागढ Brant

FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)

DEPARTMENT OF BOTANY COURSE CURRICULUM

Program	- A;	ntroductio	n'i a la l		Might iv.
Diploma	n: Bachelor i	n Science	Semester - IV	Session: 2024-2	025
Cour	se Code	BOSE-02 P	Hillipi esing kadawa water		
Cour	se Title	Lab course 02 (M	icrobiology and Phytopathol		
Cour	se Type			oby) dalam dalam kalendar	Ja Arth 18
		Discipline speci	fic Elective (DSE)	Silver Tree Section 1999	
116-	requisite (if, any	As per progra	m	Action in Making	ly San
6 Crec	urse Learning. Itcomes (CLO) How dise. Basic ides		nicrobes in the laboratory coccurs by microbes f host parasite interrelation sure of pathogen by differe	shin	(raisi)
	l Marks	Max. Marks:	50	Min Passing Marks:	20
ART -		ent of the C			700,1
0.00	Total No.	of learning-Trai	ning/performance Period	ls: 30 Periods (30 Hours)	
Module		The state of the s	opics (Course content		No. o
Contents of Course	Steriliz steriliz steriliz: Prepar culture Isolatic standa Identifi Microm of the i Prepar fungi.	a and lungi, ation of glass vation and steril bacteria and fun of micro-organd inoculation to the isolated /given to ation of camera	olated fungi by slide properties of length and wifungi. I lucida diagram of the street the the cultured bact.	romic acid and dry a NAM, PDA, to and air by using eparation. dth of spore/ conidia isolated / given	30

Signature of Convener & Members (CBoS):

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PART-C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended -

 Experiments In Microbiology, Plant Pathology And Biotechnology By K. R. Aneja. 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://efaidnbmnnnibpcajpcglclefindmkaj/https://mis.alagappauniversity.ac.in/siteAdmin/dde-
- https://admin/uploads/3/PG M.Sc. Botony 34631%20MICROBIOLOGY%20AND %20PLANT%20PATHOLOGY.ndf

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 | Internal Test / Quiz-(2): 10 & 10 |
Assessment (CIA): 15 | Assignment/Seminar + Attendance - 05 |
(By Course Teacher) | 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

Assessment Managed by -20 Marks Course teacher

B. Spotting based on tools & technology (written) – 10 Marks
C. Viva-voce (based on principle/technology) – 05 Marks

ks as per lab. status

Name and Signature of Convener & Members of CBoS:

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FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)

DEPARTMENT OF BOTANY COURSE CURRICULUM

	ART- A:	Introduction					
Pro	gram: Bachel	or in Life sciences	Semester -	0 2024	2025		
(Cei	rtificate / Diploma	1 / Degree)	MIINA	Session: 2024	-2025		
1	Course Code	BOVAC-01					
2	Course Title	The state of the s					
3	Course Type						
4	Pre-requisite (if, any)	As per program					
5`	Course Learning. Outcomes (CLO)	> Understand the value > Know about botanica medicine (CAM) > Demonstrates the known	e of herbs, herbal me al medicine profession weledge of the toxici bility for allergic an bal quality on poten in their daily life		and alternativ ingredients,		
6	Credit Value	2 Credits	Credit = 15 Hour	s - learning & Observe	ation		
7	Total Marks	Max. Marks: 50		ssing Marks: 20	gaille on a		
		ntent of the Cou		1 12 1	1 11 11 11		
7.1				period) - 30 Periods (30 Hours)		
Uni			(Course conten		No. of Perio		
Uni		lementary knowledge of		13/	A LOS A REAL		
	medicine. Concept of ethn India & the Chha Observation/In I	o-medicine, folk medicines ttisgarh. Concept of Herbal Practices - Survey and fam	, ethno-ecology, eth garden. Collection o iliarization with he	nic communities of the of ethnic information. This & local herbal plants	. 08		
п	care – health ar Common plants	nd balanced diet (Role of & plant parts providing me	proteins, carbohydr tals and vitamins.	inal plant in human health ates, lipids and vitamins). In local herbal medicinal	07		
III	medicine, meth religion. Tradition Chhattisgarh.	and Traditional knowle ods of disease diagnosis onal knowledge and utili ification of Herbal plants o	and treatment – c ty of some medicir	ommon Plants in folk nal plants in			
	Centella Aloe ver Solanum Achyran Withani Papaver Strychn	asiatica,			08		
IV	Plants in day to	day life: Nutritive and m	nedicinal value of c	common herbal fruits			

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. Benzic 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.
- Stargrove Mitchell Bebel ND, Herb, Nutrient, and Drug Interactions, Publisher: Elsevier -Health Sciences Division
- 6. Iris F. F. Benzie (Editor), Herbal Medicine (Oxidative Stress and Disease) 2nd Edition,

Online Resources-

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

Online Resources-

- https://pubmed.ncbi.nlm.nih.gov/22593937/
- https://crimsonpublishers.com/acam/pdf/ACAM.000551.pdf
- https://www.researchgate.net/publication/329823398_Medicinal_Plants_Used_in_the_Treatment_of_Ment al_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:

50 Marks Maximum Marks:

Continuous Internal Assessment (CIA): 15 Marks

35 Marks End Semester Exam (ESE): Continuous Internal Internal Test / Quiz-(2): 10 & 10

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

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., lout of 2 from each unit- 4x05 = 20 Marks

Name and Signature of Convener & Members of CBoS:

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

			Introduction	1 - 5		110
Pi	rogra	am: Bachelor	in Life	Semester -	Session: 2024-2	025
50	Sciences(Certificate / De		iploma / Degree)	II//IV/V/VI	SCSSIOII. 2024 2	
<u>,</u>	-		BOSEC-01			
2		ırse Title	Gardening and I	loriculture		
3	Cot	ırse Type	Skill Enhance Co	ourse (BOSEC 01)		14.
4	Pre	-requisite (if, any	As per program			
5		urse Learning. tcomes (CLO)	 understand the learn about to tools adopt the skill 	of gardening as well as	g & Floriculture and familiar with garden floriculture o in this field.	
6	Cre	dit Value	2 Credits	Crodit = 15 Hour	rs – Theoretical learning a	nd inina
		1 1 2 2	(1C+1C)		ory or Field learning/Tran	20
7	•	al Marks	Max. Marks:	50	Mill I assing Marine.	1,100
PA	RT	-B: Conte	nt of the Co	urse of Teaching-learning	Periods:	
		Theory - 15 Per	ods (15 Hrs) and L	ab. or Field learning/Tr	aining 30 Periods (30 Hour	s)
Mο	dule			oics (Course conten		No. o
Соп	itents	Hanging ga [Observation 2. Garden pl creepers), plants, Flo Practices 3. Floricultu Seasonal fl Carnation,	rden; Types of garde in & Practices ants: Ornamental pergolas, Edges & wer borders and be re: Present situation owers, Cut flowers Gerbera, Gladioli, in & Practices of the interest of the control of th	Hedges and Pot plants, ds, Ground covers and on & scope in India. Var. Flower Crops - Rose, Tuberose, Aster, Lilly,	nery, Arches (climbers and Cacti and Succulents carpet beds [Observation & ious types of flowers — Chrysanthemum, Dahlia and Marigold.	15
Lab/Field Training Contents 1. Familiarization with different tools and equipments used in gardening w 2. Design and Plotting of Garden and Preparation of Soil for Garden 3. Soil decontamination techniques, Planting methods, Fertigation meth 4. Propagation techniques for selected ornamental plants Weed manage 5. Harvesting techniques, Post-harvest handling, Pre cooling, Pulsing, P 6. Preparation of composite mixture and manuring practice in nursery and 7. Practice in budding, cutting, layering and grafting etc. 8. Practice of flower arrangements, flower bouquet.		for Garden Fertigation method s Weed management oling, Pulsing, Packing,	30			
Keyıv	ords	Garden, Flo	ver, Floriculture, G	arden tools		
igna	iture d	of Convener & M	embers (CBoS)	6. brief	alt	

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 Resourcese-Resources / e-books and e-learning portals www.swayam.ac.in www.ignou.ac.in www.egvankosh.ac.in www.iitm.ac.in www.eskillindia.org www.eshiksha.mp.gov.in www.vlab.co.in www.internshala.com www.ndl.iitkgp.ac.in Online Resourcese-Resources / e-books and e-learning portals https://indiaagronet.com/horticulture/CONTENTS/LANDSCAPE.htm https://www.youtube.com/watch?v=ZUIh6ZFO48c&ab channel=MountainGardens https://www.youtube.com/watch?v=EE0oQO6n9iA https://www.teachmint.com/tfile/studymaterial/bsc/j1063fog/11styleofgardeningpdf/0d ba825bd66d-4180-afe1-28950aa42454 https://k8449r.weebly.com/uploads/3/0/7/3/30731055/types of gardens [compatibility model pdf-signed.pdf https://www.egyankosh.ac.in/bitstream/123456789/73050/1/Unit-2.pdf https://www.academia.edu/40140208/A HANDBOOK ON FLORICULTURE And La 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-offloriculture/ PART -D: Assessment and Evaluation Suggested Continuous Evaluation Methods: Maximum Marks: 50 Marks 15 Marks Continuous Internal Assessment (CIA): End Semester Exam (ESE): 35 Marks Continuous Internal Internal Test / Quiz-(2): Better marks out of the two Test / Quiz Assessment (CIA): 15 | Assignment/Seminar + Attendance - 05 + obtained marks in Assignment shall be (By Course Coordinator) Total Marks -15 considered against 15 Marks Laboratory / Field Skill Performance: On spot Assessment **End Semester** Managed by A. Performed the Task based on learned skill - 20 Marks Coordinator as Exam (ESE): 35 B. Spotting based on tools (written) per skilling -10 Marks C. Viva-voce (based on principle/technology) - 05 Marks Name and Signature of Convener & Members of CBoS:

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

	rogram: Undergi		Semester - I/III/V	Session: 20	24-2025
1	Course Code	BOVAC = 02			
2	Course Title	1 1 1 1 1 1 1 1	Academic Research & Report	Writing	
3	Course Type		Value Addition Course (VAC)		
4	Pre-requisite(if,any)	Asp	er Government norms / Institutio	nal scheme	il, allerjen fyr
5	Course Learning. Outcomes (CLO)	After completion of this course, the students will be able to - > Understand the academic research and its scope & prospects. > Know the Importance of Report writing in academic and Research and Necessity of report writing for achievement of academic & research goal. > Demonstrates the knowledge of the toxicity of plant and essential oil ingredients. > Understand the kinds & characteristics of academic and research reports presentation and its prospective application. > Use the tools and techniques of academic research and report writing. > Adopt the skill of research designing and report/paper/thesis writing.			
		▶ Aaobi.iii	Skill of research designing and top	or in perper	
6	Credit Value		redits Credit = 15 Hor	urs - learning & Oc	Servation
7	Total Marks	2 C Max. Mar	redits Credit = 15 Horks: 50	urs - learning & Oh Min Passing Marks	Servation
7	Total Marks RT -B: Content of t Total No. of Teach	2 C Max. Mar the Course hing-learni	redits Credit = 15 Horeks: 50 Credit = 15	Min Passing Marks - 30 Periods (30 Herestices	: 29
7 PAF	Total Marks T -B: Content of t Total No. of Teach Introduction: Conca concept Paper for & Design, Format, in India promoting	Max. Mar the Course hing-learni Topics (Coppet of - Aca academic r Scope, Mot Research -	redits Credit = 15 Hotels: 50 Credit = 15	Min Passing Marks - 30 Periods (30 Here) Practices roject, Component of s, Type, Formulation teme & Organization	: 29 ours)
7 PAF Mod	Total Marks RT -B: Content of total No. of Teach Introduction: Concactoring a concept Paper for & Design, Format, in India promoting ICMR, CSIR, INSA. Research paper / Repaper, Structure of Methodology, Resuccept paper, Resu	Max. Mar the Course hing-learni Topics (Coppt of - Acar academic r Scope, Mot Research - view writing f Research alts and Deparch papers.	redits Credit = 15 House Res: 50 Ing Periods (01 Hr. per period) Ourse contents): Learning and Indemic Research and Research Prospects. Popular Schinspire, NSF, MEF, DBT, DST, DST, DST, DST, DST, DST, DST, DS	Min Passing Marks - 30 Periods (30 Here) Practices roject, Component of s, Type, Formulation and Pones, STARD, ICAR, port. Types of Research is, Abstract writing, ferencing, Ways of	e 29 Ours) No. of Hr
7 PAF Mod	Total Marks RT -B: Content of total No. of Teach Introduction: Concactoring a concept Paper for & Design, Format, in India promoting ICMR, CSIR, INSA. Research paper / Repaper, Structure of Methodology, Resucommunicating a resumble Report / Dissertation Literature review, Expendixes (Assignment)	Max. Man the Course hing-learni Topics (Coppt of - Aca academic r Scope, Mot Research - view writing f Research ults and D earch papers, / Thesis V experimental / & Table Properts	redits Credit = 15 How eks: 50 Ing Periods (01 Hr. per period) Ourse contents): Learning and Indemic Research and Research Presearch, Research—Characteristics ivation & Prospects. Popular Sch INSPIRE, NSF, MEF, DBT, DST, D Steps of writing a research report papers, Research paper format iscussion, Different formats re-	Min Passing Marks - 30 Periods (30 Here) Practices roject, Component of s, Type, Formulation on Start Component of Start Com	very very very very very very very very

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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/visvesvarava-technological-university/researchmethodology/general-format-of-a-research-report/33791300
- https://students.unimelb.edu.au/academic-skills/resources/report-writing/research-reports
 - Use of following sites
- https://www.wiley.com/en-

ie/Student+Research+and+Report+Writing:+From+Topic+Selection+to+the+Complete+Paper-p-9781118963913

> https://www.researchgate.net/publication/275654158 HAND BOOK FOR WRITING RESEARCH PAPER

PART -D: Assessment and Evaluation

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

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

End Semester Exam (ESE):

Two section - A & B

Section A: Q1. Objective $-05 \times 1 = 05 \text{ Mark}$; Q2. Short answer type- $5 \times 2 = 10 \text{ Marks}$ Section B: Descriptive answer type qts., lout of 2 from each unit- 4x05 = 20 Marks

Signature of Convener & Members of CBOS:

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

PA	ART-A: Introdu	ction		wy stantel of	
	Program: Unde		Semester -	- II/IV	Session: 2024-2025
1	Course Code	BOSEC-02		order to the wall	
2	Course Title	FIG	ower Decora	tion	
3	Course Type	Skill	Enhance Cours	e (SEC)	And the second of the second o
4	Pre-requisite (if, any)	As per Government norms / Institutional scheme			
5	Course Learning. Outcomes(CLO)	After completion of this course, the students will be able to- > -understand the 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 - T	Theoretical learning and or Field learning/Training
7	Total Marks	Max. Marks:	50	Min	Passing Marks: 20

	Total No. of Teaching-learning Periods: Theory - 15 Periods (15 Hrs) and Lab. or Field learning/Training 30 Periods (30 I	lours)
Module	The state of the s	No. of Hrs
I	Introduction: Basic knowledge of Flowering plants, Omamental 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
H	Floral ornaments & Flower arrangements: Garlands, Floral bouquets, Floral rangoli, Flower arrangements — concept, idea, design and style — Western styles, Japanes or Ikebana styles, Common types of Flower arrangement — Elliptical, Vertical, Horizontal Triangular, Crescent, S & Oval shapes and Cascade .flower arrangement. [Learning and Practices]	04Hours Learning and 07HoursPra ctices
ш	Flower decoration: Flowers used for decoration; Different idea of flower decoration for Home, Festivals, office, Gallery, Stage, Wall, Table, Gate. Flower Pot / Vas / Bottle decoration. [Learning and Practices]	03 Hours + 07 Hours
IV	Creative decorations: Flower drying and Dry flower decoration, Foliage arrangement; Dry foliage decoration; Flower decoration by Oil Painting, Resin art of Flower decoration Terrarium – concept, design and creation of different forms. Bonsai, Shady foliage, Fern and Water plant/ flower decoration. [Learning and Practices]	Learning

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PART-C

(Flower Decoration) BOSEC-02

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-2020byTom Loxley &VictoriaGaiger
- 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 LifeWithFlowers,2019byFleurMcHarg(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
- The Flower Chef: A Modern Guide to Do-It-Yourself Floral Arrangements, 2016 by Carly Cylinder
- 9. Easy Ikebana: 30Beautiful FlowerArrangements, 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-
- > 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-addedproducts/dry-flower-production-1.pdf
- https://www.researchgate.net/publication/362645798 Dry Flower Technology A 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/

Suggested Continuous	sment and Evaluation Evaluation Methods:		
Maximum Marks: Continuous Internal As	50 Marks		
End Semester Exam (E	SE): 35 Marks		
	Internal Test / Quiz-(2): 10 & 10 Assignment/Seminar + Attendance - 05 Total Marks - 15	+ obtained marks in Ass considered agains	signment shall be
End Semester Exam (ESE):	Laboratory / Field Skill Performent A. Performed the Task based on l. B. Spotting based on tools (written C. Viva-voce (based on principle/st	earned skill - 20 Marks n) — 10 Marks	Managed by Coordinator as per skilling

Name and Signature of Convener & Members of CBOS

FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)

DEPARTMENT OF BOTANY

COURSE CURRICULUM

P	ART- A:	Introduction	the part of the second of the	the transfer of the	30 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
Pre	ogram: Bachelor	in Life Sciences	Semester -	Session: 2024-20)25
(Di	ploma / Degree/Hono	rs)	111/17/7//1/11/11/11		
1	Course Code	BOGE -01 T	4		17.18
2	Course Title Elementary Bots			pains signification	
3			The state of the s		Harry A
4	Pre-requisite (if, any				
5	Course Learning. Outcomes (CLO)	Understand theGet acquainted environment.	rehensive understanding dicinal plants, and their	of the identification, cultivachemical constituents.	tion, ar
6	Credit Value	3 Credits	Credit = 15 Hour	s - learning & Observat	1011
7	Total Marks	Max. Marks:	100	Min Passing Marks: 4	0
		4 of the Cour	rse	A Charles of the Control of the Cont	
	Total No. of Te	aching-learning Per	iods (01 Hr. per peri	od) - 45 Periods (45 Hou	irs)
i i	the line to it transitions	Tonio	s (Course contents		No. o
Un	Basics of Plant	-tank and animal cell	Concept of prokaryote	tween; living and nonliving is and eukaryotes.Importand d Anglosperm.Structure an	12
11	function of a typical flowering plant. II Branches of botany: General idea Economic Botany, Ethnobotany, I Paleobotany, Phytochemistry, Phytopa		prestry, Genetics, F hology , Plant biotec	hnology, Plant breeding,	11
Ī	III Plants for human welfare:Plant Resources for Rural livelihood — Mahua, Tendu pa Bamboo and Firewood.Ethnobotany in India: Methods to study Ethnobotany, Application Ethnobotany, ethnomedicinal plants and ethnoecology. Application of plant products for cer diseases- Cough and cold, Jaundice, Infertility, Diabetes, Blood pressure and Skin diseases.		ood – Mahua, Tendu patta, hnobotany, Applications of of plant products for certain		
IV Ancient Indian Botany: Indigenous History, origin, panchamahabhutas, saptadhayurvedic treatments, Siddha: Origin of Siddused in Siddha medicine. Unani: History, corand their contributionsCharak, Jagdish Chambard Charak, Jagdish Chambard Charak, Jagdish Charak, Jagd		Medicinal Sciences; Defir atu and tridosha concep na medicinal systems, Ba cept. Charaksamhita. An	nition and Scope-Ayurveda: ots, Rasayana, plants used in asis of Siddha system, plants acient and modern Botanists	11	
	Swaminathan etc.		[일시] 왕으로 보는 사람이 되었다.	요즘 그렇게 하는 경험을 가는 경찰이 되었다.	

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
- "A Compendium of Medicinal Plants in India: An Introduction to Ayurveda" by S.L. Kochhar
- 6. A handbook of forest utilization by T. Mehta
- 7. Plants and human welfare by O.P.Sharma

Reference Books Recommended -

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

Online Resources-

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

Online Resources

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

- https://extension.oregonstate.edu/collection/botany-basics
- https://www.pbs.org/video/botany-basics-iuu2bl/
- https://efaidnbmnnnibpcajpcglclefindmkaj/https://www2.ca.uky.edu/agcomm/pubs/ho/ho9 6/ho96.pdf
- https://www.botanytoday.com/branches-of-botany/
- https://efaidnbmnnnibpcajpcglclefindmkaj/https://www.unanijournal.com/articles/94/3-1-
- 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 30 Marks Continuous Internal Assessment (CIA): End Semester Exam (ESE): 70 Marks Internal Test / Quiz-(2): 20 +20 Better marks out of the two Test / Quiz Continuous Internal Assignment / Seminar -10 + obtained marks in Assignment shall be Assessment (CIA): 30 30 Total Marks considered against 30 Marks (By Course Teacher) Two section - A & B **End Semester Exam** Section A: Q1. Objective - 10 x1= 10 Mark; Q2. Short answer type- 5x4 = 20 Marks (ESE): 70 Section B: Descriptive answer type qts., lout of 2 from each unit-4x10=40 Marks

Name and Signature of Convener & Members of CBoS:

शहीद नदक्मार पटेल

विश्वविद्यालयं, रायगढं (छ.ग.)

FOURYEARUNDERGRADUATEPROGRAM (2024—28) DEPARIMENTOF BOTANY COURSE CURRICULUM

PA	RT-	A:	ntroduction	i i hala		
(Dip	loma /	Degree/ Hono.	n Life Sciences	Semester –	Session: 2024-2	025
1 1	Course		BOGE -01 P		July Burkly No.	1/44
	Cours	e Title	Lab. Course -01	(Elementary Botany)		
3	Cours	е Туре	Laboratory cours			
4	Pre-re	equisite (if, any	As per program		SACON PROBLEM	
Course Learning. Outcomes (CLO)		omes (CLO)	> Understand cell. > Identify pte > Learn abou	course, the students will be a structure of plant cell, eridophytes of college can the different types of plant Ayurvedic system of me	prokaryotic cell and en npus. int tissues. idicine.	
		t Value Marks	1 Credits Max. Marks:	20		
	RT -E		and the second second	urse ng/performance Periods pics (Course contents	Promise and Client Co. Co. Co. St. 9	No. o
	/Field	1 Missoss	pic study of plant ce	I pure to the second second	2 - 1 / 2016 / 101	Perio
Train Exper	ning/ riment tents ourse	 Microsco fungi). Study of Identification Study of Study of Study of Study of Study of Study of 	thallus structure of hation of different pla a typical flowering pinternal structure of parenchyma, collend	votic (Bacteria) and eukary Riccia and Marchantia. Ints growing in college can plant and it's parts. Toot and stem. chyma and sclerenchyma.	mpus.	30

Signature of Convener & Members (CBoS):	E. a. Ley
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[14] [18] [18] [18] [18] [18] [18] [18] [18	10. Associ

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PART-C: **Learning Resources** Text Books, Reference Books and Others Text Books Recommended -Text Books Recommended -1. College Botany Ganguli Kar and dutta, HIMALAYA Publishers 2. "Handbook of Medicinal Plants" by L.D. Kapoor "Indian Medicinal Plants: An Illustrated Dictionary" by C.P. Khare 4. "Medicinal Plants in India: Conservation and Sustainable Utilization in the Emerging Global Scenario" "A Compendium of Medicinal Plants in India: An Introduction to Ayurveda" by S.L. Kochhar edited by V.K. Gupta 6. A handbook of forest utilization by T. Mehta 7. Plants and human welfare by O.P.Sharma Reference Books Recommended -1. Charak Samhita 2. Medicinal Plants of India" by C.P. Khare Online Resources-> e-Resources / e-books and e-learning portals www.swayam.ac.in

Online Resources-

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

PART -D: Assessment and Evaluation Suggested Continuous Evaluation Methods: 50 Marks Maximum Marks: 15 Marks Continuous Internal Assessment (CIA): 35 Marks End Semester Exam (ESE): Better marks out of the two Test / Quiz Continuous Internal Internal Test / Quiz-(2): 10 & 10 Assessment (CIA): 15 | Assignment/Seminar + Attendance - 05 + obtained marks in Assignment shall be considered against 15 Marks Total Marks -(By Course Teacher) Managed by Laboratory / Field Skill Performance: On spot Assessment **End Semester** - 20 Marks | Course teacher A. Performed the Task based on lab. work Exam (ESE): 35 B. Spotting based on tools & technology (written) - 10 Marks as per lab. status C. Viva-voce (based on principle/technology)

Name and Signature of Convener & Members of CBoS:

www.ignou.ac.in www.egyankosh.ac.in www.iitm.ac.in www.eskillindia.org www.eshiksha.mp.gov.in

www.vlab.co.in www.internshala.com www.ndl.iitkgp.ac.in

FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)

DEPARTMENT OF BOTANY

COURSE CURRICULUM

	T-A: Int	troduction			The first by
	am: Bachelor in l	Life Sciences	Semester –	Session: 2024	-2025
	Course Code	BOGE -02 T		Lake year 17 Televis	
	Course Title				
	Course Type	Generic elective	and a street of the	open flowing way to the first	AND THE C
	Pre-requisite (if, any			of the street of the street	
5	Course Learning. Outcomes (CLO)	Course Learning. At the end of this course, the students will be able to 1. Understand about the Microbes and their Importance. 2. Identify edible mystrooms and learn cultivation techniques.		vation	
7 .	Credit Value Total Marks	3 Credits Max. Marks:	100	Min Passing Marks:	40
		t of the Cou			
MK.	Total No. of Teach	hing_learning Per	iods (01 Hr. per period	l) - 45 Periods (45 Ho	urs)
Unit		Top	oics (Course conten	ts)	Period
I	Lytic and Lysogenic on plants , import ,Structure, reproduc characteristics , stru	cycles, transmission ant plant diseases, ction and economic acture, reproduction	and replication-of-viruses viroid, prions Actinomyo importance. Mycoplass and their economic uses.	ire, Bacterlophages and Ti i, Symptoms- of viral disea etes: general characteris na, Phytoplasma,: gene	tics 12 eral
II	Bacteria: History, go	eneral character, cla	ccification and morpholog	er Gram positive and (as	
	Bacterial Growth of recombination in being importance. Cyanob Cyanobacteria, representations of the company of	tructure of bacteria s curve, factors affect pacteria- Transforma pacteria: General ch poduction and econom	chape, size flagella and ul- ing growth of microbes ation Conjugation and T aracteristics, morphology nic importance of Bacteria	and the second second second second	cell; ion, mic 11
101	Bacterial Growth of recombination in himportance. Cyanob Cyanobacteria, reprosente Phycology: General features, occurrence, Algae. Reproduction Chara, Vaucheria, Esoil fertility, algae a	tructure of bacteria security, factors affect pacteria. Transformation acteria: General characteristic feats classification and rain classification, general characteristic, general classification, general classification, general cocarpus and Polysiphs biofertilizer, blue	shape, size flagella and ulting growth of microbes ation Conjugation and laracteristics, morphology in importance of Bacteria ares of Algae. Algae in the conjugation of the conjugation	ra structure of bacterial of sporulation, reproduction, reproduction, and Econo Heterocyst, cell structure	ion, mic 11 e of ient d in um, e in 11
	Bacterial Growth of recombination in be importance. Cyanob Cyanobacteria, reproduction of the catures, occurrence, Algae. Reproduction Chara, Vaucheria, Edsoil fertility, algae a products - Agar, bio Mycology, Mushroc Fungl, Economic impospecialization, Heter general character an Agaricus; Colletotrici	tructure of bacteria structure, factors affect carve, factors affect pacteria. Transformation and economical characteristic feat a classification, general cocarpusand Polysiph is biofertilizer, blue fuel portance and Classific pokaryosis & Parasexund life cycle of -Mucchen, Alternaria. Edib	shape, size flagella and ulting growth of microbes ation Conjugation and Taracteristics, morphology aic importance of Bacteria tures of Algae. Algae image of thallus organization eral character and life cythonia. Economic important green algae and nitrogen and properties of Fungi, Nutrition, ality in Fungi. Fungi as bior, Phytophthora Penicilliu	ra structure of bacterial of sporulation, reproduction, and Econo Heterocyst, cell structure diversified habitat, Sal Prominent pigments founce of algae - Role of algae ifixation. Symbiosis ; a eral characteristic feature Heterothallism, Physiologocontrol agent. Classification, Peziza. Ustilago, Puccid Oyster mushroom and the	ient d in um, e in lgal s of ical ion, nia, 11
IV IV	Bacterial Growth of recombination in being producted a production. Chara, Vaucheria, Edsoil fertility, algae a products - Agar, bio Mycology, Mushroc Fungl, Economic impspecialization, Heter general character ar Agaricus; Colletotricic cultivation. General and Mycoplasma, Trans	tructure of bacteria structure, factors affect curve, factors affect pacteria. Transformation of the curve, factoria is General characteristic feat classification and rain classification, generated conferming and cultivation, Liche portance and Classific okaryosis & Parasexum of life cycle of -Muccipum, Alternaria. Edibaccount of lichens. Generation, Biofertilizer affects of the cycle of -Muccipum, Alternaria. Edibaccount of lichens. Generation, Biofertilizer affects of the cycle of -Muccipum, Alternaria.	shape, size flagella and ulting growth of microbes ation Conjugation and Taracteristics, morphology nic importance of Bacteria ares of Algae. Algae image of thallus organization eral character and life cylonia. Economic important green algae and nitrogentation of Fungi, Nutrition, ality in Fungi. Fungi as biop, Phytophthora Penicillius and eneral account of Myccorian and account of Myccorian growth and eneral account of Myccorian growth and eneral account of Myccorian and account of Myccorian growth and account of Myccorian and account of Myccorian and account of Myccorian and account of Myccorian growth and account of Myccorian and account of Myccorian growth and account of Myccorian growth and account of Myccorian growth account of Myccorian growth and account of Myccorian growth account growth account growth and account growth growth account growth growth account growth growth growth growth growth growth growth growth growth g	ra structure of bacterial of sporulation, reproduction, and Econo Heterocyst, cell structure diversified habitat, Sal Prominent pigments founce of algae - Role of algae ifixation. Symbiosis ; a eral characteristic feature Heterothallism, Physiologocontrol agent. Classification, Peziza. Ustilago, Puccid Oyster mushroom and the	ient d in um, e in lgal s of ical ion, nia, 11
IV IV	Bacterial Growth of recombination in beimportance. Cyanob Cyanobacteria, reproduction of the features, occurrence, Algae, Reproduction Chara, Vaucheria, Edsoil fertility, algae a products - Agar, bio Mycology, Mushroof Fungl, Economic impospecialization, Heter general character an Agaricus; Colletotricic cultivation. General is	tructure of bacteria structure, factors affect curve, factors affect pacteria. Transformation of the curve, factoria is General characteristic feat classification and rain classification, generated conferming and cultivation, Liche portance and Classific okaryosis & Parasexum of life cycle of -Muccipum, Alternaria. Edibaccount of lichens. Generation, Biofertilizer affects of the cycle of -Muccipum, Alternaria. Edibaccount of lichens. Generation, Biofertilizer affects of the cycle of -Muccipum, Alternaria.	shape, size flagella and ulting growth of microbes ation Conjugation and Taracteristics, morphology arcteristics, and life cyclonia. Economic important green algae and nitrogen and properties of Fungi, Nutrition, ality in Fungi. Fungi as bionary, Phytophthora Penicillius arcteristics arcteristics, Phytophthora Penicillius arcteristics, Parasexuality.	ra structure of bacterial of sporulation, reproduction, and Econo Heterocyst, cell structure diversified habitat, Sal Prominent pigments founcie of <i>Volvox</i> , <i>Oedogoni</i> ce of algae - Role of algae fixation. Symbiosis; a eral characteristic feature Heterothallism, Physiologocontrol agent. Classification, <i>Peziza</i> . <i>Ustilago</i> , <i>Pucci</i> di Oyster mushroom and thiza.	ient din um, e in 11 lgal sof lical lion, nia, nia, neir
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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. Tortora, G.J., Funke, B.R., Case, C.L. (2010). Microbiology: An Introduction, Pearson Benjamin Cummings, U.S.A. 10th edition. 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. Annic Ragland, 2012. Algae and Bryophytes, Saras Publication, Kanyakumari, India. Basu, A. N. 1993. Essentials of Plant Viruses, Vectors and Plant diseases, New Age International, New Delhi. Chopra. G. L. 1984. A text book of Algae, Rastogi publications, Meerut, India. 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. Webster, I., Weber, R. (2007). Introduction to Fungi, 3rd edition. Cambridge, U.K.: Cambridge University Reference books: Press. Pelzar, 1963. Microbiology, Tata McGraw Hill, New Delhi Rangaswamy, G. 2009, Disease of Crop Plants in India, Prientice Hall of India, New Delhi.

Microbiology Fundamental and Applications (hindi) (pb) 9. ISBN: 9788188826230 Edition: 03Year:

Modern Microbiology (hindi) (hb) ISBN: 9788177543599Edition: IYear: 2018Author: Dr. Purohit SS,

2016Author: Dr. Purohit SS, Dr. Deo Publisher: Student Edition Language: Hindi

Plant pathology by R.S. Mehrotra, Tata McGraw-Hill Publication Online Resources-

> e-Resources / e-learning portals

Dr. Singh T Publisher: Agrobios (India)

- www.swayam.ac.in
- www.ignou.ac.in
- www.egyankosh.ac.in
- www.iitm.ac.in
- www.eskillindia.org
- www.eshiksha.mp.gov.in
- www.vlab.co.in
- www.internshala.com
- www.ndl.iitkgp.ac.in

Online Resources-

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

- https://www.classcentral.com/tag/microbiology
- https://www.edx.org/learn/microbiology
- https://www.mooc-list.com/tags/microbiology
- 4. https://www.udemy.com/topic/microbiology/
- https://ucmp.berkeley.edu/bacteria/bacteria.html
- https://www.livescience.com/53272-what-is-a-virus.html https://gclambathach.in/lms/Economic%20importance%20of%20Algae.pdf
- https://www.slideshare.net/sardar1109/algae-notes-1
- https://www.onlinebiologynotes.com/algae-general-characteristics-classification/
- 10. https://www.sciencedirect.com/topics/immunology-and-microbiology/fungus
- 11. https://ucmp.berkeley.edu/fungi/fungi.html
- 12. https://agrimoon.com/wp-content/uploads/Mashroom-culture.pdf
- 13. http://ecoursesonline.iasri.res.in/mod/page/view.php?id=11293
- 14. http://www.jnkvv.org/PDF/11042020102651plant_pathology.pdf
- 15. https://www.apsnet.org/edcenter/disimpactmngmnt/topc/EpidemiologyTemporal/Pages/ManagementStrategi
- 16. https://www.agrilcareer.com/6-easy-steps-for-mushroom-cultivation/

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods: 100 Marks Maximum Marks: 30 Marks Continuous Internal Assessment (CIA):

End Semester Exam (ESE):	70 Marks	
Continuous Internal	Internal Test / Quiz-(2): 20 +20 Assignment / Seminar - 10 Total Marks - 30	+ 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., lout of 2 from each unit-4x10=40 Marks