FOUR YEAR UNDERGRADUATE PROGRAM (NEP 2020) PROGRAM: BACHELOR OF SCIENCE (2024-28) DISCIPLENE: MICROBIOLOGY

Session: 2024-25

DSC- 01 to 08		DS	SE- 01 to 12	DGE- 01 to 02		
MBSC- 01 T	Introductory Microbiology and Microbial Techniques	MBSE- 01 T	Microbial Enzyme Technology	MBGE- 01 T	Introductory Microbiology and Microbial Techniques	
MBSC- 01 P	Lab Course	MBSE- 01 P	Lab Course	MBGE- 01 P	Lab Course	
MBSC- 02 T	Bacteriology, Virology and Protozoology	MBSE- 02 T	Industrial Microbiology	MBGE- 02	Bacteriology, Virology and Protozoology	
MBSC- 02 P	Lab Course	MBSE- 02 P	Lab Course	MBGE- 02 P	Lab Course	
MBSC- 03 T	Cell Biology and Biochemistry	MBSE- 03 T	Food and Dairy Microbiology			
MBSC-03 P	Lab Course	MBSE- 03 P	Lab Course			
MBSC- 04 T	Bioinstrumentation and Biostatistics	MBSE- 04 T	Microbial Biotechnology			
MBSC-04P	Lab Course	MBSE- 04 P	Lab Course			
MBSC- 05 T	Microbial Physiology and Metabolism	MBSE- 05 T	Medical Microbiology	1279		
MBSC-05P	Lab Course	MBSE- 05 P	Lab Course	SEC		
MBSC-06 T	Molecular Biology and Microbial Genetics	MBSE- 06 T	Mycology and Plant Pathology	MBSEC- 01	Mushroom Cultivation	
MBSC-06 P	Lab Course	MBSE- 06 P	Lab Course			
MBSC- 07 T	Immunology	MBSE- 07 T	Agriculture and Veterinary Microbiology			
MBSC- 07 P	Lab Course	MBSE-07 P	Lab Course		VAC	
MBSC- 08 T	Environmental Microbiology and Microbial Ecology	MBSE- 08 T	Fermentation Technology	MBVAC- 01	Microbes and Human Health	
MBSC-08 P	Lab Course	MBSE- 08 P	Lab Course			
		MBSE- 09 T	Clinical Microbiology			
	,	MBSE- 09 P	Lab Course			
,	,	MBSE- 10 T	Pharmaceutical Microbiology			
		MBSF- 10 P	Lab Course			
		MBSE- 11 T	Metagenomics, Basic Computer and Bioinformatics			
		MBSE-11 P	Lab Course			
			Biosafety and Intellectual Property Rights	ੰ Stud	airman ies	
		MBSE- 12 P	Lab Course	eed N	andkumar Patel	

Name and Signature of Convener and Members of CBoS

Vishwavidyalaya, Raigarh (C.G.)

PART	-A:	Introduct	COURSE CURRIC	ULUM					
Progran (Certifi 1	n: Bachelor cate/Diplom Course Co	in Life Science	Semeste	er - I '	Session	2024-25			
2	Course Ti	tle							
3	Course Ty	/pe	Introductory Microbiology and Microbial techniques						
4		-							
5	Course Lo Outcomes Credit Va	Course Learning At the end of this course, the students will be able to— relate the development and scope of Microbiology relate the contributions made by prominent scient including Indian Vedic Knowledge on microbiology demonstrate the nomenclature and characteristics of differ types of microorganisms identify the basic techniques in microbiology explain the methods of microbial control Credit Value O3 Credits Credit = 15 Hours - Learning & Observation Cotal Marks Max, Marks: 100 Minimum Passing marks: 40							
PART Total I Unit			riods (01 Hr. per per pics (Course conte		Periods (45 Hours)	No. of			
r	Leeuwent	and scope of mic logy, Golden era noek, Louis Paster	erobiology - History, of microbiology, C	developr	ons of Anton von	Period 12			
п	classificat classificat features a	Jenner, The Forgotten Past of Microbiology in Indian Vedic Knowledge. Systems of classification — Binomial nomenclature, principles of microbial classification, Whittaker's five kingdom and Carl Woese's three domain classification systems and their utility, Major groups of microorganisms; General features and structure of bacteria, virus, fungi, algae and protozoa.							
ш	streaking, preservati cultivatio applicatio staining,	al culture and si , serial dilution and ion/stocking of p n of fungi, actin ons of Simple stain acid fast staining.	faining techniques — d plating; types of cul- ure cultures; cultiva omycetes and algae, ing, negative staining;	Obtainir ture medi tion of Princip Different	ag pure culture by a, maintenance and anacrobic bacteria, ble, procedure and al staining- Gram's	11			
ΙΫ	Tyndalliz Radiation	staining, acid fast staining. Microbial control — Sterilization: Physical Agents — Heat: Boiling, Tyndallization, Steam under pressure (Autoclave), incineration, hot air Oven. Radiations: Ionizing and non-ionizing radiations. Filtration, Chemical agents — Disinfection, Antiseptic, Germicide, Sanitizer, Principle and application of Laminar airflow, Biological agents - Antibiotics							
	Laminar a	airnow, Biological	agents - Antibiotics oc, Nomenclature, Pur		Ev.				

Name and Signature of Convener and Members of CBoS

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Officer-In-Charge (Academic) Shaheed Nandkumar Patel Vishwavidyalaya, Raigarh (C.G.)

Part - C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

- 1. Microbiology: P. D. Sharma, Rastogi Publications.
- 2. A textbook of Microbiology: R. C. Dubey and Maheshwari, S Chand publications.
- 3. General Microbiology, Vol. II, C. B. Powar and Daginawala
- 4. Fundamentals of Microbiology and Immunology, Ajit Kr. Banerjee and Nirmalya Banerji, Central publication,

Reference Books:

- 1. Microbiology: Pelczar, MJ Chan ECS and Krieg NR, McGraw-Hill.
- 2. Microbiology: 5th Edition Prescot, M.J., Harley, J.P. and Klein, D.A. WCB Mc Graw Hill, New York.
- 3. Microbiology: An Introduction: Pearson Education Tortora, G.J., Funke, B.R. and Case, C.L.,
- 4. Fundamentals of Microbiology: VI Edition Alcomo, I.E., Jones and Bartlett Publishers. Sudbury. Massachusetts, (2001).

Online Resources - e-Resources/ e-Books and e- learning portals

- https://www.jsscacs.edu.in/sites/default/files/Department%20Files/History%20of%20Microbiology.pdf
- https://www.britannica.com/science/microbiology
- https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7810802/
- https://www.slideshare.net/HarinathaReddyA/methods-for-isolation-of-pure-culture
- https://microbenotes-com.webpkgcache.com/doc/-/s/microbenotes.com/sterilization-physical-andchemical-methods/

Part - D: Assessment and Evaluation

Maximum Marks:

100 Marks

Continuous Internal Assessment (CIA): 30 Marks

End Semester Exam (ESE):

70 Marks

Continuous Internal

Internal Test / Ouiz - (2): 20+20 Assignment/ Seminar -10 Better marks out of the two Test/ Quiz

Assessment (CIA):

+ obtained marks in Assignment shall be

(By Course Teacher)

Total Marks -

considered against 30 Marks

End Semester

Two Section - A & B

Exam (ESE):

Section A: Q1. Objective $10 \times 1 = 10 \text{ Mark}$; Q2. Short answer type $-5 \times 4 = 20 \text{ Marks}$ Section B: Descriptive answer type qts., 1 out of 2 from each unit -4X10 = 40 Marks

30

Name and Signature of Convener and Members of CBoS

Officer-In-Charge (Auademic) Shaheed Nandkumar Patel Vishwavidyalaya, Raigarh (C.G.)

7 (8)	-71			COURSE	CURRICU	T.TIM				
	RT-A:		Introducti		COMIGEO	DOM				
Prog	ram: Bac	helor in L	ife Science		Semester	7	<u> </u>			
1 (Ce	Cours	e Code	egree/Honors)	MADOG	Semester I Session: 2024-25 MBSC- 01 P					
2	10.00	e Title	-							
3		е Турс			se – MBSC	-01				
4	_	quisite (If	Ann	Laborator		,				
5			• /	As per pro					,	
3	(CLO	e Learnir V	g Outcomes	At the end	of this cou	rse, the stude	nts will be a	ble to -	.,	
	(020)	,		> det	ine the basic	laboratory pr	actices and s	afety meas	ures	
}				> sele	ect the prope	ciple, working	g and applica	itions of In	struments	
	-			> ide	ntify differer	r culture med it microorgan	ia ior microb	nal growth		
6		t Value		1 Credit	Credit = 30	Hours. Labor	atory or Field	learning/	Training	
DAT	1 Total	Marks		M	lax. Marks:	50		assing mar		
Tota	IN B:	Conten	t of the Cours	e .				- Bonie		
Tota	1140.01	carning-	Fraining/ Perfor	mance Peri	ods: 30 Per	iods (30 Hou	rs)			
M	odule				Course con				No. of	
	Field	1. Good	Laboratory Pract	ices and Dia s	ofoto in Mi	111		,	Period	
Train	ning/ riment	103	tudy the brincinie	and annligation	and af with a la	obiology.	ROD incubat	on hat also		
	ents of	Oven	, laminar air flow,	light microsco	ope.	· · · · · · · · · · · · · · · · · · ·	DOD Incubati	or, not air		
-Cour		4. Isola	aration of culture n	nedia (liquid &	& solid), steríl	ization and ass	essment of ste	rility		
1		techi	nique.	Pring HOIII CIIA	monthineur ph t	our plate, strea	k plate and sp	read plate	1	
		5. Obse	ervation of microon	rganisms - cy	anobacteria, p	rotozoa, fungi.	veasts and a	lage from	30	
1		6. Obse	ral habitats. ervation of bacteria	bu Carre i :		, , ,	, p.i.a /a	.gao man	4	
		7. Stud	y of common fung	i, algae and nr	ning technique	B,	. f			
PAI	RT - C	Learn	ing Resources	, p and pr		temporary / pe	rmanent mou	nts.		
Lexi	BOOKS.	Reference	Rooks and Oth	040					71.	
Text	ROOKS K	ecommend	led:					9.1		
1	Exper	iments in	microbiology, pla	ant pathology	and biotech	nology: K P	\ maia			
	ne Resou		piology: R C Dub	ey and DK	Maheshwari.	'	nieja			
· Onn	TC TCSUL	r ces;	tube.com/watch?							
•	https:	//www.you	tube.com/watch?	v=UndcMyuI v=CbMCr0m	EXS					
PAJ	RT – D	Assess	ment and Eva	I	I V Z W					
Suga	gested C	Ontinuous	Evaluation Met	ination						
IVIAX	muum ly	larks:	51	N/1	š. ≥. t					
. Cont	tinuous Ir	ternal Ass	essment (CTA). 1	5 Marks					*	
Lilly	Semester ntinuous	Exam (E)	SE): 3	5 Marks	I Justine		•	ε,	, Te	
- Ass	essment ((CIA):	Internal Test/ C Assignment/ Ser	uiz → (2):	10 & 10	Better Mark	s out of the t	Wo Test/ O	niz	
(Ву	Course	Teacher)	Total Marks:	muar T Atte	ndance: 05 15	. Tobtained;	marks in Ass	ignment sh	all be	
Enc	l Semest	er Exam	Laboratory/Fie	ld Skill Parfo	rmanass O-	considered	against 15 M	arks	an 06	
(ES	E);					spot Assessme	nt ,	Managed	by	
-			D. Spoume pas	Sed on toole &	toobnolo		Marks Marks	course tea	cher as	
	.0							per lab. st	atus	
(9)	Il Dar	λ. 	Name and Sig	mature of Co	invener and	Members of	CBoS	Λ		

Offiscr-In-Charge (Academic) Shahood Nanchumar Patel Vishwavidyalaya, Raigarh (C.G.)

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PART-A: Introduction Program: Bachelor in Life Science Session: 2024-25 Semester - II (Certificate/Diploma/Degree/Honors) Course Code MBSC-02 T 2 Course Title Bacteriology, Virology and Protozoology Course Type 3 DSC 4 Prerequisite (If Any) As per program 5 Course Learning At the end of this course, the students will be able to -Outcomes (CLO) > recall the ultrastructure of bacteria relate ecological distribution of microorganism and their significances for society illustrate the essential and current knowledge of bacteria Identify virus, protozog and archaebacteria with their special characteristics outline the beneficial & harmful behavior of viruses, bacteria, protozoan and other microbes 6 Credit Value 03 Credits | Credit = 15 Hours - Learning & Observation Total Marks Max. Marks: 100 Minimum Passing marks: 40 PART-B: Content of the Course Total No. of Teaching-Learning Periods (01 Hr. per period) - 45 Periods (45 Hours) No. of UNIT **TOPIC** (Course Contents) Period Morphology and Ultra structure of Bacteria: Cell size, shape and arrangements. Composition, structure and function of cell membrane, cell wall of gram-positive, I 12 gram-negative bacteria, capsule, flagella, pili, ribosomes, inclusions, nucleoid, plasmids. Structure and stages of spore formation. Gram negative, positive bacteria & Archaebacteria: Gram negative and positive bacteria; characteristics and examples - Gram negative (nonproteobacteria-Deinococcus, Spirochetes. Alpha proteobacteria, Rhizobium, Agrobacterium. Gamma proteo-bacteria- Escherichia, Pseudomonas). Gram m 11 positive low G+C; Bacillus, Clostridium, Staphylococcus. High G+C: Streptomyces, Frankia. General characteristics, Ecological significance and economic importance of Archaea: Methanogens, thermophiles (Thermococcus, pyrococcus, thermoplasma) and halophiles (halobacteria and halococcus). Morphology, ultrastructure, Classification & multiplication of viruses: General introduction, morphology and ultra- structure of viruses, capsid, envelopes. Types of Viral genome. Viral related forms -virions, viroids, virusoids, III 11 and prions. Classification of viruses. Salient features and life cycle of viruses: Bacteriophages (T4 & Lambda), Plant (TMV & CMV), Animal (Adenovirus & Pox virus). Introduction to protozoa; Occurrence and classification of protozoa. Structure, reproduction, life cycle and diseases caused by important protozoans - Entamoeba, Uhairi Giardia, Leishmania, Trypanosoma and Plasmodium Key Words Bacteria, Archaea, Virus, Bacteriophage, Prions, Protozoan

Name and Signature of Convener and Members of CBoS

Dant June Roshmi Dacho

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Oniser-In-Charge (Auarlemus) Shahood Nandkumar Patei Vishwavidyalaya, Raigarh (C.G.)

Part – C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

- 1. General Microbiology; Vol I & II, Powar C.B. and Daginawala H. I., Himalay Pub. House, Bombay.
- 2. A Text Book of Microbiology; Dubey & Malieshwari.
- 3. A Text Book of Microbiology; R. P. Singh.
- 4. Fundamentals of Microbiology and Immunology, Ajit Kr. Bancrjee and Nirmalya Bancrji, Central publication.
- 5. Parasitology; H.S. Singh and P. Rastogi, First Edition, Rastogi Publications.

Reference Books:

- 6. Prescott's Microbiology. Wiley J M, Sherwood L M and Woolverton C J.
- 7. Microbiology. Pelczar M J, Chan E C S and Krieg N R.
- 8. General Microbiology. Stanier R Y, Ingraham J L, Wheelis M L, and Painter P R.
- 9. Microbiology: An Introduction. Tortora G J, Funke B R and Case C L.

Online Resources - e-Resources/ e-Books and e- learning portals

- https://www.ncbi.nlm.nih.gov/books/NBK8477 /
- https://www.britannica.com/science/archaea
- https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7150055/
- https://nios.ac.in/media/documents/dmlt/Microbiology/Lesson-53.pdf
- http://ecoursesonline.iasri.res.in/Courses/Agricultural%20Microbiology/

Part-D: Assessment and Evaluation

Sygnostad	Continuous	Estalonation	37.41. 1
Suggested	Communuous	Evaluation	wiethods:

Maximum Marks:

100 Marks

Continuous Internal Assessment (CIA): 30 Marks

End Semester Exam (ESE):

70 Marks

Continuous	Interna
Assessment	(CIA):

Internal Test / Quiz - (2): 20+20 Assignment/Seminar -10 Better marks out of the two Test/ Quiz

Total Marks -

+ obtained marks in Assignment shall

be considered against 30 Marks

(By Course Teacher) **End Semester**

Exam (ESE):

Two Section - A & B

Section A: Q1. Objective $10 \times 1 = 10 \text{ Mark}$; Q2. Short answer type $-5 \times 4 = 20$

30

Marks

Section B: Descriptive answer type qts., 1 out of 2 from each unit - 4X10 = 40

Name and Signature of Convener and Members of CBoS

Vishwavidyalaya, Raigarh (C.G.)

*	No. Assay No.	COURSE CORRECTED				
PART-	A: Introdu			2024.25		
Certificat	achelor in Life Science te/Diploma/Degree/Honors)	Semester - II	Sessi	on: 2024-25		
1 Co	ourse Code	MBSC-02 P	,			
2 Co	ourse Title	Lab. Course - MBSC-02	- In the second			
3 Cc	ourse Type	Laboratory Course				
4 Pr	erequisite (If Any)	As per program				
	ourse Learning utcomes (CLO)	At the end of this course, the students will be able to — > culture microorganisms and get the knowledge about their morphological features > illustrate different staining procedures > identify bacteria and protozoa from different samples > get practice of identification of colonics on different culture media				
6 C	redit Value	1 Credit Credit = 30 H	Hours. Laboratory or Fiel	d learning/Training		
7 T	otal Marks	Max. Marks: 50	Min. Passing	g marks: 20		
PART-	-B: Content of the C	Course				
Total No	o. of learning-Training/Po	erformance Periods: 30 Peri	ods (30 Hours)			
Module	4	Topics (Course conten		No. of Period		
• ***	The second secon	erization of bacteria by colony cl				
Training Experiments Course	of 4. Differential Staining 5. Special Staining Tec 6. Study of cytopathic 7. Observation of protes	edia — Nutrient agar and Nutrient media — Blood agar, Chocolate a Techniques: Gram staining and a Inniques: Negative staining and E effects of viruses using photograph coa from different samples.	gar, Maconkey's, and EM acid-fast staining indospore staining hs.	B agar. 30		
		ı, Staining Techniques, Cytopat	hic effects, Protozoa			
PART			1.			
	ooks, Reference Books and	1 Others	With the state of			
1. Lab 2. Prac 3. Lab	ctical Microbiology: R. C. Do oratory Manual in Microbiolo Resources:	gy: P. Gunasekaran.	, , , , , , , , , , , , , , , , , , ,			
	https://books.google.co.in/bo	oks?id=Wh9OTbjcsfUC&prints	sec= age&q&l=lalse			
PART		d Evaluation	· · · · · · · · · · · · · · · · · · ·	7 500 000		
Maximu Continu	ed Continuous Evaluation ım Marks: ous Internal Assessment (CI nester Exam (ESE):	50 Marks				
Contin	uous Internal Internal Te	est/Quiz – (2): 10 & 10 t/Seminar + Attendance: 05 ks – 15	Better Marks out of the + obtained marks in a considered against 15	Assignment shall be		
End Se Exam (mester (ESE): Laborator A. Perfor B. Spottin C. Viva-v	y/ Field Skill Performance: On med the Task based on lab. wor ng based on tools & technology oce (based on principle/ technol	spot Assessment k – 20 Marks (written) – 10 Marks logy) – 05 Marks	Managed by a course teacher a per labi status		
(D)	Name and	Signature of Convener and	Members of CBoS	lan On ic		

Officer-In-Charge (Auademic) Shahood Nandkumar Patel Vishwavidyalaya, Raigarh (C.G.)

	The Introduction	URSE CURRICULUM				
Conti	: Bachelor in Life Calan					
(Certi	licate/Diploma/Degree/Honore)	Semester - I	Session	ı: 2024-25		
4	Course Code	MBGE-01 T				
2	Course Title	Introductory Microbiology a	nd Microbial	techniques		
3	Course Type	Generic Elective (GE) As per Program				
4	Prerequisite (If Any)					
5	Course Learning Outcomes At the end of this course, the students will b					
	(CLO)	> relate the development				
	(CLO)	illustrate the contribution				
•		scientists including Indi				
في :			an venic Kliov	vicugo on		
		microbiology		natoviation o		
		> demonstrate the nomeno		acteristics o		
		different types of micro	organisms			
		identify the basic techni	ques in microb	iology		
	G 111-5 3	> explain the methods of a				
6	Credit Value	03 Credits Credit = 15 Hou	rs - Learning &	Observation		
7	Total Marks	Max. Marks: 100 · M	inimum Passin	g marks: 4		
<u> </u>	Γ-B: Content of the Cou	se				
Total I	No. of Teaching-Learning Period	se s (01 Hr. per period) - 45 Period		No. of		
<u> </u>	No. of Teaching-Learning Period Topics	se (01 Hr. per period) - 45 Period (Course contents)	Is (45 Hours)			
Total I	No. of Teaching-Learning Period Topics History and scope of microb	se (01 Hr. per period) - 45 Period (Course contents)	As (45 Hours) and Scope of	No. of		
Total I Unit	Topics History and scope of microbiology, Contributions of A	(Course contents) Tology - History, development Anton von Leeuwenhoek, Louis P	Is (45 Hours) and Scope of asteur, Robert	No. of		
Total I	Topics History and scope of microbiology, Contributions of Koch, Alexander Fleming and	(Course contents) fology - History, development Anton von Leeuwenhoek, Louis Pd Edward Jenner, The Forgo	Is (45 Hours) and Scope of asteur, Robert	No. of Period		
Total I Unit	Topics History and scope of microbi Microbiology, Contributions of A Koch, Alexander Fleming an Microbiology in Indian Vedic Kr	(Course contents) cology – History, development anton you Leeuwenhoek, Louis Pd Edward Jenner, The Forgonowledge.	and Scope of asteur, Robert often Past of	No. of Period		
Total I Unit	Topics History and scope of microbi Microbiology, Contributions of A Koch, Alexander Fleming an Microbiology in Indian Vedic Kn Nomenclature and General	(Course contents)	and Scope of Pasteur, Robert often Past of	No. of Period		
Total I Unit	Topics History and scope of microbiology, Contributions of A Koch, Alexander Fleming an Microbiology in Indian Vedic Kr. Nomenclature and General nomenclature, principles of	(Course contents) (Course contents) (Course contents) (Anton von Leeuwenhoek, Louis Pd Edward Jenner, The Forgonowledge. features of microorganisms microbial classification, Major	and Scope of Pasteur, Robert of Binomial regroups of	No. of Period		
Total I Unit	Topics History and scope of microbi Microbiology, Contributions of A Koch, Alexander Fleming an Microbiology in Indian Vedic Kn Nomenclature and General	(Course contents) (Course contents) (Course contents) (Anton von Leeuwenhoek, Louis Pd Edward Jenner, The Forgonowledge. features of microorganisms microbial classification, Major	and Scope of Pasteur, Robert of Binomial regroups of	No. of Period		
Total I Unit	Topics History and scope of microbiology, Contributions of A Koch, Alexander Fleming an Microbiology in Indian Vedic Kr. Nomenclature and General nomenclature, principles of microorganisms; General feature and protozoa.	(Course contents) (Course contents) (Course contents) (Index of the contents) (Index of the course of the cour	and Scope of asteur, Robert of the Past of Binomial regroups of s, fungi, algae	No. of Period		
Total? Unit I	Topics History and scope of microbiology, Contributions of A Koch, Alexander Fleming an Microbiology in Indian Vedic Kn Nomenclature and General nomenclature, principles of microorganisms; General feature and protozoa. Microbial culture and stain	(Course contents) (Course contents) (Course contents) (Index of the contents) (Index of the course of the cour	and Scope of asteur, Robert of Binomial r groups of s, fungi, algae e techniques:	No. of Period		
Total? Unit I	Topics History and scope of microbiology, Contributions of A Koch, Alexander Fleming an Microbiology in Indian Vedic Knomenclature and General nomenclature, principles of microorganisms; General feature and protozoa. Microbial culture and stain streaking, serial dilution and plate	(Course contents) (Course contents) (Course contents) (Index of the contents) (Index of the course of the cour	and Scope of asteur, Robert of the Past of Binomial regroups of s, fungi, algae techniques: ration of fungi	No. of Period 12		
Total? Unit I	Topics History and scope of microbiology, Contributions of A Koch, Alexander Fleming and Microbiology in Indian Vedic Knomenclature and General nomenclature, principles of microorganisms; General feature and protozoa. Microbial culture and stain streaking, serial dilution and plat and algae. Principle, procedure	(Course contents) (Course conte	and Scope of asteur, Robert of the Past of Binomial regroups of s, fungi, algae techniques: ration of fungi	No. of Period		
Total? Unit I	Topics History and scope of microbiology, Contributions of A Koch, Alexander Fleming an Microbiology in Indian Vedic Knomenclature and General nomenclature, principles of microorganisms; General feature and protozoa. Microbial culture and stain streaking, serial dilution and plate	(Course contents) (Course conte	and Scope of asteur, Robert of the Past of Binomial regroups of s, fungi, algae techniques: ration of fungi	No. of Period 12		
Total? Unit I	Topics History and scope of microbiology, Contributions of A Koch, Alexander Fleming and Microbiology in Indian Vedic Knomenclature and General nomenclature, principles of microorganisms; General feature and protozoa. Microbial culture and stain streaking, serial dilution and plat and algae. Principle, procedure	(Course contents) (Course conte	and Scope of asteur, Robert of Past of Binomial regroups of s, fungi, algae e techniques: ration of fungining, negative	No. of Period 12		
Total? Unit I	Topics History and scope of microbiology, Contributions of A Koch, Alexander Fleming an Microbiology in Indian Vedic Knomenclature and General nomenclature, principles of microorganisms; General feature and protozoa. Microbial culture and stain streaking, serial dilution and plat and algae. Principle, procedure staining; Differential staining- Grimicrobial control — Steriliz Tyndallization, Steam under pre	(Course contents) (Course conte	and Scope of asteur, Robert of Past of Binomial regroups of s, fungi, algae e techniques: ration of fungining, negative eat: Boiling, hot air Oyen.	No. of Period 12		
Total? Unit I	Topics History and scope of microbiology, Contributions of A Koch, Alexander Fleming an Microbiology in Indian Vedic Knomenclature and General nomenclature, principles of microorganisms; General feature and protozoa. Microbial culture and stain streaking, serial dilution and plat and algae. Principle, procedure staining; Differential staining- Grimicrobial control — Steriliz Tyndallization, Steam under pre	(Course contents) (Course conte	and Scope of asteur, Robert of Past of Binomial regroups of s, fungi, algae e techniques: ration of fungining, negative eat: Boiling, hot air Oyen.	No. of Period 12		
Total? Unit I	Topics History and scope of microbiology, Contributions of A Koch, Alexander Fleming an Microbiology in Indian Vedic Kr. Nomenclature and General nomenclature, principles of microorganisms; General feature and protozoa. Microbial culture and stain streaking, serial dilution and plat and algae. Principle, procedure staining; Differential staining-Gi. Microbial control — Steriliz Tyndallization, Steam under pre Radiations: Ionizing and non-ion	(Course contents) (Anton von Leeuwenhoek, Louis Particulation of Edward Jenner, The Forgonomic of Edward Jenner, The Forgonomic of Edward Jenner, The Forgonomic of Edward Jenner, Major of Edward Structure of Bacteria, virus of Edward Structure of Bacteria, virus of Edward Edward Structure of Simple stain and applications of Simple stain am's staining, acid fast staining, acid fast staining. (Autoclave), incineration, izing radiations. Filtration, Chemical Structure of Edward Structure of Edward Structure of Edward Structure of Bacteria, virus of Edward Structur	and Scope of asteur, Robert of the Past of Binomial regroups of strong, algae techniques: ration of funging, negative eat: Boiling, hot air Oven.	No. of Period 12		
Total? Unit I	Topics History and scope of microbiology, Contributions of A Koch, Alexander Fleming an Microbiology in Indian Vedic Knomenclature and General nomenclature, principles of microorganisms; General feature and protozoa. Microbial culture and stain streaking, serial dilution and plat and algae. Principle, procedure staining; Differential staining- Grimicrobial control — Steriliz Tyndallization, Steam under pre	(Course contents) (Anton von Leeuwenhoek, Louis Particulation of Edward Jenner, The Forgonomic of Edward Jenner, The Forgonomic of Edward Jenner, The Forgonomic of Edward Jenner, Major of Edward Structure of Bacteria, virus of Edward Structure of Bacteria, virus of Edward Edward Structure of Simple stain and applications of Simple stain am's staining, acid fast staining, acid fast staining. (Autoclave), incineration, izing radiations. Filtration, Chemical Structure of Edward Structure of Edward Structure of Edward Structure of Bacteria, virus of Edward Structur	and Scope of asteur, Robert of the Past of Binomial regroups of s, fungi, algae techniques: ration of fungining, negative teat: Boiling, hot air Oven. mical agents in application of	No. of Period 12 11		
Total? Unit I II III	Topics History and scope of microbiology, Contributions of A Koch, Alexander Fleming an Microbiology in Indian Vedic Kromenclature and General nomenclature, principles of microorganisms; General feature and protozoa. Microbial culture and stain streaking, serial dilution and plate and algae. Principle, procedure staining; Differential staining- Gromicrobial control — Steriliz Tyndallization, Steam under pre Radiations: Ionizing and non-ior types, Disinfection, Antiseptic, Gromicrobiology.	(Course contents) (Anton von Leeuwenhoek, Louis Particulation of Edward Jenner, The Forgonomic of Edward Jenner, The Forgonomic of Edward Jenner, The Forgonomic of Edward Jenner, Major of Edward Structure of Bacteria, virus of Edward Structure of Bacteria, virus of Edward Edward Structure of Simple stain and applications of Simple stain am's staining, acid fast staining, acid fast staining. (Autoclave), incineration, izing radiations. Filtration, Chemical Structure of Edward Structure of Edward Structure of Edward Structure of Bacteria, virus of Edward Structur	and Scope of asteur, Robert of Past of Binomial regroups of s, fungi, algae etechniques: ration of fungining, negative eat: Boiling, hot air Oven. mical agents in application of	No. of Period 12 11 11		

Name and Signature of Convener and Members of CBoS

Officer-In-Charge (Academic) Shaheed Nandkumar Patel Vighwavidyalaya, Raigarh (G.C.)

part - C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

1. Microbiology: P. D. Sharma, Rastogi Publications.

2. A textbook of Microbiology: R. C. Dubey and Maheshwari, S Chand publications.

3. General Microbiology, Vol. II, C. B. Powar and Daginawala

4. Fundamentals of Microbiology and Immunology, Ajit Kr. Banerjee and Nirmalya Banerji, Central publication.

Reference Books:

1. Microbiology: Pelczar, MJ Chan ECS and Krieg NR, McGraw-Hill.

2. Microbiology: 5th Edition Prescot, M.J., Harley, J.P. and Klein, D.A. WCB Mc Graw Hill, New York.

3. Microbiology: An Introduction: Pearson Education Tortora, G.J., Funke, B.R. and Case, C.L., Singapore.

4. Fundamentals of Microbiology: VI Edition Alcomo, I.E., Jones and Bartlett Publishers. Sudbury. Massachusetts, (2001).

Online Resources - e-Resources/ e-Books and e-learning portals

https://www.jsscacs.edu.in/sites/default/files/Department%20Files/History%20of%20Microbiology.pdf

https://www.britannica.com/science/microbiology

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7810802/

https://www.slideshare.net/HarinathaReddyA/methods-for-isolation-of-pure-culture

https://microbenotes-com.webpkgcache.com/doc/-/s/microbenotes.com/sterilization-physical-andchemical-methods/

Part - D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

100 Marks Maximum Marks:

Continuous Internal Assessment (CIA): 30 Marks

70 Marks End Semester Exam (ESE):

Internal Test / Quiz - (2): 20+20 Continuous Internal

Better marks out of the two Test/ Quiz + obtained marks in Assignment shall be Assignment/ Seminar -Assessment (CIA): considered against 30 Marks 30

Total Marks -(By Course Teacher) Two Section - A & B

End Semester Exam (ESE):

Section A: Q1. Objective 10 X 1 = 10 Mark; Q2. Short answer type - 5X4= 20 Marks Section B: Descriptive answer type qts., 1 out of 2 from each unit - 4X10 = 40 Marks

Name and Signature of Convener and Members of CBoS

Officer-in-Charge (Academic) Shaheed Nandkumar Patel Vishwavidyalaya, Raigarh (C.G.)

- LOM	A	COURSE CURRICULUM						
PART.		etion						
Program (Certific	: Bachelor in Life Science cate/Diploma/Degree/Honors)	Semester	I	Session: 2024- 25				
1	Course Code	MBGE- 01 P	MBGE-01 P					
.2	Course Title	Lab. Course - MBGE- 01		1				
3	Course Type	Laboratory Course						
4	Prerequisite (If Any)	As per Program						
5	Course Learning Outcomes (CLO)	At the end of this course, to define the basic labo microbiology laborat explain the principle, Instruments > select the proper cult	At the end of this course, the students will be able to — > define the basic laboratory practices and safety measures i microbiology laboratory > explain the principle, working and applications of laborator Instruments > select the proper culture media for microbial growth					
6	Credit Value	1 Credit Credit = 30 Hours	s Laboratory or Fi	ield learning/Training				
7	Total Marks	Max, Marks:		Min. Passing marks: 20				
PART	-B: Content of the Cou	rse						
Total N	No. of learning-Training/Per	ormance Periods: 30 Period	s (30 Hours)	No. of				
Mod		Topics (Course contents)		Period				
Course	sterility 4. Isolation of microo spread plate technic	rganisms from environment by pour plate, streak plate and ue. oorganisms-fungi, yeasts and algae from natural habitats. eria by Gram staining technique.						
PAR'	Γ-C: Learning Resource		v.					
Text F	Books, Reference Books and C	thers						
Text I	Books Recommended: Experiments in microbiology, Practical microbiology: R C D	plant pathology and biotechnology	ogy; K R Aneja					
	e Resources: https://www.youtube.com/watc https://www.youtube.com/watc	h?v=IIndcMyuEXs						
PAR'	T-D: Assessment and E	valuation	,					
Sugge Maxir Contin	sted Continuous Evaluation N num Marks: nuous Internal Assessment (CIA) emester Exam (ESE):	Iethods: 50 Marks : 15 Marks 35 Marks						
Asses (By (Course Teacher) Total Marks:	Seminar + Attendance: 05 + 15 b	obtained marks in e considered again	f the two Test/ Quiz n Assignment shall nst 15 Marks				
End (ESE	A. Performed B. Spotting be C. Viva-voce	ield Skill Performance: On spot the Task based on lab, work — ised on tools & technology (writ based on principle/ technology)	20 Marks ten) - 10 Marks – 05 Marks	Managed by course teacher as per lab. status				
	Name and Sig	nature of Convener and Men	nbers of CBoS	Cyliman Cyliman				

Officer-In-Charge (Acade unc)
Shahood Nandkumar Patel
Vishwavidyalaya, Raigarh (C.G.)

umar Palel a, Raigarh (C.G

		COURSE CUR	RICULUM						
ART-									
	Bachelor in Life Science	Se	mester - II	Session	1: 2024-25				
	cate/Diploma/Degree/Honors) Course Code		inester II						
	Course Title	MBGE-02 T							
	Course Type	Bacteriology, Virology and Protozoology							
			Generic Elective (GE) As per Program						
	Prerequisite (If Any)	As per Program	m the students	will be able to	0 -				
5	Course Learning Outcomes (CLO)		is course, the students	Will be able to					
	Outcomes (CLO)	> relate eco	 recall the ultrastructure of bacteria relate ecological distribution of microorganism and their significances for society 						
		1	it and curren	nt knowledge	of bacteria				
		> identify v	irus, protozoa and archaeo	acteria with the	eir speciai				
		character	istics e beneficial & harmful b	ehavior of viru	ses, bacteria,				
,	2 1	protozoar	and other microbes						
6	Credit Value	03 Credits	Credit = 15 Hours - Lea	rning & Obse	rvation				
7	Total Marks		arks: 100 Min	imum Passin	g marks: 40				
Ann	Contant of the C	Ource							
Cotal	No. of Teaching-Learning Pe	riods (01 Hr. per	period) - 45 Periods (4	45 Hours)					
			`		No. of				
IINU	T	OPIC (Course	Contents)		Period				
1	Morphology and Ultra structure and gram-negative bacteria, cap				12				
,	plasmids. Eubacteria & Archaebe proteobacteria—Deinococcu Agrobacterium. Gamma positive-Characteristics of	s, Spirocheies. proteo-bacteria- low G+C: Bacilli	Escherichia, Pseudom is, Clostridium, Staphylo	onas. Gram	11				
π	G+C: Streptomyces, Franki Ecological significance an thermophiles (Thermococ	d economic imp cus, Pyrococcus)	ortance of Archaea: N and halophiles (halo	Methanogens, bacteria and	-				
m	viruses: Bacteriophages (Te	capsid, envelopes usoids, and prior 4), Plant Virus (ns. Salient features and rMV), Animal Virus (Po	life cycle of ox virus).					
IV	Leishmania, Trypanosoma	diseases caused t and <i>Plasmodium</i>	y important protozoans -	Entamoeva,	Chairmar Studio 11				
Key '	Words Bacteria, Archaea, V	irus, Bacteriop	hage, Prions, Protozos	TRoS	Augusta 12				
	Name and Signal	mature of Conv	Poshor 10.6.27	A A	Drie Drie Nellan Xel				
	Dr. Raidon Claud	y Ton	6 by	e (Acadamic)					

Officer-In-Charge (Academic)
Shaheed Nandhumar Patel
Vishwavidyalaya, Raigarh (C.G.)

Part - C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

- 1. General Microbiology; Vol I & II, Powar C.B. and Daginawala H. I., Himalay Pub. House, Bombay.
- 2. A Text Book of Microbiology; Dubcy & Malicshwari.
- 3. A Text Book of Microbiology; R. P. Singh. 4. Fundamentals of Microbiology and Immunology, Ajit Kr. Banerjee and Nirmalya Banerji, Central
- publication. 5. Parasitology; H.S. Singh and P. Rastogi, First Edition, Rastogi Publications.

Reference Books:

- 6. Prescott's Microbiology. Wiley J.M, Sherwood L M and Woolverton C J.
- 7. Microbiology. Pelczar M J, Chan E C S and Krieg N R.
- 8. General Microbiology. Stanier R Y, Ingraham J L, Wheelis M L, and Painter P R.
- 9. Microbiology: An Introduction. Tortora G J, Funke B R and Case C L.

Online Resources - e-Resources/ e-Books and e- learning portals

- https://www.ncbi.nlm.nih.gov/books/NBK8477 /
- https://www.britannica.com/science/archaea
- https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7150055/
- https://nios.ac.in/media/documents/dmlt/Microbiology/Lesson-53.pdf
- http://ecoursesonline.insri.res.in/Courses/Agricultural%20Microbiology/

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 10 Better marks out of the two Test/ Quiz

Assessment (CIA):

Assignment/ Seminar -30 + obtained marks in Assignment shall be

considered against 30 Marks

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

Total Marks -Two Section - A & B

Section A: Q1. Objective 10 X 1 = 10 Mark; Q2. Short answer type - 5X4= 20 Marks

Section B: Descriptive answer type qts., 1 out of 2 from each unit -4x10 =

Name and Signature of Convener and Members of CBoS

Vishwavidyalaya, Raigarh (C.G:)

		COURSE	CURRICUL	UM '				
PART - A:		ction						
	ielor in Life Science Diploma/Degree/Honors)		Semester - :	ίΙ	Session: 202	24-25		
	se Code	MBGE-02	P					
2 Cours	sc Title	Lab. Cours	se - MBGE-02	,				
3 Cours	ве Туре	Laborator	***************************************		, , , , , , , , , , , , , , , , , , , ,			
4 Prere	quisite (If Any)	As per Program						
5 Cour (CLC	se Learning Outcomes	At the end of this course, the students will be able to— > culture microorganisms and get the knowledge about their morphological features > illustrate different staining procedures > identify bacteria and protozoa from different samples > get practice of identification of colonies on different culture						
(Creati	it Value	media 1 Credit	Credit = 30 H	ours. Laborat	ory or Field learning.	Training		
			Marks: 50	M	in. Passing marks:	20		
	Marks		Marks. 20					
raki - B	: Content of the Co learning-Training/Per	Common D.	eriods: 30 Pe	riods (30 Ho	urs)	37F		
Total No. of	learning-Training/ Per	Tormance P	ci ious. Jo i o	-4-1		No. of Period		
Module	1. Isolation and character	" Topics (Course conte	nts)		Lond		
Experiment contents of Course Key Words PART - C	 Differential Staining T Special Staining Techn Study of cytopathic eff Observation of protozo Isolation, Identification, Learning Resour 	edia — Blood a cechniques: Graiques: Negativets of viruses a from different staining Technics.	am staining and ve staining and using photogra	acid-fast stain Endospore stai phs.	ning	30		
Text Books I	Reference Books and C Recommended: y Manual of Microbiolog Microbiology: R. C. Dube y Manual in Microbiology:	y and Biotech	Janeshwaii.	K. R				
	urces: //books.google.co.in/books	?id=Wh9OTI	ojesfUC&print	sec= age&q&	<u>f=false</u>	· ·		
PART-D	Assessment and	Evaluation		···········				
Suggested Co	ntinuous Evaluation M arks: ternal Assessment (CIA): Exam (ESE): nternal Internal Test/ Assignment/ S Cacher) Total Marks: Laboratory/ F A. Performe B. Spotting	ethods: 50 Marks 15 Marks 35 Marks Quiz — (2): Seminar + Att ield Skill Period the Task ba	10 & 10 endance: 05 15	+ obtained be consider spot Assessment rk - 20 v (written) - 10	Marks course to	ent shall ks d by acher as		
Band Of	Name and Signal	nature of Co	Roshmin 10.6.24	Members of C	ONCLOR IN	W Walt		

Officer-In-Charge (Academic) Shahood Nandkumar Patel Vishwavidyalaya, Raigarh (C.G.)

FOUR YEAR UNDERGRADUATE PROGRAM (2024 - 28) DEPARTMENT OF MICROBIOLOGY

				COURSE C	URRICUI	LUM			
AR	Γ-A:		Introduc	ction					
_			n Life Science ma/Degree)	Semester	· - II/ IV/	V/VI	Session: 2024	1-25	
1	Course		ли, в св. со)	MBSEC-01					
2	Course	e Title Mushroom Cultivation							
3	Course			Skill Enhand	cement Co	urse (SE	C)		
4	Prereq	uisite ((If Any)	As nor Prog	rām		4.		
5	Course Learning Outcomes (CLO)			> explain i > relate the > examine > attain ex	types of i the metho pertise usions	mushroom ds of culti ng differen	einal values of mushrooms and their spawn preply vation and economic and Agro-residues for cultural transfer of mushrooms	aration spects Itivation o	
				> observe	Cuadit =	15 Hrs. T	heoretical Learning an	z and	
6	Credit	Value		02 Credits (1C + 1C)	= 30 Hrs	. Laborate	ory or fletti teat to be		
7	Total I	Marks		Max. Mar	ks: 50	Mi	nimum Passing mark	rks: 20	
	Theory	– 15 Pe	eriods (15 Hrs.)	No. of Teachin and Lab. or Fi	eld Learm	ng / man	ning 30 Periods (30 Ho	No. of Period	
M	odule			Topics (Co	urse Conte	ents)	i dilia and	Periou	
	heory ntents	noned mush of m (Calo mush Princ mediu	room cultivation. ushrooms; Butto cybe indica), Oy room (Volvariella iples and Requi	Taxonomic poson mushroom ster mushroom volvacea). (Obsites: Sterilizati	ition and I (Agaricus (Pleurotus	Life cycle biporus) s sajor ka	cation of edible and mushroom, Scope of of mushroom. Types of Milky mushroom (ju) and paddy straw of substrates, growth maintenance.	15	
(Observation) Techniques of Cultiva			onal and Green in huts, Compos ning (Observati	n house mating, bed a on).	and polyth	iene dag preparation,			
Tra	o./Field aining	1.Prep 2.Bas 3.Ster 4.Ider 5.Prep	paration of laboration aboration aboration and sani attification of ediboration of Motheration o	tory Glassware out autoclave, h tation of mushre le and poisonou	(Chemical ot air oven oom house is mushroo	i, laminar i , instrume ms.	cleaning and drying). air flow nts etc. ion, Inoculation, and	30	
	ntents	7.Cult 10.Ha	paration of differe	oom using com -harvest manag	post/ paddy ement of c	y straw/ag rops. (Obs	Chairman ricultural wastes ervation & Practice)	Pitsl	
1	Key Wor	us	Name and Sig					-	

Danielly Delivy Japanes June 24

Officer-In-Charge (Acade Inte)
Shahood Nandkumar Patel
Vishwavidyalaya, Haigarh (C.G.)

Part - C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

- 1. Nita Bhal. (2000). Hand book on Mushrooms. 2nded. Vol. I and II. Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi.
- 2. Tewari, S. C., Pankaj Kapoor, (1988). Mushroom Cultivation. Mittal Publication, New Delhi.
- 3. Biotechnology, V. Kumaresan.

1. Stamets, Paul, and J.S. Chilton. 1983. The Mushroom Cultivator. Agarikon Press, Olympia, WA. 415 p. Reference Books:

Online Resources - e-Resources/ e-Books and e-learning portals

- https://nios.ac.in/media/documents/vocational/mushroom production (revised)(618)/Lesson
 - https://agriportal.cg.nic.in/horticulture/PDF/Download/Mushroom%20Project Part%201.pdf
 - http://nhb.gov.in/pdf/Cultivation.pdf

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 Assessment (CIA): (By Course Teacher)

10 & 10 Internal Test/Quiz-(2): Assignment/Seminar + Attendance: 05 Total Marks:

Better Marks out of the two Test/ Quiz + obtained marks in Assignment shall be considered against 15 Marks

End Semester

Laboratory/Field Skill Performance: On spot Assessment

20 Marks

Managed by Coordinator as per skilling

Exam (ESE):

A. Performed the Task based on lab. work-B. Spotting based on tools & technology (written) - 10 Marks

05 Marks

C. Viva-voce (based on principle/ technology) -Name and Signature of Convener and Members of CBoS

Shaheod Nandkumar Patel Vishwavidyalaya, Raigarh (C.G.)