SHRI DAVARA UNIVERSITY

NAYA RAIPUR (C.G.)

PROGRAMME CURRICULUM

FOR

BECHELOR IN LIFE SCIENCES

(MICROBIOLOGY)

SEMESTER-III

AS PER EDUCATION POLICY-2020

AND

NATIONAL EDUCATION POLICT-2025

FOUR YEAR UNDERGRADUATE PROGRAMME- 2024-25

(EFFECTIVE FROM THE SESSION-2024-2025)

SEMESTER III

S.NO	COURSE CODE	COURSE TITLE	TEACHING HOURS PER WEEK				EXAMINATION SCHEME				
DISCIPLINE SPECIFIC COURSE (DSC)			L	T	P	C	THEORY		PRACTICAL		TOTAL MARKS
							EX	IN	EX	IN	
1.	CHSC-03T	INORGANIC AND PHYSICAL CHEMISTRY - I	3	0	0	3	70	30	-	-	100
2.	BOSC-O3T	ARCHEGONIATE AND FOSSILS	3	0	0	3	70	30	-	-	100
3.	MBSC-03T	CELL BIOLOGY AND BIOCHEMISTRY	3	0	0	3	70	30	-	-	100
DISCIPLINE GENERAL ELECTIVE COURSE (GE)/DISCIPLINE SPECIFIC ELECTIVE COURSE (DSE)											
4.	SCGE-03	BASICS OF NUTRITION	3	1	0	4	70	30	-	-	100
5,	MBSE-01T	MICROBIAL ENZYME TECHNOLOGY	3	0	0	3	70	30	-	-	100
ABILITY ENHANCEMENT COURSE (AEC)											
6.	AEC-03	ENVIRONMENTAL STUDIES	2	0	0	2	35	15	-	-	50
VALUE ADDITION COURSE (VAC)											
7.	VAC-03	DISASTER MANAGEMENT	2	0	0	2	35	15	-	-	50
PRACTICALS (LAB)											
8.	CHSC-03P	INORGANIC AND PHYSICAL CHEMISTRY – I LAB COURSE	0	0	2	1	-	-	35	15	50
9.	BOSC-O3P	ARCHEGONIATE AND FOSSILS LAB COURSE	0	0	2	1	-	-	35	15	50
10.	MBOSC-03P	CELL BIOLOGY AND BIOCHEMISTRY LAB COURSE	0	0	2	1	-	-	35	15	50
11.	MBSE-01P	MICROBIAL ENZYME TECHNOLOGY LAB COURSE	0	0	2	1	-	-	35	15	50
Total Contact hours Per Week:30		Total credit:				20	Total mark				650/700

FOUR YEAR UNDERGRADUATE PROGRAMME (2024-28)

DEPARTMENT OF CHEMISTRY

COURSE CURRICULUM

PART-A: Introduction			
Programme: Bachelor in Life Sciences (Certificate/Diploma/Degree Honors)		**Semester-III**	**Session: 2024-2025**
Course Code	**CHSC-03T**		
Course Title	**INORGANIC AND PHYSICAL CHEMISTRY - I**		
Course Type	**Discipline Specific course (DSC)**		
Pre-requisite (if any)	**As per program**		
Course Learning. Outcomes (CLO)	**At the end of this course, the students will be able to** ➢ **Understand Fundamental chemical concepts of transition elements and their applications.** ➢ **Master the principles of coordination chemistry.** ➢ **Grasp the core principles of thermodynamics and apply them to various phenomena.** ➢ **Explore the world of electrochemistry and its applications**.		
Credit Value	**3 Credits**	**Credit =45 Hours-learning & Observation**	
Total Marks	**Max. Marks: =100**	**Min Passing Marks: 40**	

PART -B: Content of the Course		
Total No. of Teaching-learning Periods (01 Hr. per period) -45 Periods (45 Hours)		
Unit	Topics (Course contents)	
I	**Chemistry of d & f-block elements** **A. d-block elements (f hrs.)** Chemistry of elements of first transition series: Characteristic properties of the elements of first transition series with reference to their: Electronics configuration, Atomic and ionic radii, Ionization potential, Variable oxidation states, Magnetic properties, Color, Complex formation tendency and catalytic activity. 1. Chemistry od elements of second and third transition series: Electronic configuration of 4d and 5d transition series. Comparative treatment with their 3d-analogous (Group Cr-Mo-W, Co-Rh-Ir) in respect of oxidation states and magnetic behavior. **B. F-block elements (6hrs.)** Chemistry of Lanthanide & Actinides: Electronic structure, oxidation states, ionic radii, magnetic, and spectral properties. Lanthanide contraction and its consequences, extraction and ion exchange method. General features **and**	12

	Chemistry of actinides, Transuranic elements, chemistry of separation of Mp, Pu and Am from Am from uranium, similarities between the later actinides and the later lanthanides.	
II	**Oxidation and reduction (5 Hrs.)** Various definitions of oxidation and reduction, Balancing of redox reaction by ion-electron method, Latimer diagram of Chlorine and Oxygen, Frost diagram of Mitogen and Oxygen and Pourbaix diagrams of Iron. Predicting disproportionation and comproportionating phenomena. **Coordination Chemistry (6 Hrs)** A. Coordination compounds: Distinction among simple salts, double salts, and coordination compounds. Terminology and nomenclature of Coordination Compounds. Types of ligands based on denticity. Werner's Coordination theory and its experimental verification. Sidgwick's electronic interpretation Ean rule with examples. Electroneutrality principle, Valence Bond Theory of transition metal complexes. Determination of structures and magnetic properties of complexes based on VBT. Chelates: Classification and their application. **B)** Isomerism in coordination compounds: structural isomerism and Stereoisomerism (Geometrical and optical) in coordination compounds with four and six coordination numbers.	11
III	**Thermodynamics-I: (5 Hrs.)** **A.** Basic concept of thermodynamics: System, surrounding, types of system (closed, open & isolated). Intensive & extensive properties. Thermodynamics processes: isothermal, adiabatic, isobaric, isochoric, isochoric, cyclic, reversible & irreversible. State function & path functions and their differentiation, concept of heat & work. Zeroth law of thermodynamics, First law of thermodynamics. Definition of internal energy & enthalpy. Concept of heat capacity, heat capacity at constant volume & at constant pressure, and there relationship. Jouble- Thomson experiment, Joule-Thomson coefficient (no derivation) & inversion temperature. Calculations of W, q, E & H for expansion of gases for isothermal & adiabatic conditions for reversible process. **B. Thermochemistry (2 hrs.)** Standards. states, Heat of reaction, enthalpy of formation, enthalpy of combustion, enthalpy of solution, enthalpy of neutralization, Hess's law of constant heat of summation & its applications. Variation of enthalpy change of reaction with temperature (Kirchoff's equation). **C. Thermodynamics II (4 hrs.)** Second law of thermodynamics: Limitations of first law and need for the second Thermodynamic principle of working of a refrigerator (Carnot theorem). Concept of entropy: entropy change in a reversible and irreversible process; entropy change in isothermal reversible expansion of an ideal gas. Physical significance of entropy. Gibbs free energy, Gibbs- Helmoholtzeqation. **D. Third law of thermodynamics (1hr)**	11

	E. Statement of third law, Nernst heat theorem, Absolute entropy of solids, liquids, and gases.	
IV	**Electrochemistry-I** Electrolyte conductance: specific and equivalent conductance, measurement of equivalent conductance, effect of dilution on conductance, Kohlrausch law, application of Kohlrausch law in determination of dissociation constant of weak electrolyte, solubility of sparingly soluble electrolyte, absolute velocity of ions, ionic product of water, conductometric titrations. Single electrode potential, standard electrode potential, electrochemical series and its applications. Concept of overvoltage. Theory of strong electrolyte: limitation of Ostwald's dilution law weak and strong electrolyte, Debye-Huckel-Onsager's (DHO) equation for strong electrolytes, relaxation, and electrophoretic effect. Migration of ions: Transport nimbler-definition and determination by Hittorf method and moving boundary method. electrochemical cells or Galvanic cells: reversible and irreversible cells, conventional Representation of electrochemical cells. EMF of a cell, effect of Temperature on EMF of cell, Nernst equation calculation of AG, AH and AS for cell reaction, polarization, over potential and hydrogen overvoltage**.**	11
Keywords	***D & f-blocks elements, Coordination compounds, Werner;s theory, VBT, Isomerism, Thermodynamics, thermochemistry, Electrical/electrolytical conductance, Transport number***.	
Signature of Convener & Members (CBoS)		

DEPARTMENT OF CHEMISTRY

COURSE CURRICULUM

PART-C: Learning Resources

Text Books, Reference Books and Others

- Jauhar, S.P.(2010). Modern Approuch to Inorganic Chemistry: A Textbook for B.Sc. I Students. Modern publishers.
- Bajpai, D. N.(1992), Advanced book of physical chemistry. S. Chand publishing.
- Sharma, K.K. & Sharma, L.K. (2016), A Textbook of physical chemistry. Vikas publishing.
- Bhasin, K. K. (2018), Pradeep's Inorganic ChemistryVol. III. Pradeep publications.
- Puri, S. & Sharma, L. R. (20008), Kalia" Principles of Inorganic Chemistry."

Text Books Recommended-

1. Lee, J.D. (2008), Concise inorganic chemistry. John Wiley & Sons.
2. Cotton, F.A. Wilkinson,G. & Gaur, P. L. (1995), Basic inorganic Chemistry: John Wiley & Sons.
3. Huheey, J.E. Keiter, E. A. Keiter, R.L. &Medhi, O.K. (2006). Inorganic chemistry: Principles of Structure and reactivity, Pearson Education India.
4. Douglas, B. E. McDaniel, D. H. & Alexander, J.J. (1994), Concepts and models of inorganic chemistry: John Wiley & Sons.

Physical Chemistry:

1 .Puri, L.B. Sharma, L.R. &Pathania, M.S. (2013), Principles of physical chemistry, Vishal Publishing Co.

2. Atkins ,P. W. De Paula, J, & Keeler. J. (2023), Atkins' Physical chemistry, Oxford university press.
3. McQureeie, D.A.& Simon, J.D. (2004), Molecular Thermodynamics Viva Books Pvt. Ltd: New Delhi.

Online Resources-

- e-books and e-learning portals
- https://bit.lv/3AvV3mZ
- https://bit.ly/30V85z
- https://bit.ly/3C9PXPS
- https://bit.ly/301p9rZ
- https://bit.ly/BPnwqe

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

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks:	100 Marks
Continuous Internal Assessment (CIA):	30 Marks
End Semester Exam (ESE):	70 Marks

Continuous Internal Assessment (CIA): 30 (By Course Teacher)	Internal Test/Quiz:20+20 Assignment/ Semenar-10 Total Marks-30	Better marks out of the two Tot Quiz + obtained marks in Assignment shall be considered against 15 Marks
End Semester Exam (ESE):70	Two section A&B Section A :Q1 Objective 10∗1=10 Marks Q2 Short answer type-5*4=20 Section B : Descriptive answer type qts 1 out of 2frm each- 4*10=40 Marks	
Signature of Convener & Members (CBoS)		

FOUR YEAR UNDERGRADUATE PROGRAMME (2024-28)

DEPARTMENT OF CHEMISTRY

COURSE CURRICULUM

PART- A: Introduction			
Programme: Bachelor in Life Sciences (Certificate/Diploma/Degree/Honors		**Semester-III**	**Session: 2024-2025**
Course Code	**CHSC-03P**		
Course Title	**Lab. Course -01 INORGANIC AND PHYSICAL CHEMISTRY - I**		
Course Type	**Laboratory course**		
Pre-requisite(if any)	**As per program**		
Course Learning. Outcomes (CLO)	**At the end of this course, the students will be able to** ➢ **Understand the principle of determining transition temperature of hydrated or other allotropic salts.** ➢ **Employ the principle of determination of stability of a given salt at different temperature.** ➢ **Apply Born-Haber cycle to determine enthalpy and lattice energy.** ➢ **Determine strength of an acid , ionization constant of weak acid and solubility product by conductometric or potentiometric titrations.**		
Credits Value	**1 Credits**	**Credit =30 Hours Laboratory or Field learning/Training**	
Total Marks	**Max. Marks:50**	**Min Passing Marks: 20**	

PART-B: Content of the Course		
Total No. of learning-Training/performance Periods: 30 Periods (30 Hours)		
Module	Topics (Course contents)	No. of Period
Lab/ field Training/ Experiment Content of Course	**Transition Temperature:** (1) Transition temperature of a salt hydrate – determination of molecular weight. (2) Determination of the transition of the temperature of the given substance by thermometric / dilatometric method (e.g. SrBr2. 2H2O or MnCl2.4H2O). **Thermochemistry** A. Determination of solubility: (1) To determine the enthalpy of neutralization of hydrochloric acid (strong acid) by sodium hydroxide (strong base) solution. (2) (a)To determine the enthalpy of neutralization of a weak acid (acetic acid) versus strong base (sodium hydroxide) and determine enthalpy of ionization of weak acid.	30

	(b) To determine the enthalpy of neutralization of a weak base (ammonium hydroxide) verses strong acid (hydrochloric acid) and determine enthalpy of ionization of weak base. (3) To determine the enthalpy of solution of solid calcium chloride and calculate the lattice energy. **Conductometry** (1) Conductometry – Determination of limiting molar conductance of a strong Electrolyte (KCl). (2) To determine the strength of the given acid (HCl) or CH3COOH) conductometric ally using standard alkali (NaOH) solution. (3) To determine the strength of strong acid and a weak acid in the given mixture conductometric ally against a standard alkali mixture. (4) To determine the ionization constant of weak acid conductometric ally. **Solubility Product** (1) To determine the solubility and solubility product of a sparingly soluble salt conductometric ally. (2) Potentiometry – Determination of solubility product of a sparingly soluble substance.	
Keywords	**Solution, Acid, Alkali, Transition temperature Thermochemistry, Temperature, Enthalpy, Conductometric titration, Potentiometric titration, Solubility product.**	
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FOUR YEAR UNDERGRADUATE PROGRAMME (2024-28)

DEPARTMENT OF CHEMISTRY

COURSE CURRICULUM

PART-C: Learning Resources		
Text Books, Reference Books and Others		
Text Books Recommended- ➢ Vishwanathan, B.&.Raghavan, P.S. (2017), Practical Physical Chemistry.Viva books organals publishing. ➢ Yadav, J. B. (2006), Advanced Practical Physical Chemistry. Krishna Prakashan Media. ➢ Sahu, D. P. &Bapai, K. N. (2022), Unified practical chemistry. NavbodhPrakashan.		
Reference Books Recommended- ➢ Moudgill, H.K. (2010), Textbook of physical chemistry. PHI Learning Pvt. Ltd ➢ Adamson, A. (2012), A. Textbook of physical chemistry. Elsevier. ➢ Findlay. A. (1923), Practical Physical Chemistry.Langmaans, Green.		
Online Resources- ➢ E-resources/e-books and e-learning portals ➢ http://www.swayam.ac.in ➢ http://www.ignou.ac.in ➢ www.egyankosh.ac.in ➢ www.litm.ac.in ➢ www.eskillindia.org ➢ www.eshiksha.mp.gov.in ➢ www.vlab.co.in		
Online Resources- e-sources/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/arcas-of-specialization- in-botany.html		
PART -D: Assessment and Evaluation		
Suggested Continuous Evaluation Methods: Maximum Marks: 50 Marks Continuous Internal Assessment (CIA): 15 Marks End Semester Exam (ESE): 35 Marks		
Continuous Internal Assessment (CIA): 15 (By Course Teacher)	Internal Test/Quiz:10+10 Assignment/ Semenar-05 Total Marks-15	Better marks out of the two Tot Quiz + obtained marks in Assignment shall be considered against 15 Marks

End Semester Exam (ESE):35	Laboratory/Field Skill Performance: On spot Assessment Section A : Performed the Task based on lab, work 20*1=20 Marks B: Performed the Task based on lab, work (written) 10*1=10Marks Section B : Viva-voce (based on principle/technology) - 5*1=05 Marks
Signature of Convener & Members (CBoS)	

FOUR YEAR UNDERGRADUATE PROGRAMME (2024-28)

DEPARTMENT OF BOTANY

COURSE CURRICULUM

PART-A: Introduction			
Programme: Bachelor in Life Sciences (Certificate/Diploma/Degree Honors)		**Semester-III**	**Session: 2024-2025**
Course Code	**BOSC-3T**		
Course Title	**Archegoniate and Fossils**		
Course Type	**Discipline Specific course (DSC)**		
Pre-requisite (if any)	**As per program**		
Course Learning. Outcomes (CLO)	**At the end of this course, the students will be able to** ➢ **Students Will Be Familiar With Amphibians And Reptiles Plants Progressive Evolution In Plants.** ➢ **Relics Of Past Plants.** ➢ **Diversity In Plants.** ➢ **Development Of Seeds.**		
Credit Value	**3 Credits**	**Credit =45 Hours-learning & Observation**	
Total Marks	**Max. Marks: =100**	**Min Passing Marks: 40**	

PART -B: Content of the Course		
Total No. of Teaching-learning Periods (01 Hr. per period) -45 Periods (45 Hours)		
Unit	Topics (Course contents)	
I	**Bryophyta:-** Morphology,structure,reproduction and life history,distribution,classification evolution of gametophytes and sterilization of sporogenous tissue.General account of-Riccia,Marchantia,Anthoceros and Funaria,Economic and ecological importance of bryophytes.	12
II	**Pteridophytes** Morphology,anatomy and reproduction,classification evolution of stele,heterospory telome, theory and origin of seed habit ,general account and life history of of Psilotum,Lycopodium,Sellaginella,Equisetum Pteris,Marsilea.	11
III	**Gymnosperm:-** Characteristics of Gymnosperms,the vessel -less &fruitless seed plants, Classification of Gymnosperm ,Polyembryony in Gymnosperms and its role; Distribution of Gymnosperm in India ,Economic importance of Gymnosperm ,General account of Cycas,Pinus,Gnetum, Concepts of living fossil (Cycas &Ginkgo); Angiospermic characters of Gnetum.	11
IV	**Fossil:-** Fossil and fossilization,types of fossils, Geological time table	11

	Brief account of the families of Pteridospermales-Rhynia,Calamites. **General Account and Affinities -**Cycadeoidales Pentoxylales and Cordaitales	
Keywords	**Archegonia, seedless, heterospory, fossils**	
Signature of Convener & Members (CBoS)		

FOUR YEAR UNDERGRADUATE PROGRAMME (2024-28)

DEPARTMENT OF BOTANY

COURSE CURRICULUM

PART-C: Learning Resources

Text Books, Reference Books and Others

1.Puri,P.(1980)Bryophytes,Atma Ram and Sons,Delhi

2.Vashishtha,B.R.(2005)Pteridophytes S.Chand and Co.,Delhi.

3.Bhatnagar,S.P.,Moitra,A.(1996)Gymnosperms,New Age International Pvt.Ltd.,New Delhi

Text Books Recommended-

1. Sporne,K.K.(1991)The Morphology of Gymnosperm.B.I.Publishing Pvt.Ltd.,Bombay

2. Stewart,W.N.and Ruthwell,G.W.(1993)Paleobotany and the Evolution of Plants.Cambridge Univ.Press,UK

3. Singh.(1978)Embryology of Gymnosperms; Encyclopedia of Plant Anatomy Gebauer Bortraeger, Berlin.

Online Resources-

- e-books and e-learning portals
- http://www.swayam.ac.in
- http://www.ignou.ac.in
- http://www.egvankosh.ac.in
- http://www.itm.sc.in
- http://www.eskillindia.org
- http://www.eshiksha.mp.gov.in
- http://www.viah.co.in
- http://www.internshala.com

Online Resources-

e-sources/e-books and e-learning portals

- https://www.pbs.org/video/botany-basics-iuu2bl/
- https://efaidohmannibpcapcalclefindorkaj/https://www2.ca.uky.edu/apcom/pubs/ho/ho96/ho96.pdf
- https://www.botanytoday.com/brunches-of-botany

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks:	100 Marks
Continuous Internal Assessment (CIA):	30 Marks
End Semester Exam (ESE):	70 Marks

Continuous Internal Assessment (CIA): 30 (By Course Teacher)	Internal Test/Quiz:20+20 Assignment/ Semenar-10 Total Marks-30	Better marks out of the two Tot Quiz + obtained marks in Assignment shall be considered against 15 Marks
End Semester Exam (ESE):70	Two section A&B Section A :Q1 Objective 10∗1=10 Marks, Q2 Short answer type-5∗4=20 Section B : Descriptive answer type qts 1 out of 2frm each- 4*10=40 Marks	
Signature of Convener & Members (CBoS)		

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FOUR YEAR UNDERGRADUATE PROGRAMME (2024-28)

DEPARTMENT OF BOTANY

COURSE CURRICULUM

PART- A: Introduction			
Programme: Bachelor in Life Sciences **(Certificate/Diploma/Degree/Honors**		**Semester-III**	**Session: 2024-2025**
Course Code	**BOSC-03P**		
Course Title	**Lab.Course-02 (Archegoniate and Fossils)**		
Course Type	**Laboratory course**		
Pre-requisite(if any)	**As per program**		
Course Learning. Outcomes (CLO)	**At the end of this course, the students will be able to** ➢ **At the end of the course students will be familiar with amphibians and reptiles plants** ➢ **progressive evolution in plants** ➢ **relics of past plants** ➢ **diversity in plants** ➢ **Development of seeds.**		
Credits Value	**1 Credits**	**Credit =30 Hours Laboratory or Field learning/Training**	
Total Marks	**Max. Marks:50**	**Min Passing Marks: 20**	
PART-B:	**Content of the Course**		
Total No. of learning-Training/performance Periods: 30 Periods (30 Hours)			
Module	Topics (Course contents)		No. of Period
Lab/ field Training/ Experiment Content of Course	**Bryophyta**:-Comparative study of the anatomy of vegetative and reproductive parts of Marchantia,Pellia,Anthoceros,Notothylus Funaria,Polytrichum. **Pteridophyta:-**Comparative study of the anatomy of vegetative and reproductive parts of Psilotum,Lycopodium,Selaginella,Equisetum Gleichenia,Pteris,Ophioglossum,Isoetes. **Gymnosperms:-**Comparative study of the anatomy of vegetative and reproductive parts of Cycas,Ginkgo,Cedrus,Abies,Picea,Cupressus, Araucaria,Cryptomeria,Taxodium,Podocarpus,Agathis,Taxus Ephedra and Gnetum. ·Collection of various gymnospermic plant materials · Field work-as far practicable conveniently		30

	Fossil:-Study of important fossil gymnosperms from prepared photographs, slides and specimens	
Keywords	**Archegonia, venter, bryophytes, pteridophytes**	
Signature of Convener & Members (CBoS)		

FOUR YEAR UNDERGRADUATE PROGRAMME (2024-28)

DEPARTMENT OF BOTANY

COURSE CURRICULUM

PART-C: Learning Resources

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 Delhi.

Text Books Recommended-

1. Principles of Paleontology 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
- http://www.swayam.ac.in
- http://www.ignou.ac.in
- www.egyankosh.ac.in
- www.litm.ac.in
- www.eskillindia.org
- www.eshiksha.mp.gov.in
- www.vlab.co.in

Online Resources-
e-sources/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/arcas-of-specialization- in-botany.html

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

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

Continuous Internal Assessment (CIA): 15 (By Course Teacher)	Internal Test/Quiz:10+10 Assignment/ Semenar-05 Total Marks-15	Better marks out of the two Tot Quiz + obtained marks in Assignment shall be considered against 15 Marks
End Semester Exam (ESE):35	Laboratory/Field Skill Performance: On spot Assessment Section A : Performed the Task based on lab, work 20*1=20 Marks B: Sporting based on lab, work (written) 10*1=10Marks Section B : Viva-voce (based on principle/technology) - 5*1=05 Marks	
Signature of Convener & Members (CBoS)		

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FOUR YEAR UNDERGRADUATE PROGRAMME (2024-28)

DEPARTMENT OF MICROBIOLOGY

COURSE CURRICULUM

PART-A: Introduction			
Programme: Bachelor in Life Sciences (Certificate/Diploma/Degree Honors)		**Semester-III**	**Session: 2024-2025**
Course Code	**MBSC-03T**		
Course Title	**Cell Biology and Biochemistry**		
Course Type	**Discipline Specific course (DSC)**		
Pre-requisite (if any)	**As per program**		
Course Learning. Outcomes (CLO)	**At the end of this course,the student will able to -** ➢ **Illustrate The Structural Organization Of Eukaryotic And Prokaryotic Cells.** ➢ **Interpret Cell Division.** ➢ **Classify The Biomolecules And Compare Their Characteristics.** ➢ **Relate Structure And Functions Of Nucleic Acids.** ➢ **Interpret The Mechanism Of Enzyme Action.**		
Credit Value	**3 Credits**	**Credit =45 Hours-learning & Observation**	
Total Marks	**Max. Marks: =100**	**Min Passing Marks: 40**	

PART -B: Content of the Course		
	Total No. of Teaching-learning Periods (01 Hr. per period) -45 Periods (45 Hours)	
Unit	Topics (Course contents)	
I	**History of Cell Biology:**Contribution of Indian Cell biologists and Biochemists:Ramakrishnan ,Nagaraj,Joyoti Basu,Veena Krishnaji Parnaik. **Cell Structure:-**Prokaryotic and Eukaryotic cell,cellular organelles; Plasma membrane,Mitochondria,Golgi body,Nucleus,Ribosome,Lysosome,Endoplasmic reticulum.Cell division.	12
II	**Carbohydrate**:Structure,properties &classification of carbohydrates;Monosaccharides, Disaccharides and Polysaccharides. **Proteins:-**Structure, properties &classification of amino acids. Structure &Classification of Protein-Primary, secondary; salient of a helix,β sheet, tertiary and quaternary	11
III	**Lipid:**Structure,properties and classification of lipids. **Nucleic acids:**Structure of purine and pyrimidine bases,nucleoside and nucleotide;DNA structure and types:A,B,Z form;RNA-Structure,types and functions.	11
IV	**Enzymes: -** Classification of enzymes, mechanisms of enzyme action; Lock and key hypothesis induced fit hypothesis. Active site and activation energy, coenzyme, Iso-enzyme,	11

	metal cofactors Allosteric enzymes. Enzyme inhibition; competitive, noncompetitive, uncompetitive.	
Keywords	**Cell structure, Carbohydrates, Protein, Lipids, Enzymes, DNA, RNA**	
Signature of Convener & Members (CBoS)		

FOUR YEAR UNDERGRADUATE PROGRAMME (2024-28)

DEPARTMENT OF MICROBILOGY

COURSE CURRICULUM

PART-C: Learning Resources
Text Books, Reference Books and Others
1.Cell and molecular biology;P.K.Gupta 2.Cell biology;C B Pawar 3.Biochemistry;U Satyanarayan and U Chakrapani 4.Fundamentals of Biochemistry;J L Jain,Sanjay Jain and Nitin Jain
Reference Books Recommended- 1. Lehninger's principles of Biochemistry;M.M.Cox,D.L.Nelson and W H Freeman 2.Quick Review Biochemistry;Arun Kumar Singhal,AITBS Pub.India
Online Resources- ➢ e-books and e-learning portals ➢ https://www.coursera.org/lecture/emergence-of-life/4-5-invertebrates-successes-of-life-http://www.ignou.ac.in ➢ https://www.shiksha.com/online-courses/introduction-to-biology-biodiversity-course-http://www.itm.sc.in ➢ https://www.youtube.com/watch?v=uK-XYhttp://www.eshiksha.mp.gov.in ➢ https://www.youtube.com/watch?v=WxMSckEcio4http://www.internshala.com
Online Resources- e-sources/e-books and e-learning portals ➢ https://www.pbs.org/video/botany-basics-iuu2bl/ ➢ https://efaidohmannibpcapcalclefindorkaj/https://www2.ca.uky.edu/apcom/pubs/ho/ho96/ho96.pdf ➢ https://www.botanytoday.com/brunches-of-botany

PART -D: Assessment and Evaluation		
Suggested Continuous Evaluation Methods: Maximum Marks: 100 Marks Continuous Internal Assessment (CIA): 30 Marks End Semester Exam (ESE): 70 Marks		
Continuous Internal Assessment (CIA): 30 (By Course Teacher)	Internal Test/Quiz:20+20 Assignment/ Semenar-10 Total Marks-30	Better marks out of the two Tot Quiz + obtained marks in Assignment shall be considered against 15 Marks

End Semester Exam (ESE):70	Two section A&B Section A :Q1 Objective 10*1=10 Marks Q2 Short answer type-5*4=20 Section B : Descriptive answer type qts 1 out of 2frm each- 4*10=40 Marks
Signature of Convener & Members (CBoS)	

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FOUR YEAR UNDERGRADUATE PROGRAMME (2024-28)

DEPARTMENT OF MICROBIOLOGY

COURSE CURRICULUM

PART- A: Introduction			
Programme: Bachelor in Life Sciences **(Certificate/Diploma/Degree/Honors**		**Semester-III**	**Session: 2024-2025**
Course Code	**MBSC-03P**		
Course Title	**Lab. Course -03 Cell Biology and Biochemistry**		
Course Type	**Laboratory course**		
Pre-requisite (if any)	**As per program**		
Course Learning. Outcomes (CLO)	**After successfully completing this course, the students will be able to -** ➢ **Identify The Various Stages Of Cell Division.** ➢ **Quantify The Carbohydrates And Protein In Any Sample Determine The Vmax And Km Value Of Enzymes.** ➢ **Analyse The Effect Of Environmental Factors On Enzyme Activity.**		
Credits Value	**1 Credits**	**Credit =30 Hours Laboratory or Field learning/Training**	
Total Marks	**Max. Marks:50**	**Min Passing Marks: 20**	

PART-B:	**Content of the Course**	
Total No. of learning-Training/performance Periods: 30 Periods (30 Hours)		
Module	Topics (Course contents)	No. of Period
Lab/ field Training/ Experiment Content of Course	1.Identification of different stages of mitosis in onion root tips. 2.Staining and visualisation of mitochondria by Janus green stain. 3.Qualitative tests for carbohydrates,reducing sugars,non-reducing sugars 4.Qualitative tests for lipids and proteins. 5.Quantitative estimation of proteins by Folin Lawry method. 6.Study of protein secondary and tertiary structures with the help of models .	30

	7.Study of enzyme kinetics-calculation of Vmax,Km values. 8.Study effect of temperature, pH and heavy metals on enzyme activity.	
Keywords	**Museum specimens, Histological slides, Alternative of Dissection, Animal album**	
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FOUR YEAR UNDERGRADUATE PROGRAMME (2024-28)

DEPARTMENT OF MICROBIOLOGY

COURSE CURRICULUM

PART-C: Learning Resources		
Text Books, Reference Books and Others		
Text Books Recommended- 1.Practical microbiology:R C Dubey and D K Maheshwari 2.An introduction to practical biochemistry:David T Plummer. 3.Basic concepts in clinical Biochemistry: A practical guide: Vijay Kumar, Kiran Dip Gill		
Reference Books Recommended- 1. Park Haswell, Marshall and Williams, A textbook on Zoology Invertebrate, AITBS Publishing and Distributers, Delhi . 2. Park Haswell, Marshall and Williams, A textbook on Zoology Vertebrate, AFTBS Publishing and Distributers, Delhi.		
Online Resources- ➢ E-resources/e-books and e-learning portals ➢ http://ndi.ätkgp.ac.in/he/document/swayamprabha/swayam ➢ http://www.swayam.ac.in ➢ http://www.ignou.ac.in ➢ www.egyankosh.ac.in ➢ www.litm.ac.in ➢ www.eskillindia.org ➢ www.eshiksha.mp.gov.in		
Online Resources- e-sources/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/arcas-of-specialization- in-botany.html		
PART -D: Assessment and Evaluation		
Suggested Continuous Evaluation Methods: Maximum Marks: 50 Marks Continuous Internal Assessment (CIA): 15 Marks End Semester Exam (ESE): 35 Marks		
Continuous Internal Assessment (CIA): 15 (By Course Teacher)	Internal Test/Quiz:10+10 Assignment/ Semenar-05 Total Marks-15	Better marks out of the two Tot Quiz + obtained marks in Assignment shall be considered against 15 Marks

End Semester Exam (ESE):35	Laboratory/Field Skill Performance: On spot Assessment Section A : Performed the Task based on lab, work 20*1=20 Marks B: Spotting framed on tools & technology (written) 10*1=10Marks Section B : Viva-voce (based on principle/technology) - 5*1=05 Marks
Signature of Convener & Members (CBoS)	

FOUR YEAR UNDERGRADUATE PROGRAMME (2024-28)

DEPARTMENT OF DIET AND NUTRITION

COURSE CURRICULUM

PART-A: Introduction			
Program: Bachelor in Computer Application (Certificate/Diploma/Degree/Honors)		**Semester-III**	**Session: 2024-2028**
Course Code	**BDSC 03**		
Course Title	**Basics of Nutrition**		
Course Type	**Discipline General Elective course (GE)**		
Prerequisite	**As per program**		
Course Learning Outcomes (CLO)	**At the end of this course, the students will be able** ➢ Ability to embrace moral/ethical theory of dietetics. ➢ Capable of demonstrating comprehensive knowledge of diet modification. ➢ Capability to apply analytic thought of therapeutic diet for disease condition. ➢ Ability to acquire knowledge and skills of immune system dysfunction and metabolic syndrome. ➢ Capable of demonstrating comprehensive knowledge and understanding of DM, obesity, underweight, drug interaction and their dietary treatment.		
Credit Value	**4 Credits**	**1 Credit-60 Hours - Learning & Observation**	
Total Marks	**Max. Marks:100**	**Min marks -40**	

PART -B: Content of the Course		
Total No. of Teaching-Learning Periods (01 Hr. per period)-60 Periods (60 Hours) No. of Topics (Course contents)		
Unit	**Topics(Course Content)**	**No. of Period**
I	**Ancient Theory of Dietetics** History of Dietetics, Ancient cultures, Ancient diet. Role of dietician: The hospital & community. Basic concepts of diet therapy. Therapeutic Diet: Principle of therapeutic diet, nutrition for changing needs.	**15**

II	**Nutrition Support**: Internal Nutrition and Parental Nutrition. Modification of diet (Symptoms, Causes, Classification, Dietary Treatment): Diet in Febrile conditions and infections. Diet in surgical conditions. Diet for Burn. Diet for Cancer.	**15**
III	Diet for gastro –intestinal disorders: constipation, diarrhea, peptic ulcer. Diet for cardiovascular disease: Hypertension, Atherosclerosis. (Risk factor, Etiology, Nutritional management) Diet for renal diseases-Nephritis, Nephrotic syndrome and renal failure, renal calculi. (Causes, Symptoms and Dietary management)	**15**
IV	Nutrition in Immune system dysfunction, AIDS & Allergy. Nutrition support in metabolic disorders: Maple syrup Urine Disease, PKU, Gaucher Disease. Nutrition -Addictive behavior in anorexia nervosa, bulimia & alcoholism. Diet in Diabetes Mellitus: Prevalence, types, Symptoms, Diagnosis, Treatment, Complications, Nutrition support during Diabetes. Diet in Obesity and Underweight: Obesity, A etiology, Theories, Assessment, Types, Dietary Treatment. Nutrient drug interaction.	**15**
Keywords	**A etiology, Theories, Assessment, Types, Dietary Treatment. Nutrient drug interaction.**	

Name and Signature of Convener & Members of CBS

PART-C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

1. Manjula Shantaram, Biochemistry & Nutrition for B.Sc. Nursing, Jaypee Brothers Medical Publishers (P) Ltd.
2. Ruma Singh, Food and Nutrition for Nurses, Jaypee Brothers Medical Publishers (P)Ltd.
3. Y. K. Joshi, Basics of clinical nutrition, Jaypee Brothers Medical Publishers (P)Ltd.

Reference Resources:.

1. B. Srilaskshmi, Dietetics, New Age International Publishers.
2. T. Longvah, R.Ananthan, K. Bhaskaracharya, K. Venkalah, Indian Food Composition Tables, NIN

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): (By Course Teacher)	**Internal test/Quiz-: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):	**Two section- A&B Section A: Q1. Objective-10 marks: Q2. Short answer type-5x4=20 marks Section B: Descriptive answer type question, 1 out of 2 from each unit-4x10=40 marks**	
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FOUR YEAR UNDERGRADUATE PROGRAMME (2024-28)

DEPARTMENT OF MICROBIOLOGY

COURSE CURRICULUM

PART-A: Introduction			
Programme: Bachelor in Life Sciences (Certificate/Diploma/Degree Honors)		**Semester-III**	**Session: 2024-2025**
Course Code	**MBSE-03T**		
Course Title	**Microbial Enzyme Technology**		
Course Type	**Discipline Specific Elective course (DSE)**		
Pre-requisite (if any)	**As per program**		
Course Learning. Outcomes (CLO)	**After completion of the course, the student shall be able to..** ➢ **Learn The Fundamentals Of Enzymes, Enzyme-Action And** ➢ **Metabolic Reactions** ➢ **Explain The Mechanism Of Enzyme Action** ➢ **Relate Enzyme Modifications** ➢ **Identify The Applications Of Enzymes In Various Fields** ➢ **Attain Knowledge About Various Biochemical Techniques**		
Credit Value	**3 Credits**	**Credit =45Hours-learning & Observation**	
Total Marks	**Max. Marks:=100**	**Min Passing Marks: 40**	

PART -B: Content of the Course		
	Total No. of Teaching-learning Periods (01 Hr. per period) -45 Periods (45 Hours)	
Unit	Topics (Course contents)	
I	**Basic concept of enzymes:** Nomenclature, classification, methods for determination of enzyme activity. **Enzyme kinetics:** Michaelis-Menten equation, effect of pH, substrate concentration, temperature and inhibitors. Iso-enzymes and allosteric enzymes. Enzyme inhibition-competitive and non-competitive inhibition.	12
II	**Mechanism of enzyme action:** Action of ribonuclease, chymotrypsin and trypsin. Coenzyme catalysis. Mechanism of action of thiamine pyrophosphate enzyme. Control and regulation of enzyme activity and feedback mechanisms. Metabolic compartmentalization in relation to enzyme, enzymes and secondary metabolites	11
III	**Enzyme engineering &applications of microbial enzymes**: Chemical modification and site-directed mutagenesis structure &function relationship of industrially important enzymes. Microbial enzymes in textile, leather, wood industries and detergents	11

IV	**Biochemical techniques:** Determination of molecular weights, purity, General methods of extraction-salting out, use of organic solvents; Purification; analysis of proteins -mass determination- GC-MS; structure determination-X-ray diffraction.	11
Keywords	**Enzyme, Enzyme action, Enzyme inhibition, Enzyme engineering, Biochemical techniques,**	
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FOUR YEAR UNDERGRADUATE PROGRAMME (2024-28)

DEPARTMENT OF MICROBIOLOGY

COURSE CURRICULUM

PART-C: Learning Resources

Text Books, Reference Books and Others

A Text Book of Microbiology: R.C.Dubey & D.K.Maheshwari
2.A text book of Industrial Microbiology.2nd edition.Panima Publishing Company,New Delhi
3.Industrial Microbiology: Patel A H.(1996).1st edition. MacMillan India Limited Publishing Company Ltd.New Delhi,India.
4.Fundamentals of Biochemistry;Dr.J.L.Jain,Dr.Sanjay Jain,Nitin Jain,S.Chand Publication

Text Books Recommended-

Reference Books Recommended-

- Principles of Biochemistry and molecular biology:Wilson &Walker
- Lehninger Principles ob Biochemistry,8 Edition,David L.Nelson,Micheal M.Cox
- Biotechnology:Crueger Wand Crueger A.(2000)

Online Resources-

- e-books and e-learning portals
- https://www.coursera.org/lecture/emergence-of-life/-http://www.ignou.ac.in
- https://www.shiksha.com/online-courses/-http://www.itm.sc.in
- https://www.youtube.com/watch?v=uK-XYhttp://www.eshiksha.mp.gov.in
- https://www.youtube.com/watch?v=WxMSckEcio4http://www.internshala.com

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

- https://www.pbs.org/video/political-basics-iuu2bl/
- https://efaidohmannibpcapcalclefindorkaj/https://www2.ca.uky.edu/apcom/pubs/ho/ho96/ho96.pdf
- https://www.botanytoday.com/brunches-of-botany

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks:	100 Marks
Continuous Internal Assessment (CIA):	30 Marks
End Semester Exam (ESE):	70 Marks

Continuous Internal Assessment (CIA): 30 (By Course Teacher)	Internal Test/Quiz:20+20 Assignment/ Semenar-10 Total Marks-30	Better marks out of the two Tot Quiz + obtained marks in Assignment shall be considered against 15 Marks

End Semester Exam	Two section A&B

(ESE):70	Section A: Q1 Objective 10∗1=10 Marks Q2 Short answer type-5∗4=20 Section B : Descriptive answer type qts 1 out of 2frm each- 4*10=40 Marks
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FOUR YEAR UNDERGRADUATE PROGRAMME (2024-28)

DEPARTMENT OF MICROBIOLGY

COURSE CURRICULUM

PART-A: Introduction			
Programme: Bachelor in Life Sciences (Certificate/Diploma/Degree Honors)		**Semester-III**	**Session: 2024-2025**
Course Code	**MBSE-03P**		
Course Title	**Microbial Enzyme Technology**		
Course Type	**Discipline Specific Elective course (DSE)**		
Pre-requisite (if any)	**As per program**		
Course Learning. Outcomes (CLO)	**After the completion of this course, the students will be able to-** ➢ **show the enzyme production by microorganisms** ➢ **demonstrate the actions of different enzymes** ➢ **determine various parameters of enzyme action** ➢ **examine various biochemical techniques used for enzyme technology**		
Credit Value	**2 Credits**	**Credit =30 Periods -learning & Observation**	
Total Marks	**Max. Marks: =50**	**Min Passing Marks: 20**	

PART -B: Content of the Course		
Total No. of Teaching-learning Periods (1HR. per period) -30 Periods		
Module	Topics (Course contents)	No. of Period
Lab./ Field Training Experiment contents of Course	1.Screening of amylase producing microorganisms 2.Demonstrations of enzyme activity: Phosphatase and Catalase 3.Determination of kinetic constant of enzyme: Amylase activity, Vmax. Km 4. Effect of pH and temperature on amylase activity 5.Effect of inhibitors on amylase activity 6.Effect of UV absorption on proteins	
Keywords	**Enzyme, Enzyme activity, Enzyme inhibition, Biochemical techniques**	
Signature of Convener & Members (CBoS)		

FOUR YEAR UNDERGRADUATE PROGRAMME (2024-28)

DEPARTMENT OF MICROBIOLOGY

COURSE CURRICULUM

PART-C: Learning Resources
Text Books, Reference Books and Others
Text Books Recommended-
Reference Books Recommended- ➢ Laboratory Manual of Microbiology and Biotechnology.By Aneja K.R ➢ Practical Microbiology,R.C.Dubey and D.K.Maheshwari ➢ Laboratory Manual in Microbiology.By P.Gunasekaran
Online Resources- ➢ Applying Communication Theory for Professional Life: A Practical Introduction. Dainton and Zelley, http://taime.uz.ac.zw/claroline/backends/download.php?urf-L0ludHJvX3RvX2NvbW1lbmljYXRpb25f ➢ https://www.coursera.org/lecture/emergence-of-life/4-5-invertebrates-successes-of-life-http://www.ignou.ac.in ➢ https://web.sol.du.ac.in/my modules/type/cbcs-11-2/data/root/B.Com/Semester%202/ABILITY-ENHANCEMENT%20COMPULSORY%20COURSE-AECC/English%20Communication%20A-B-C/Unit%201-5. ➢ pdf https://www.youtube.com/watch?v=uK-XYhttp://www.eshiksha.mp.gov.in ➢ https://www.youtube.com/watch?v=WxMSckEcio4http://www.internshala.com ➢ https://archive.org/details/personality-development-book/mode/lup ➢ https://www.coursera.org/articles/presentation-skills ➢ https://www.cbs.de/en/blog/15-effective-presentation-tips-to-improve-presentation-skills/ ➢ https://benjaminball.com/blog/good-body-language-best-visual-aid-talks/ ➢
Online Resources- ➢ e-sources/e-books and e-learning portals https://blog.moderngov.com/importance-of-body-language-in-presentations-good-bad- ➢ https://efaidohmannibpcapcalclefindorkaj/https://www2.ca.uky.edu/apcom/pubs/ho/ho96/ho96.pdf ➢ https://www.botanytoday.com/brunches-of-botany
PART -D: Assessment and Evaluation
Suggested Continuous Evaluation Methods: Maximum Marks: 50 Marks Continuous Internal Assessment (CIA): 15 Marks End Semester Exam (ESE): 35 Marks

Continuous Internal Assessment (CIA): 15 (By Course Teacher)	Internal Test/Quiz:10+10 Assignment/ Semenar-05 Total Marks-15	Better marks out of the two Tot Quiz + obtained marks in Assignment shall be considered against 15 Marks
End Semester Exam (ESE):70	Two section A&B Section A :Q1 Objective 1*5=5 Marks Q2 Short answer type-2*5=10 (I. Vocabulary, II Unseen passage Section B : Descriptive answer type qts 1 out of 2frm each- 5*4=20 Marks	
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FOUR YEAR UNDERGRADUATE PROGRAMME (2024-28)

DEPARTMENT OF ENVIRONMENTAL SCIENCE

COURSE CURRICULUM

PART-A: Introduction			
Programme: Bachelor in Life Sciences (Certificate/Diploma/Degree Honors)		**Semester-III**	**Session: 2024-2025**
Course Code	**AEC-03**		
Course Title	**Environmental Studies**		
Course Type	**Ability Enhancement course (AEC)**		
Pre-requisite (if any)	**As per program**		
Course Learning. Outcomes (CLO)	**After completing this course, the students will be able to –** ➢ **Relate The Basic Concept of The Environment** ➢ **Explain Environmental Alterations** ➢ **Develop Skills in Environmental Measurement** ➢ **Examine Correction Measures of the Environment.**		
Credit Value	**1 Credits**	**Credit =30 Periods -learning & Observation**	
Total Marks	**Max. Marks: =50**	**Min Passing Marks: 20**	

PART -B: Content of the Course		
Total No. of learning-Training/performance Periods:30 Periods (30 Hours)		
Unit	Topics (Course contents)	No. of Period
I	**Basic Composition:** 1. Abiotic and Biotic components of the environment 2. Biodiversity Concept, types, and measures about its protection 3. Basic concept of Bio-Geo Chemical Cycle 4. Energy Flow in an ecosystem	**7**
II	**Alterations in Environment** 1. Concept and components of the pond ecosystem 2. Air pollution and measures for its control 3. Water pollution and measures for its control 4. Global warming, Climate change, and possible measures	**7**
III	**Measurements of Environmental Components** 1. Soil composition and methods of its analysis 2. Water analysis methods for DO, BOD, COD 3. Water analysis methods for pH, TDS, Turbidity, Salinity, and Alkalinity 4. Information about environmental factors-PM-10, PM-2.5, NO2, 03	**8**
IV	**Application Measures** 1.Useful microbes to control water pollution	

	2. Useful microbes to control soil pollution 3. Concept of Biodegradation 4. Concept of Phytoremediation	**8**
Keywords	Ecosystem, Pollution, Climate Change, Biodegradation	
Signature of Convener & Members (CBoS)		

FOUR YEAR UNDERGRADUATE PROGRAMME (2024-28)

DEPARTMENT OF ENVIRONMENTAL SCIENCE

COURSE CURRICULUM

PART-C: Learning Resources

Text Books, Reference Books and Others

1 Ecology and Environment, 8th Edition, P.D.Sharma, Rastogi Publication, Meerut.
2. Environmental Biology, 2nd Edition, P,D.Sharma, Rastogi Publication, Meerut.
3. Environmental Biology and Toxicology, 2nd Edition, P.D.Sharma, Rastogi Publication, Meerut.
4. Environmental Studies, 1st Edition, S.V.S.Rana, Rastogi Publication, Meerut.
5. Environmental Biotechnology, 1" Edition, S. V. S. Rana, Rastogi Publication, Meerut.

Reference Books Recommended-

- Jogdand S.N.-Environmental Biotechnology-Hin
- Kalaichelvan P.T.,I Arul Pandi-Bioprocess Technology,MJP Publishers ·Rajendran,Gunashekaran-Microbial Bioremediation-MJP
- Hammer &Hammer-Water &Wastewater Technology-PHI ·Metcaf &Eddy-Waste water Engineering-TMH
- Indushekhar Thakur-Environmental Biotechnology-I K Internation

Online Resources-

- Introduction to Computer Fundamental from W3school: https://www.w3schools.blog/computer-fundamentals-tutorial
- Introduction to MS-Word from W3school: https://www.w3schools.blog/ms-word-tutorial
- Introduction to MS-Excel from W3school:https://www.w3schools.com/excel/excel_introduction.php
- ntroduction to MS-PowerPoint from W3school:https://www.w3schools.blog/powerpoint-tutorial Introduction to MS-Access from W3school:
- https://www.youtube.com/watch?v=WxMSckEcio4http://www.internshala.com

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

- https://www.rgycsm.org/uploads/books/MICROSOFT-OFFICE-BOOK.pdf
- https://www.youtube.com/watch?v=SH40YV5AJ6A
- https://www.youtube.com/watch?v=SH40YV5AJ6A
- https://hte.rajasthan.gov.in/dept/dte/board

PART -D: Assessment and Evaluation

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

Continuous Internal Assessment (CIA): 15 (By Course Teacher)	Internal Test/Quiz:10+10 Assignment/ Semenar-10 Total Marks-15	Better marks out of the two Tot Quiz + obtained marks

		in Assignment shall be considered against 15 Marks
End Semester Exam (ESE):50	Two section A&B Section A :Q1 Objective 5*1=5 Marks Q2 Short answer type-5*4=20 Section B : Descriptive answer type qts 1 out of 2frm each- 10*1=10 Marks	
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FOUR YEAR UNDERGRADUATE PROGRAMME (2024-28)

DEPARTMENT OF DISASTER MANAGEMENT

COURSE CURRICULUM

PART-A: Introduction			
Programme: Bachelor in Life Sciences (Certificate/Diploma/Degree Honors)		**Semester-III**	**Session: 2024-2025**
Course Code	**VAC-03**		
Course Title	**Disaster management**		
Course Type	**Value Addition Course (VAC)**		
Pre-requisite (if any)	**As per program**		
Course Learning. Outcomes (CLO)	**After completing this course, the students will be able to –** ➢ **Explain Emergencies and controls, with examples of industrial disasters and their consequences.** ➢ **Describe the elements of emergency planning and preparedness.** ➢ **Summarize the causes of natural disasters, mitigation of their effects, rescue, relief and rehabilitation.** ➢ **Explain the disaster management mechanism and capacity building concepts .**		
Credit Value	**1 Credits**	**Credit =30 Periods -learning & Observation**	
Total Marks	**Max. Marks: =50**	**Min Passing Marks: 20**	

PART -B: Content of the Course		
Total No. of learning-Training/performance Periods:30 Periods (30 Hours)		
Unit	Topics (Course contents)	No. of Period
I	**Definition and types of disaster** Hazards and Disasters, Risk and Vulnerability in Disasters, Natural and Man-made disasters, earthquakes, floods drought, landside, land subsidence, cyclones, volcanoes, tsunami, avalanches, global climate extremes. Man-made disasters: Terrorism, gas and radiations leaks, toxic waste disposal, oil spills, forest fires.	**7**
II	**Study of Important disasters** Earthquakes and its types, magnitude and intensity, seismic zones of India, major fault systems of India plate, flood types and its management, drought types and its management, landside and its managements case studies of disasters in Sikkim (e.g) Earthquakes, Landside). Social Economics and Environmental impact of disasters.	**7**
III	**Mitigation and Management techniques of Disaster** Basic principles of disasters management, Disaster Management cycle, Disaster management policy, National and State Bodies for Disaster Management, Early Warming Systems, Building design and construction in highly seismic zones, retrofitting of buildings.	**8**

IV	**Training, awareness program and project on disaster management** Training and drills for disaster preparedness, Awareness generation program, Usages of GIS and Remote sensing techniques in disaster management, Mini project on disaster risk assessment and preparedness for disasters with reference to disasters in Sikkim and its surrounding areas.	**8**
Keywords	Wastewater management, biodegradation, bioremediation, xenobiotics.	
Signature of Convener & Members (CBoS)		

FOUR YEAR UNDERGRADUATE PROGRAMME (2024-28)

DEPARTMENT OF DISASTER MANAGEMENT

COURSE CURRICULUM

PART-C: Learning Resources
Text Books, Reference Books and Others
Disaster Management Guidelines, GOI-UND Disaster Risk Program (2009-2012) 2. Damon, P. Copola, (2006) Introduction to International Disaster Management, Butterworth Heineman.
Reference Books Recommended- ➢ Gupta A.K., Niar S.S and Chatterjee S. (2013) Disaster management and Risk Reduction, Role of Environmental Knowledge, Narosa Publishing House, Delhi. ➢ Murthy D.B.N. (2012) Disaster Management, Deep and Deep Publication PVT. Ltd. New Delhi. ➢ Modh S. (2010) Managing Natural Disasters, Mac Millan publishers India LTD.
Online Resources- ➢ Introduction to Computer Fundamental from W3school: https://www.w3schools.blog/computer-fundamentals-tutorial ➢ Introduction to MS-Word from W3school: https://www.w3schools.blog/ms-word-tutorial ➢ Introduction to MS-Excel from W3school:https://www.w3schools.com/excel/excel_introduction.php ➢ ntroduction to MS-PowerPoint from W3school:https://www.w3schools.blog/powerpoint-tutorial Introduction to MS-Access from W3school: ➢ https://www.youtube.com/watch?v=WxMSckEcio4http://www.internshala.com
Online Resources- e-sources/e-books and e-learning portals ➢ https://www.rgycsm.org/uploads/books/MICROSOFT-OFFICE-BOOK.pdf ➢ https://www.youtube.com/watch?v=SH40YV5AJ6A ➢ https://www.youtube.com/watch?v=SH40YV5AJ6A ➢ https://hte.rajasthan.gov.in/dept/dte/board
APART -D: Assessment and Evaluation
Suggested Continuous Evaluation Methods: Maximum Marks: 50 Marks Continuous Internal Assessment (CIA): 15 Marks End Semester Exam (ESE): 35 Marks

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

End Semester Exam (ESE):50	Two section A&B Section A :Q1 Objective 5*1=5 Marks Q2 Short answer type-5*4=20 Section B : Descriptive answer type qts 1 out of 2frm each- 10*1=10 Marks

Signature of Convener & Members (CBoS)

SHRI DAVARA UNIVERSITY

NAYA RAIPUR (C.G.)

PROGRAMME CURRICULUM

FOR

BECHELOR IN LIFE SCIENCES

(MICROBIOLOGY)

SEMESTER-IV

AS PER EDUCATION POLICY-2020

AND

NATIONAL EDUCATION POLICT-2025

FOUR YEAR UNDERGRADUATE PROGRAMME- 2024-25

(EFFECTIVE FROM THE SESSION-2024-2025)

SEMESTER IV

S.NO	COURSE CODE	COURSE TITLE	TEACHING HOURS PER WEEK				EXAMINATION SCHEME				
DISCIPLINE SPECIFIC COURSE (DSC)			L	T	P	C	THEORY		PRACTICAL		TOTAL MARKS
							EX	IN	EX	IN	
1.	CHSC-04T	ORGANIC AND PHYSICAL CHEMISTRY - I	3	1	0	4	70	30	-	-	100
2.	BOSC-O4T	ANGIOSPERMS	3	1	0	4	70	30	-	-	100
3.	MBSC-04T	BIOINSTRUMENTATION AND BIOSTATISTICS	3	1	0	4	70	30	-	-	100
DISCIPLINE GENERAL ELECTIVE COURSE (GE)/DISCIPLINE SPECIFIC ELECTIVE COURSE (DSE)											
4.	SCGE-04	HISTORY OF INDIA FROM BEGINNING TO 2ND CENTURY BC	3	1	0	4	70	30	-	-	100
5.	MBSE-02T	INDUSTRIAL MICROBIOLOGY									
ABILITY ENHANCEMENT COURSE (AEC)											
6.	AEC-04	COMMUNICATIVE ENGLISH AND SOFT SKILLS	2	0	0	2	35	15	-	-	50
SKILLS ENHANCEMENT COURSE (SEC)											
7.	SEC-04	EQUINE STUDIES & HORSEMANSHIP	1	1	0	2	35	15	-	-	50
PRACTICALS (LAB)											
8.	CHSC-04P	ORGANIC AND PHYSICAL CHEMISTRY - I	0	0	2	2	-	-	35	15	50
9.	BOSC-O4P	ANGIOSPERMS	0	0	2	2	-	-	35	15	50

10.	**MBSC-04P**	**BIOINSTRUMENTATION AND BIOSTATISTICS**	**0**	**0**	**2**	**2**	**-**	**-**	**35**	**15**	**50**
11.	**MBSE-02P**	**INDUSTRIAL MICROBIOLOGY**									
Total Contact hours Per Week:30		**Total credit:**				**26**	**Total mark**				**650/700 WIRH DSE**

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FOUR YEAR UNDERGRADUATE PROGRAMME (2024-28)

DEPARTMENT OF CHEMISTRY

COURSE CURRICULUM

PART-A: Introduction			
Programme: Bachelor in Life Sciences (Certificate/Diploma/Degree Honors)		**Semester-IV**	**Session: 2024-2025**
Course Code	**CHSC-04T**		
Course Title	**ORGANIC AND PHYSICAL CHEMISTRY - I**		
Course Type	**Discipline Specific course (DSC)**		
Pre-requisite (if any)	**As per program**		
Course Learning. Outcomes (CLO)	**At the end of this course, the students will be able to** ➢ **Master the synthesis, properties, and reactivity of various functional groups and apply this knowledge to understand their significance in organic chemistry.** ➢ **Employ the principles of chemical/Ionic equilibria, their influencing factors and applications.** ➢ **Interpret phase diagrams for one and two –component system, determine degrees of freedom and identify the triple point.** ➢ **Master the principles and applications of liquid – liquid mixtures using Raoult's law, Henry's and Nernst Distribution law.**		
Credit Value	**3 Credits**	**Credit =45 Hours-learning & Observation**	
Total Marks	**Max. Marks: =100**	**Min Passing Marks: 40**	

PART -B: Content of the Course		
Total No. of Teaching-learning Periods (01 Hr. per period) -45 Periods (45 Hours)		
Unit	Topics (Course contents)	
I	**A. Halides (5 hrs.)** **(i) Alkyl Halides:** Preparation: from alkenes and alcohols. Reactions: Nucleophilic substitution reactions of alkyl halides (alcohol, ester, nitrile &azonitrile formation, Williamson's ether synthesis), mechanism and stereochemistry of nucleophilic substitution reactions (SN1 and SN2), factors affecting SN1 and SN2 reactions. **(ii) Aryl Halides:** Chlorobenzene: Preparation by aromatic halogenation and Sandmeyer reaction. Aromatic nucleophilic substitution involving Benzyne Mechanism: KNH_2/NH_3 (or $NaNH_2/NH_3$). Reactivity and Relative strength of C-Halogen bond in alkyl and aryl/ Vinyl halides.	12

	B. Alcohols & Phenols (7 hrs.) **(i) Alcohols** **(a)** Monohydric-nomenclature, methods of formation, Properties & chemical reactions distinction between primary, secondary & tertiary alcohols. **(b) Dihydric alcohols:** Nomenclature, methods of formation of ethylene glycol (from ethylene, epoxide, ethylene dibromide and ethylene diamine). Chemical reactions of vicinal glycols: with carbonyl compounds, dehydration, oxidative cleavage with Pb (OAc)4 and HIO4 and Pinacol-Pinacolone rearrangement (with mechanism). **(c) Trihydric alcohols:** Nomenclature and methods of formation (from Hydrolysis of fats and oils, propene and acrolein), chemical reactions of glycerol (with PCl5, HI, oxidation, and dehydration) and uses/applications. **(ii) Phenols** Nomenclature and methods of formation, physical properties, and acidic character. Resonance stabilization of phenoxide ion. Comparative acidic strength of alcohols and phenols. Electrophilic aromatic substitution, acetylation, and carboxylation. Mechanism of Fries rearrangement, Claisen rearrangement, and Reimer-Tiemann reaction.	
II	**Aldehydes/Ketones and acid/Its derivatives** **A. Aldehydes and Ketones (6hrs)** Nomenclature and structure of the carbonyl group, synthesis of aldehydes and ketones. Acidity of alpha hydrogens and formation of enolate, Concept of reactive methylene group, Keto-enol tautomerism in Acetoacetic ester. Oxidation of aldehydes by KMnO4, and Tollen's reagent, Reduction of aldehydes by $LiAlH_4$ and $NaBH_4$. Mechanism of nucleophilicadditons to carbonyl group with particular emphasis on aldol, Perkin, and Knoevenagel reactions. Wittig and Minnich reaction (without mechanism), Baeyer-Villager oxidation of Ketones (without mechanism), Cannizaro reaction (with mechanism), MPV, Clemmensen, and Wolf-Kushner reaction. **B. Acid & its derivatives (5 hrs)** **(i) Carboxylic Acids** Nomenclature, structure, physical properties, acidity of carboxylic acids, effect of substituent on acid strength, method of preparation and chemical reaction. Hell-Volhard-Zelinsky (HVZ) reaction, Reduction of carboxylic acids, Mechanism of Decarboxylation. Di carboxylic acids: - Methods of formation and chemical reactions, **(ii) Carboxylic Acid Derivatives** tructure, method of preparation & physical properties of acid chlorides, esters, amides (Urea) and acid anhydrides, Relative stability of acyl derivatives.	11

III	**Equilibrium** **A. Chemical equilibria (3hrs)** Equilibrium in physical and chemical processes, dynamic nature of equilibrium, law of mas action, equilibrium constants and their quantitative dependence on temperature, pressure, and concentration, factors affecting equilibrium –Le Chatelier's principle. **B. Ionic Equilibria (5 hrs)** Ionization of acids and bases, Strong and weak electrolytes, degree of ionization ionization constant and ionic product of water. Ionization of weak acids and bases, pH scale, common ion effect and solubility product with illustrative examples), Salt hydrolysis-calculation of hydrolysis constant and degree of hydrolysis for salt of strong acid and weak base, Buffer solutions –Introduction, Henderson-Hasselbalch equations for acidic and basic buffer. **C. Phase Equilibrium (3 hrs)** **(A)** Hibbs phase (no derivation), phase, component and degree of freedom, Application of phase rule to one component system (water system and Sulphur systems), Reduced phase rule. Application of phase rule to two component systems: Pb-Ag system. Congruent-Ferric chloride system.	11
IV	**Photochemistry and Liquid-liquid mixtures** **(A) Photochemistry (8hrs)** Interaction of radiation with matter, difference between thermal and photochemical reactions, Laws governing absorption of light, laws of photochemistry, Jablonski diagram depicting various process quantum yield, determination of quantum yield of reactions, reasons various processes, quantum yield. Some examples of photochemical reactions (e.g. Photochemical decomposition of Hydrogen iodide, Photosynthesis of HBr from H_2 and Br_2 and photosynthesis of HCl from H_2 and Cl_2). Photosensitization and Quenching, Photosensitized reactions. **(B) Liquid-Liquid mixtures (3 hrs)** Ideal liquid mixtures, Raoult's law of ideal solutions, Henry's law and its applications, Nernst distribution law, limitations, and applications (association and dissociation – No derivation.)	11
Keywords	***Halides (alkyl & aryl halides), Alcohols, Phenols, Aldehydes & Ketones, Carboxylic acids & their derivatives, Equilibrium (Chemical, Ioic, and Phase equilibria), Photochemistry, Liquid-Liquid mixtures***	
Signature of Convener & Members (CBoS)		

DEPARTMENT OF CHEMISTRY

COURSE CURRICULUM

PART-C: Learning Resources

Text Books, Reference Books and Others

- Boyd, R. N. & Morrison , R. T. (1983), Organic Chemistry (uden title), Allyn and Bacon.
- Physical Chemistry.
- Atkins, P. W. De Paula, J.& Keeler, J. (2023), Atkins Physical Chemistry, Oxford University Press.
- MeQuarrie, D.A. & Simon, J. D. (2004), Molecular Thermodynamics Viva Books Pvt. Ltd: New Delhi.

Text Books Recommended-

- Bahl, A. (2010),Advanced Organic chemistry S.Chand publishing.
- Singh, J. &Yadav, L. D. S. (2016), Advanced Organic chemistry. PragatiPrakashan Meerut.
- Puri, L.B. Sharma, L. R. &Pathania, M. S. (2013), Principles of physical chemistry, Vishal Publishing. Co.
- Kapoor, K.L. (2019), A. Textbook of Physical Chemistry. Thermodynamics and Chemical Equilibrium (SI Units) – Vol. 2. 6th Edition.

Online Resources-

- e-books and e-learning portals
- https://bit.lv/3AvV3mZ
- https://bit.ly/30V85z
- https://bit.ly/3C9PXPS
- https://bit.ly/301p9rZ
- https://bit.ly/BPnwqe

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

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks:	100 Marks
Continuous Internal Assessment (CIA):	30 Marks
End Semester Exam (ESE):	70 Marks

Continuous Internal Assessment (CIA): 30 (By Course Teacher)	Internal Test/Quiz:20+20 Assignment/ Semenar-10 Total Marks-30	Better marks out of the two Tot Quiz + obtained marks

		in Assignment shall be considered against 15 Marks
End Semester Exam (ESE):70	Two section A&B Section A :Q1 Objective 10*1=10 Marks Q2 Short answer type-5*4=20 Section B : Descriptive answer type qts 1 out of 2frm each- 4*10=40 Marks	
Signature of Convener & Members (CBoS)		

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FOUR YEAR UNDERGRADUATE PROGRAMME (2024-28)

DEPARTMENT OF CHEMISTRY

COURSE CURRICULUM

PART- A: Introduction			
Programme: Bachelor in Life Sciences **(Certificate/Diploma/Degree/Honors**		**Semester-IV**	**Session: 2024-2025**
Course Code	**CHSC-04P**		
Course Title	**Lab. Course -01 ORGANIC AND PHYSICAL CHEMISTRY - I**		
Course Type	**Laboratory course**		
Pre-requisite(if any)	**As per program**		
Course Learning. Outcomes (CLO)	**At the end of this course, the students will be able to-** ➢ **Understand the fundamentals of organic compounds analysis including preparation of sodium extract and detection of elements.** ➢ **Identify functional groups and prepare derivations.** ➢ **Determine the PH of various samples like water /acid/base/soil etc.** ➢ **Apply the concepts of phase equilibria to determine critical solution temperature and study concepts of Nernst distribution law and determine equilibrium constant of various reactions.**		
Credits Value	**1 Credits**	**Credit =30 Hours Laboratory or Field learning/Training**	
Total Marks	**Max. Marks:50**	**Min Passing Marks: 20**	

PART-B:	Content of the Course	
Total No. of learning-Training/performance Periods: 30 Periods (30 Hours)		
Module	Topics (Course contents)	No. of Period
Lab/ field Training/ Experiment Content of Course	**Organic Analysis:** Systematic Identification of organic compounds: (a) Test for aliphatic and aromatic nature of substances. (b) Test for saturation and unsaturation. (c) Detection of elements (N, S and halogens) in organic compounds. (d) Identification of functional groups: (i) Carboxylic acids (ii) Phenols (iii) Aldehydes (iv) Ketones (v) Esters (vi) Carbohydrates (vii) Amines (viii) Amides (ix) **Halogen compounds.** (e) Determination of melting and boiling points. (f) Preparation of solid derivatives. PH Determination (1)Determination of PH of soil, water.	30

	(2) To measure the PH of various solution using PH indicators and PH meter. (3) To prepare and study the properties of buffer solutions. Phase Equilibrium: (1) To determine the critical solution temperature of two partially miscible liquids (phenol-water systems). (2) To study the effect of solute such as (i) sodium chloride (NaCl) , (ii) succinic acid (HOOC-CH2- CH2-COOH) on the critical solution temperature of two partially miscible liquids (e.g. phenol-water system). (3) To construct the phase diagram of two compounds (e.g. diphenylamine-benzophenone system) by cooling method. Nernst Distribution Law (1) To determine the partition coefficient of Iodine between water and carbon tetrachloride / Kerosene. (2) To determine the partition coefficient of benzoic water and benzene. (3) To determine the equilibrium constant of the reactions, KI+I2=KI3 by distribution method.	
Keywords	**Organic analysis, Aromatic/Aliphatic compounds, Saturated /Unsaturated compounds, Element detection, Functional groups, Derivatives for Functional groups, PH, Phase equilibria, Nernst Distribution Law.**	
Signature of Convener & Members (CBoS)		

FOUR YEAR UNDERGRADUATE PROGRAMME (2024-28)

DEPARTMENT OF CHEMISTRY

COURSE CURRICULUM

PART-C: Learning Resources
Text Books, Reference Books and Others
Text Books Recommended-
➢ Sahu, D. P. &Bapai, K. N. (2022), Unified practical chemistry. NavbodhPrakashan. ➢ Yadav, J. B. (2006), Advanced Practical Physical Chemistry. Krishna Prakashan Media. ➢ Pandey, O. P. &Bapai, D. N. (2010), practical chemistry. S. Chand Publisher
Reference Books Recommended- 1. Moudgill, H.K. (2010), Textbook of physical chemistry. PHI Learning Pvt. Ltd. 2. Adamson, A. (2012), A. Textbook of physical chemistry. Elsevier. 3. Findlay. A. (1923), Practical Physical Chemistry.Langmaans, Green. 4. Learnard, J. Lygo, B. & Procter, G.(2013), Advanced Organic Chemistry.CRC Press. 5.
Online Resources- ➢ E-resources/e-books and e-learning portals ➢ http://www.swayam.ac.in ➢ http://www.ignou.ac.in ➢ www.egyankosh.ac.in ➢ www.litm.ac.in ➢ www.eskillindia.org ➢ www.eshiksha.mp.gov.in ➢ www.vlab.co.in
Online Resources- e-sources/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/arcas-of-specialization- in-botany.html
PART -D: Assessment and Evaluation
Suggested Continuous Evaluation Methods: Maximum Marks: 50 Marks Continuous Internal Assessment (CIA): 15 Marks End Semester Exam (ESE): 35 Marks

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

End Semester Exam (ESE):35	Laboratory/Field Skill Performance: On spot Assessment Section A : Performed the Task based on lab, work 20*1=20 Marks B: Performed the Task based on lab, work (written) 10*1=10Marks Section B : Viva-voce (based on principle/technology) - 5*1=05 Marks
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FOUR YEAR UNDERGRADUATE PROGRAMME (2024-28)

DEPARTMENT OF BOTANY

COURSE CURRICULUM

PART-A: Introduction			
Programme: Bachelor in Life Sciences (Certificate/Diploma/Degree Honors)		**Semester-IV**	**Session: 2024-2025**
Course Code	**BOSC-4T**		
Course Title	**Angiosperms**		
Course Type	**Discipline Specific course (DSC)**		
Pre-requisite (if any)	**As per program**		
Course Learning. Outcomes (CLO)	**At the end of this course, the students will be able to** ➢ **Understand basics of plant identification,classification and nomenclature Understand the concept,diversity and evolution of Angiosperm plants.** ➢ **Become familiar with the intemal structure of plants and concept of plant tissues with its revolutionary concept** ➢ **Understand the reproductive system in flowering plants**		
Credit Value	**3 Credits**	**Credit =45 Hours-learning & Observation**	
Total Marks	**Max. Marks: =100**	**Min Passing Marks: 40**	

PART -B: Content of the Course		
Total No. of Teaching-learning Periods (01 Hr. per period) -45 Periods (45 Hours)		
Unit	Topics (Course contents)	
I	**Plant taxonomy**:Types of classification-artificial,natural and phylogenetic Bentham &Hooke (upto series),Engler &Prantl (upto series)and Hutchinson system of classification with its merit and demerits,Modern trends of taxonomy and Numerical taxonomy.Binomial nomenclatur system..Principles and rules (ICBN/ICN)Ranks and names,Typification,author citation,vali publication,principle of priority and its limitations;.Herbarium technique,important herbaria,d herbarium and Botanical gardens of India.	12
II	**Taxonomic Description:**Characteristics,systematics and economic importance of Dicotyledonous families- Brassicaceae,Malvaceae,Fabaceae(subfamily),Apiaceae,Rutaceae, Euphorbiaceae,Lamiaceae,Asteraceae.Monocotyledonous families - Orchidaceae,Liliaceae, Cyperaceae,Musaceae and Poaceae.(Floral features,Floral formulaand floral diagrami are essential.	11
III	**Anatomy**:Tissue system features,functions of different types of meristematic and permanent tissues.Internal Structure of dicot and monocot root stem and leaf.Root and shoot apex organizationStructure and function of cambium and secondary	11

	growth in root and stem.Wood (heartwood and sapwood,annual rings)Abnormal Secondary Growth(Dracaena Achyranthes, Nyctanthes,Boerhavia)	
IV	**Embryology:**Structure of anther and pollen.Structure and types of ovules,Embryo sacs-types, Pollination and Fertilization,Double fertilization,Endosperm types,structure and functions Development of embryo-Dicot and monocot embryo.Concept of Apomixes and Polyembryony Seed structure;appendages and dispersal mechanisms.	11
Keywords	**Taxonomy, Herbarium, Tissue, Fertilization**	
Signature of Convener & Members (CBoS)		

FOUR YEAR UNDERGRADUATE PROGRAMME (2024-28)

DEPARTMENT OF BOTANY

COURSE CURRICULUM

PART-C: Learning Resources

Text Books, Reference Books and Others

1.Simpson,M.G.(2006)Plant Systematics.Elsevier Academic Press,San Diego,CA,USA
2.Beck,C.B.(2010).An Introduction to Plant Structure and Development,II edition
3.Johri,B.M.(1984).Embryology of Angiosperms.Springer-Verlag,Berlin
4.Singh,G.(2012)Plant Systematics.Theory and Practice.Oxford &IBH Pvt.Ltd,New Delhi.
5.Bhojwani,SS.&Bhatnagar,SP(2011).Embryology of Angiosperms.Vikas Publication House Pvt.Lid.New Delhi 5 edition
6.Mauseth.1.1)(1988)Plant Anatomy.The Benjamin Cummings Publisher.USA
7.Pandey,B.P.(LatesEdt),Plant Anatomy

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.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 9.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-books and e-learning portals
- http://www.swayam.ac.in
- http://www.ignou.ac.in
- http://www.egvankosh.ac.in
- http://www.itm.sc.in
- http://www.eskillindia.org
- http://www.eshiksha.mp.gov.in
- http://www.viah.co.in
- http://www.internshala.com

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

- https://www.pbs.org/video/botany-basics-iuu2bl/
- https://efaidohmannibpcapcalclefindorkaj/https://www2.ca.uky.edu/apcom/pubs/ho/ho96/ho96.pdf
- https://www.botanytoday.com/brunches-of-botany

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks:	100 Marks
Continuous Internal Assessment (CIA):	30 Marks
End Semester Exam (ESE):	70 Marks

Continuous Internal Assessment (CIA): 30 (By Course Teacher)	Internal Test/Quiz:20+20 Assignment/ Semenar-10 Total Marks-30	Better marks out of the two Tot Quiz + obtained marks in Assignment shall be considered against 15 Marks

End Semester Exam (ESE):70	Two section A&B Section A: Q1 Objective 10*1=10 Marks, Q2 Short answer type-5*4=20 Section B: Descriptive answer type qts 1 out of 2frm each- 4*10=40 Marks

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FOUR YEAR UNDERGRADUATE PROGRAMME (2024-28)

DEPARTMENT OF BOTANY

COURSE CURRICULUM

PART- A: Introduction			
Programme: Bachelor in Life Sciences **(Certificate/Diploma/Degree/Honors**		**Semester-IV**	**Session: 2024-2025**
Course Code	**BOSC-04P**		
Course Title	**Lab.Course-02 (Angiosperms)**		
Course Type	**Laboratory course**		
Pre-requisite (if any)	**As per program**		
Course Learning. Outcomes (CLO)	**At the end of this course, the students will be able to-** ➢ **Understand the systematic status of flowering plants** ➢ **Learn collection of local flora ,identification and herbarium preparation** ➢ **Understand internal structure of different plant parts** ➢ **Understand the pollination and seed dispersal mechanism.** ➢ **Understand about reproduction system in flowering plants.**		
Credits Value	**1 Credits**	**Credit =30 Hours Laboratory or Field learning/Training**	
Total Marks	**Max. Marks:50**	**Min Passing Marks: 20**	

PART-B:	**Content of the Course**	
Total No. of learning-Training/performance Periods: 30 Periods (30 Hours)		
Module	Topics (Course contents)	No. of Period
Lab/ field Training/ Experiment Content of Course	➢ Description of local plants of the syllabus in semitechnical language,floral formula and floral diagrams should be drawn ➢ Anatomy of primary and secondary growth in monocuts and dicots stem using hand sections or permanent slides.	30

	➢ Anatomy of root,primary and secondary structure · Study of placentation. ➢ Study of types of ovule in permanent slide. ➢ Isolation of globular,heart shape and torpedo embryo ➢ Study of pollination by insects ➢ Prepration of herbarium of local	
Keywords	Herbarium, Monocot, Placentation, Pollination	
Signature of Convener & Members (CBoS)		

DEPARTMENT OF BOTANY

COURSE CURRICULUM

PART-C: Learning Resources

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 Delhi.

6. Pandey,B.P.(2014).Modern Practical Botany Vol.II.S.Chand and Company Ltd.,NewDelhi.

7. .Bendre,A.M.and Kumar A.(2003).Manual of Practical Botany Vol.II.RastogiPublications,Meerut. 8..Santra S.C.and Chatterjee (2005).College Botany Practical Vol.III New Central Book Agency Pvt.Ltd

Text Books Recommended-

1. Principles of Paleontology 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
- http://www.swayam.ac.in
- http://www.ignou.ac.in
- www.egyankosh.ac.in
- www.litm.ac.in
- www.eskillindia.org
- www.eshiksha.mp.gov.in

- www.vlab.co.in

Online Resources-
e-sources/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/arcas-of-specialization- in-botany.html

APART -D: Assessment and Evaluation

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

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

End Semester Exam (ESE):35	Laboratory/Field Skill Performance: On spot Assessment Section A : Performed the Task based on lab, work 20*1=20 Marks B: Sporting based on lab, work (written) 10*1=10Marks Section B : Viva-voce (based on principle/technology) - 5*1=05 Marks

Signature of Convener & Members (CBoS)

FOUR YEAR UNDERGRADUATE PROGRAMME (2024-28)

DEPARTMENT OF MICROBIOLOGY

COURSE CURRICULUM

PART-A: Introduction			
Programme: Bachelor in Life Sciences (Certificate/Diploma/Degree Honors)		**Semester-IV**	**Session: 2024-2025**
Course Code	**MBSC-04T**		
Course Title	**Bioinstrumentation and Biostatistics**		
Course Type	**Discipline Specific course (DSC)**		
Pre-requisite (if any)	**As per program**		
Course Learning. Outcomes (CLO)	**After successfully completing this course, the students will be able to –** ➢ recall the principle of microscopy and compare the types of microscopes for specialized viewing ➢ identify the basic analytical instruments for performing microbiological manipulations ➢ relate the techniques used for processing the microbial samples ➢ recognize the basics of radiobiology and its applications ➢ illustrate basic concept of Biostatistics and develop their application		
Credit Value	**3 Credits**	**Credit =45 Hours-learning & Observation**	
Total Marks	**Max. Marks: =100**	**Min Passing Marks: 40**	

PART -B: Content of the Course		
Total No. of Teaching-learning Periods (01 Hr. per period) -45 Periods (45 Hours)		
Unit	Topics (Course contents)	
I	**Microscopy:**Principle,Mechanism and application of different types of microscopes- Bright field,Dark field and Phase Contrast microscope;Fluorescence microscopy, Confocal microscopy,Scanning and Transmission Electron Microscopy (SEM&TEM). Micrometry.	12

	pH metry: Principle, Types of electrodes, factors affecting pH measurement, application of pH meter.	
II	**Centrifugation:**Principle and Types of Centrifugal Machines,Analytical,Preparatory differential,Rate zonal and ultracentrifugation and their applications. **Chromatography**:Principle and techniques with applications of Partition,ion-exchange, exclusion and affinity chromatography. **Electrophoresis:** Principle of Agarose and Polyacrylamide Gel Electrophoresis Components, working and applications.	11
III	**Spectrophotometry**:Electromagnetic spectrum,Basic principles and Law of absorption; principle,mechanism and applications of Visible and UV spectrophotometer **Radiobiology:** Radioactivity, forms of radioactive emissions, biological effects of radiation exposure, characters of radioisotopes and their applications, Principles and methods of radioactive detection, GM counter, counter and Autoradiography.	11
IV	**Biostatistics:** Definitions, Basic concepts, sample and population, Measurement scales, Statistical inference and parameters, methods of sampling, Classification of Data, Tabulation, Frequency distribution, diagrammatic and Graphical presentation of data, Data Analysis-Central Tendencies (Mean, Median and Mode). Deviation (Variance, SD and SE)	11
Keywords	**Microscope, Centrifuge, pH meter, Chromatography, Electrophoresis, Spectrophotometer, Radiobiology, Biostatistics**	
Signature of Convener & Members (CBoS)		

FOUR YEAR UNDERGRADUATE PROGRAMME (2024-28)

DEPARTMENT OF MICROBIOLGY

COURSE CURRICULUM

PART-C: Learning Resources
Text Books, Reference Books and Others
Text Books Recommended:- 1. Biophysical Chemistry,Principles and Techniques-A.Upadhyay,K.Upadhyay and N.Nath,Himalaya Pub 2.Biotechniques:Theory and Practice-S.V.S.Rana,Rastogi Pub 3.Analytical Chemistry-G.Chatwal and Anand,Himalaya Pub 4.Statistical Methods;S.P.Gupta 5.Fundamentals of Biostatistics;Khan and Khanum,Ukaaz Publications,Hyderabad
Reference Books Recommended- 1.Fundamental of light Microscopy &Electron Imaging.1 Edition.Murphy D.B 2.Fundamentals and techniques of biophysics and molecular biology (2016)Pranav Kumar. 3.Techniques and methods in biology PHI publication (2011)K L Ghatak 4.Biostatistics;Sunder Rao
Online Resources- ➢ e-books and e-learning portals ➢ https://www.coursera.org/lecture/emergence-of-life/4-5-invertebrates-successes-of-life-http://www.ignou.ac.in ➢ https://www.shiksha.com/online-courses/introduction-to-biology-biodiversity-course-http://www.itm.sc.in ➢ https://www.youtube.com/watch?v=uK-XYhttp://www.eshiksha.mp.gov.in ➢ https://www.youtube.com/watch?v=WxMSckEcio4http://www.internshala.com
Online Resources- e-sources/e-books and e-learning portals ➢ https://www.pbs.org/video/botany-basics-iuu2bl/ ➢ https://efaidohmannibpcapcalclefindorkaj/https://www2.ca.uky.edu/apcom/pubs/ho/ho96/ho96.pdf ➢ https://www.botanytoday.com/brunches-of-botany

APART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks: 100 Marks

Continuous Internal Assessment (CIA): 30 Marks

End Semester Exam (ESE): 70 Marks

Continuous Internal Assessment (CIA): 30 (By Course Teacher)	Internal Test/Quiz:20+20 Assignment/ Semenar-10 Total Marks-30	Better marks out of the two Tot Quiz + obtained marks in Assignment shall be considered against 15 Marks

End Semester Exam (ESE):70	Two section A&B Section A :Q1 Objective 10*1=10 Marks Q2 Short answer type- 5*4=20 Section B : Descriptive answer type qts 1 out of 2frm each- 4*10=40 Marks

Signature of Convener & Members (CBoS)

FOUR YEAR UNDERGRADUATE PROGRAMME (2024-28)

DEPARTMENT OF MICROBIOLOGY

COURSE CURRICULUM

PART- A: Introduction			
Programme: Bachelor in Life Sciences **(Certificate/Diploma/Degree/Honors**		**Semester-IV**	**Session: 2024-2025**
Course Code	**MBSC-04P**		
Course Title	**Lab. Course -03 Bioinstrumentation and Biostatistics**		
Course Type	**Laboratory course**		
Pre-requisite (if any)	**As per program**		
Course Learning. Outcomes (CLO)	**After successfully completing this course, the students will be able to –** ➢ **Identify Microorganisms On The Basis Of Microscopic Features.** ➢ **Relate Common Analytical Techniques In Microbiology.** ➢ **Infer The Concept Of Biostatistics.** ➢ **Explain The Significance Of Central Tendencies.**		
Credits Value	**1 Credits**	**Credit =30 Hours Laboratory or Field learning/Training**	
Total Marks	**Max. Marks:50**	**Min Passing Marks: 20**	
PART-B:	**Content of the Course**		
Total No. of learning-Training/performance Periods: 30 Periods (30 Hours)			

Module	Topics (Course contents)	No. of Period
Lab/ field Training/ Experiment Content of Course	1.Study of different parts of microscope 2.Determination of λmax of given coloured solution and Confirmation of Beer's law 3.Separation of components of a given mixture using a laboratory scale centrifuge 4.Separation of Ink components/chlorophyll /Amino acids by Paper Chromatography 5.Separation of Amino acids by Thin Layer Chromatography 6.Demonstration of Gel Filtration Chromatography 7.Measurement of pH of water and soil samples and maintenance of required pH	30

	8.Demonstration of SDS-PAGE and Submarine Gel Electrophoresis 9.Preparation of Tables,Bar diagrams and Histograms from given data 10.Calculation of Mean, Median and Mode from grouped and ungrouped data.	
Keywords	**Microscopy,Spectrophotometry,Chromatography,Centrirugation Presentation of Data,Calculation of Central Tendencies**.	
Signature of Convener & Members (CBoS)		

FOUR YEAR UNDERGRADUATE PROGRAMME (2024-28)

DEPARTMENT OF MICROBIOLOGY

COURSE CURRICULUM

PART-C: Learning Resources		
Text Books, Reference Books and Others		
Text Books Recommended-		
1.An Introduction to practical Biochemistry;McGraw Hill Publication 1987.D.T Plummer. 2.Principles and Techniques in Practical Biochemistry;Wilson &Walker 3.Biotechniques:Theory and Practice;S.V.S.Rana,Rastogi Pub 4.Statistical Methods; S.P.Gupta		
Reference Books Recommended-		
Online Resources- ➢ E-resources/e-books and e-learning portals ➢ http://ndi.ätkgp.ac.in/he/document/swayamprabha/swayam ➢ http://www.swayam.ac.in ➢ http://www.ignou.ac.in ➢ www.egyankosh.ac.in ➢ www.litm.ac.in ➢ www.eskillindia.org ➢ www.eshiksha.mp.gov.in		
Online Resources- e-sources/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/arcas-of-specialization- in-botany.html		
PART -D: Assessment and Evaluation		
Suggested Continuous Evaluation Methods: Maximum Marks: 50 Marks Continuous Internal Assessment (CIA): 15 Marks End Semester Exam (ESE): 35 Marks		
Continuous Internal Assessment (CIA): 15 (By Course Teacher)	Internal Test/Quiz:10+10 Assignment/ Semenar-05 Total Marks-15	Better marks out of the two Tot Quiz + obtained marks in Assignment shall be considered against 15 Marks
End Semester Exam	Laboratory/Field Skill Performance: On spot Assessment Section A : Performed the Task based on lab, work 20*1=20 Marks	

(ESE):35	B: Spotting frased on tools & technology (written) 10*1=10Marks Section B : Viva-voce (based on principle/technology) - 5*1=05 Marks
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FOUR YEAR UNDERGRADUATE PROGRAMME (2024-28)

DEPARTMENT OF HISTORY

COURSE CURRICULUM

PART-A: Introduction			
Programme: Bachelor in Life Sciences (Certificate/Diploma/Degree Honors)		**Semester-IV**	**Session: 2024-2025**
Course Code	**SCGE-04**		
Course Title	**History of India from beginning to 2nd century BC**		
Course Type	**Discipline General Elective course (GE)**		
Pre-requisite (if any)	**As per program**		
Course Learning. Outcomes (CLO)	**After completion of the course, the student shall be able to.** ➢ **Understand about various sources of ancient Indian History.** ➢ **Understand various chrono logical Period of ancient Indian history.** ➢ **Become familiar with various aspects of political and cultural history of those periods.**		
Credit Value	**4 Credits**	**Credit =60 Hours-learning & Observation**	
Total Marks	**Max. Marks: =100**	**Min Passing Marks: 40**	

PART -B: Content of the Course		
Total No. of Teaching-learning Periods (01 Hr. per period) -45 Periods (45 Hours)		
Unit	Topics (Course contents)	
I	**1.**Sources of ancient Indian history. 2.Literacy of sources brahman, Jain, Buddha and accounts of foreign Travelers 3.Archaeological sources: stone, tools, inscriptions, coins Architecture and sculptures	15
II	1.Vedic age 2.Mahajan padas 3.Flourishing of Magadh Empire	15
III	1.Achievements of Chandragupta Maurya and Ashoka and decline of Mauryan Empire 2.Indo Greeks 3.Sunga	15
IV	1.Satvahan 2.. Shaka Ksha trap and partiyon 3.kharvela	15
Keywords	**Source, Vaidik, Magadh, Shung, Karvelas**	
Signature of Convener & Members (CBoS)		

FOUR YEAR UNDERGRADUATE PROGRAMME (2024-28)

DEPARTMENT OF HISTORY

COURSE CURRICULUM

PART-C: Learning Resources

Text Books, Reference Books and Others

1.उदयनारायण राय - गुप्त राजवंश तथा उसका इतिहास (नया संस्करण) 1988

2. श्री राम गोयल- भारत का राजनैतिक इतिहास भाग 2 एवं 3

3. श्री राम गोयल- गुप्त साम्राज्य का इतिहास

4. विशुद्धानंद पाठक- उत्तर भारत का राजनीतिक इतिहास

5 डी.सी. गांगुली - परमार राजवंश

. 6 .अवध बिहारी लाल अवस्थी- राजपूत राजवंश

7. भगवती प्रसाद पांथरी- गौखरी और पुष्यभूमि राजवंश

8. डॉ. बैजनाथ शर्मा- हर्षवर्धन

डॉ. के.ए. नीलकंठ शास्त्री- दक्षिण भारत का इतिहास

Text Books Recommended-

Reference Books Recommended-

1.Majumdar, Roy - An Advanced History of India Vol. I

2.. Ashvini Agrawal- Rise and Fall of the imperial Gupta

3. R.C. Majumdar & A.D. Pusalkar (Ed.) The Classicale Age "The age of Imperial

Online Resources-

- e-books and e-learning portals
- https://www.coursera.org/lecture/emergence-of-life/-http://www.ignou.ac.in
- https://www.shiksha.com/online-courses/-http://www.itm.sc.in
- https://www.youtube.com/watch?v=uK-XYhttp://www.eshiksha.mp.gov.in
- https://www.youtube.com/watch?v=WxMSckEcio4http://www.internshala.com

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

- https://www.pbs.org/video/political-basics-iuu2bl/
- https://efaidohmannibpcapcalclefindorkaj/https://www2.ca.uky.edu/apcom/pubs/ho/ho96/ho96.pdf
- https://www.botanytoday.com/brunches-of-botany

RT -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks:	100 Marks
Continuous Internal Assessment (CIA):	30 Marks
End Semester Exam (ESE):	70 Marks

Continuous Internal Assessment (CIA): 30 (By Course Teacher)	Internal Test/Quiz:20+20 Assignment/ Semenar-10 Total Marks-30	Better marks out of the two Tot Quiz + obtained marks in Assignment shall be considered against 15 Marks

End Semester Exam (ESE):70	Two section A&B Section A: Q1 Objective 10∗1=10 Marks Q2 Short answer type-5∗4=20 Section B: Descriptive answer type qts 1 out of 2frm each- 4*10=40 Marks

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FOUR YEAR UNDERGRADUATE PROGRAMME (2024-28)

DEPARTMENT OF MICROBIOLOGY

COURSE CURRICULUM

PART-A: Introduction			
Programme: Bachelor in Life Sciences (Certificate/Diploma/Degree Honors)		**Semester-IV**	**Session: 2024-2025**
Course Code	**MBSE-02T**		
Course Title	**INDUSTRIAL MICROBIOLOGY**		
Course Type	**DISCIPLINE SPECIFIC ELECTIVE COURSE (DSE)**		
Pre-requisite (if any)	**As per program**		
Course Learning. Outcomes (CLO)	**After successfully completing this course, the students will be able to –** ➢ **Define The Role of Microorganism in Industry.** ➢ **Explain The Processing of The Best Microbial Strains for The Industry.** ➢ **Outline The Fundamentals of Fermenters and Fermentation** ➢ **Processes** ➢ **Relate Metabolic Pathways for Industrial Products** ➢ **Identify The Production of Various Industrially Important** ➢ **Products**		
Credit Value	**3 Credits**	**Credit =45 Hours-learning & Observation**	
Total Marks	**Max. Marks: =100**	**Min Passing Marks: 40**	

PART -B: Content of the Course		
Total No. of Teaching-learning Periods (01 Hr. per period) -45 Periods (45 Hours)		
Unit	Topics (Course contents)	
I	**Multidisciplinary nature of Industrial microbiology:** Introduction, brief History, ancient Indian perspective, important characteristics of industrially useful microorganisms	12

	Upstream and Down-stream processing: Detection and assay of the product Recovery and Purification, storage and packaging methods.	
II	**Scale up, Screening and Strain Development Strategies:** Industrial sterilization, Isolation. preservation and maintenance of industrial strains Production Media and Raw materials, Fermenter design. Types of fermentation: Aerobic and anaerobic Batch, fed-batch and Continuous fermentation.	11
III	**Metabolic pathways**: Industrial production of citric acid, acetic acid, Lactic acid, Glutamic acid. **Vaccines and Hormones:** Hepatitis vaccine, Rabies vaccine, insulin.	11
IV	**Production of industrial fermentation products:** Fermented food and beverages, Ethanol, Amylases, Penicillin, Single Cell Protein, Biofertilizers and Biopesticides.	11
Keywords	**Scale up, Fermenter, Fermentation, Downstream processing, Metabolic pathways. Fermented food**	
Signature of Convener & Members (CBoS)		

FOUR YEAR UNDERGRADUATE PROGRAMME (2024-28)

DEPARTMENT OF MICROBIOLGY

COURSE CURRICULUM

PART-C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:-

- Industrial Microbiology:Patel A.H.(1996).I edition,MacMillan India Limited publishing
- company Ltd New Delhi,India
- A Text Book of Microbiology:R.C.Dubey &D.K.Maheshwari
- Industrial Microbiology by Prescott &Dunns,AVI Publishing Company Inc Biotechnology;V.Kumaresan,Saras Publications

Reference Books Recommended-

- Modern Industrial Microbiology and Biotechnology:Okafor N.(2007).1st edition.Bios Scientific Publishers Limited.USA.
- Industrial Microbiology:Casida LE,New age International (P)Ltd

Online Resources-

- e-books and e-learning portals
- https://www.coursera.org/lecture/emergence-of-life/4-5-invertebrates-successes-of-life-http://www.ignou.ac.in
- https://www.shiksha.com/online-courses/introduction-to-biology-biodiversity-course-http://www.itm.sc.in
- https://www.youtube.com/watch?v=uK-XYhttp://www.eshiksha.mp.gov.in
- https://www.youtube.com/watch?v=WxMSckEcio4http://www.internshala.com

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

- https://www.pbs.org/video/botany-basics-iuu2bl/
- https://efaidohmannibpcapcalclefindorkaj/https://www2.ca.uky.edu/apcom/pubs/ho/ho96/ho96.pdf
- https://www.botanytoday.com/brunches-of-botany

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks:	100 Marks
Continuous Internal Assessment (CIA):	30 Marks
End Semester Exam (ESE):	70 Marks

Continuous Internal Assessment (CIA): 30 (By Course Teacher)	Internal Test/Quiz:20+20 Assignment/ Semenar-10	Better marks out of the two Tot Quiz + obtained marks

	Total Marks-30	in Assignment shall be considered against 15 Marks
End Semester Exam (ESE):70	Two section A&B Section A :Q1 Objective 10*1=10 Marks Q2 Short answer type-5*4=20 Section B : Descriptive answer type qts 1 out of 2frm each- 4*10=40 Marks	
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FOUR YEAR UNDERGRADUATE PROGRAMME (2024-28)

DEPARTMENT OF MICROBIOLOGY

COURSE CURRICULUM

PART- A: Introduction			
Programme: Bachelor in Life Sciences **(Certificate/Diploma/Degree/Honors**		**Semester-IV**	**Session: 2024-2025**
Course Code	**MBSE-02P**		
Course Title	**LAB COURSE, INDUSTRIAL MICROBIOLOGY**		
Course Type	**LABORATARY COURSE, DISCIPLINE SPECIFIC ELECTIVE COURSE (DSE)**		
Pre-requisite (if any)	**As per program**		
Course Learning. Outcomes (CLO)	**After successfully completing this course, the students will be able to –** ➢ **Recall Laboratory Discipline, Instrumentation And Techniques** ➢ **Involved In Industrial Microbiology** ➢ **Develop Skill To Culture And Identify Industrially Important** ➢ **Microbes** ➢ **Relate About Design Of Fermenter** ➢ **Experiment With The Whole Steps Of Fermentation**		
Credits Value	**1 Credits**	**Credit =30 Hours Laboratory or Field learning/Training**	
Total Marks	**Max. Marks:50**	**Min Passing Marks: 20**	
PART-B:	**Content of the Course**		
Total No. of learning-Training/performance Periods: 30 Periods (30 Hours)			
Module	Topics (Course contents)		No. of Period
Lab/ field Training/ Experiment Content of Course	1.Study of Bioreactor used in large scale production. 2.Isolation and characterization of Industrial microorganisms 3. Isolation of antibiotic producing microorganisms from soil. 4.Demonstration of production of Amylase/Protease/Cellulase by microorganisms. 5.Demonstration of Production of lipase by microorganisms 6.Production of ethanol by Yeast 7.Production of Citric acid by Aspergillus Niger:		30
Keywords	**Fermenter,Bioreactor,Industrial Microorganisms,Production,Preservation techniques**		**Electroph**
Signature of Convener & Members (CBoS)			

FOUR YEAR UNDERGRADUATE PROGRAMME (2024-28)

DEPARTMENT OF MICROBIOLOGY

COURSE CURRICULUM

PART-C: Learning Resources		
Text Books, Reference Books and Others		
Text Books Recommended-		
1.Practical Microbiology:Dubey,R.C.and Maheshwari.D.K.2012.,S.Chand &Company,Pvt.Ltd 2.Experiments in Microbiology,Pathology and Tissue Culture:Aneja,K.R.1993.,Vishwa Prakashan		
Reference Books Recommended-		
Online Resources- ➢ E-resources/e-books and e-learning portals ➢ http://ndi.ätkgp.ac.in/he/document/swayamprabha/swayam ➢ http://www.swayam.ac.in ➢ http://www.ignou.ac.in ➢ www.egyankosh.ac.in ➢ www.litm.ac.in ➢ www.eskillindia.org ➢ www.eshiksha.mp.gov.in		
Online Resources- e-sources/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/arcas-of-specialization- in-botany.html		
PART -D: Assessment and Evaluation		
Suggested Continuous Evaluation Methods: Maximum Marks: 50 Marks Continuous Internal Assessment (CIA): 15 Marks End Semester Exam (ESE): 35 Marks		
Continuous Internal Assessment (CIA): 15 (By Course Teacher)	Internal Test/Quiz:10+10 Assignment/ Semenar-05 Total Marks-15	Better marks out of the two Tot Quiz + obtained marks in Assignment shall be considered against 15 Marks

End Semester Exam (ESE):35	Laboratory/Field Skill Performance: On spot Assessment Section A : Performed the Task based on lab, work 20*1=20 Marks B: Spotting frased on tools & technology (written) 10*1=10Marks Section B : Viva-voce (based on principle/technology) - 5*1=05 Marks
Signature of Convener & Members (CBoS)	

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FOUR YEAR UNDERGRADUATE PROGRAMME (2024-28)

DEPARTMENT OF ENGLISH

COURSE CURRICULUM

PART-A:Introduction			
PROGRAMME: Bachelor in Computer Application (Certificate/Diploma/Degree/Honors)		**Semester-IV**	**Session: 2024-2028**
Course Code	**AEC- 04**		
Course Title	**Communicative English and Soft Skills**		
Course Type	**Ability Enhancement Course (AEC)**		
Prerequisite	**As per PROGRAMME**		
Course Learning Outcomes (CLO)	**At the end of this course, the students will be able** • Learn deviant use of English both in written and spoken forms. • Understand the importance of communication n English. • Apply the ability to improve competence in using English language. • Analyze the importance of reading skills, • Develop language for speaking with confidence		
Credit Value	**2 Credits**	**1 Credit-15 Hours - Learning & Observation**	
Total Marks	**Max. Marks: 50**	**Min marks -20**	

PART -B: Content of the Course

Total No. of Teaching-Learning Periods (45 min. per period)-30 Periods

Unit	Topics(Course Content)	No. of Period
I	**What is communication?** • Purpose of Communication. • Types of Communication (Verbal and Non- Verbal), • The motivating factors (lntrinsic and Extrinsic) • Barriers of Communication (Internal and External).	**07**
II	**Building Vocabulary** i. Use of Dictionary, ii. Building vocabulary through synonyms and antonyms, iii. Use of Phrasal Verbs, Idioms and Phrases iv. Unseen passage	**07**
III	**Conversation in English** (Performance Based) **A) Reading:** Very short stories (Gif of Magi, Cinderella, The Selfish Giant, Stories from Panchatantra), Newspaper reports / Fact-based articles, Diction and tone,	**08**

	Identifying topic sentences, Reading aloud: Reading an article/report. **B) Spoken English for the Real world and Situational Dialogues (any four)** • Call Center: Talking to service Providers, Professional Enquiries, Talking with peers/ seniors. • Bank: for opening an account (seeking information on loans/FDs/other schemes. • Office: (seeking information regarding job vacancy) • Market (asking for price of an object, discount etc), • Restaurant: (asking for the special dish, offerings in the menu and ordering for food) • At the Railway Station / Bus Station enquiry: (Arrival and departure of buses/ trains) • Hotel: Booking a room, asking tariff rate • Travel agency:-(Asking to book tickets fares, finding vacancies in hotels) C) **Greetings and Common Etiquettes:** Introducing oneself Invitation; Making Requests; Expressing Gratitude; Complimenting and Congratulating; Expressing Sympathy; Apologizing; Complaining and Expressing Regret	
IV	**Applied Riding Practice and Ethics** i. Introduction to trail riding or arena riding ii. Group riding etiquette and communication iii. Intro to jumping and dressage (optional for advanced learners) iv. Ethical treatment and welfare of horses v. Assessment through practical demonstrations and logbook maintenance **Presentation skills** (Performance Based): Effective oral presentation, Characteristics of good oral presentation. Use of quotations and anecdotes. Ways of Oral Presentation (Seminar, Viva -voce, Interview, Power Point etc.) Gestures/ Mannerism during oral presentation. Media methods used for effective oral presentation, Body Language, Attire.	**08**
Keywords	Communication, Vocabulary, Conversation, Reading, Presentation.	

Name and Signature of Convener & Members of CBS

PART-C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

- Fluency in English - Part II, Oxford University Press, 2006.
- Enrich Your English, OUP, SR Inthira and V. Saraswathi, CIEFL,1997
- Oxford A-Z of English Usage, ed. Jeremy Butterfield, OUP, 2007.
- Longman Dictionary of Common Errors, N.D. Turton and J.B. Heaton, Longman, 1998
- Contemporary Communicative English, S Chand
- Malhotra Prerna, Deb Dulal Halder,(2019) Communication Skills: Theory and Practice, Eighth Edition,
- BookAge Publications, New Delhi.

Online Resources:

- Applying Communication Theory for Professional Life: A Practical Introduction. Dainton andZelley, http://tsime.uz.ac.zw/claroline/backends/download.php/url-L0ludHJvX3RvX2NvbWl1bmliYXRpb2Sf
- https://web.sol.du.ac.in/my_modules/type/cbcs-4l=2ldata/root/B.Com/Semester%20ABILITY-ENHANCEMENT 20COMPU_ SORY%20COURSE-AECC/English%20Communication%20A-B-C/Unit%201-5.pdf
- https:/larchive.ore/details/personality-development-book/mode/1up
- https://www.coursera.org/articles/presentation-skills
- https://eniaminball.com/blogleood-body-lanzuage-best-visual-aid-falks/
- https://www.cbs.de/en/blog/15-effective-presentation-tips-to-improve-presentation-skills/
- https://blow.moderngeoy.com/importance-of-body-language-in-presentations-good-bad-examples

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks: 50 marks
Continuous Internal Assessment (CIA): 15 Marks.
End Semester Exam (ESE): 35 marks

Continuous Internal Assessment (CIA): (By Course Teacher)	**Internal test/Quiz-:10 & 10 Assignment /seminar-05 Total marks:-15**	**Better marks out of the two test/Quiz+ obtained marks in assignment shall be considered against 15 marks.**
End Semester Exam (ESE):	**Two section- A&B Section A: Q1. Objective-05 marks: Q2. Short answer type-5x2=10 marks ction B: Descriptive answer type question, 1 out of 2 from each unit-4x5=20 marks otal = 35 marks**	

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FOUR YEAR UNDERGRADUATE PROGRAMME (2024-2028)

EQUINE STUDIES & HORSEMANSHIP

COURSE CURRICULUM

PART-A: Introduction			
Programme: Common to All the UGs		**Semester-IV**	**Session: 2024-2025**
Course Code	**SEC-04T/P**		
Course Title	**Equine Studies & Horsemanship**		
Course Type	**Skill Enhancement Course (SEC)**		
Pre-requisite (if any)	**As per Programme**		
Course Learning Outcomes (CLO)	**At the end of this course, the students will be able:** **i. to develop riding proficiency and demonstrate basic riding skills and control at various gaits.** **ii. to understand equine behavior and care by gaining knowledge of horse behavior and basic care practices.** **iii. to enhance physical fitness and coordination by improving fitness, balance, and coordination through riding practice.** **iv. to learn riding techniques and styles by exploring different riding techniques and disciplines for specialization.** **v. to promote safety and risk management by applying safety protocols and risk management strategies in equestrian activities.**		
Credit Value	**02 Credits**	**1 Credit =15 Hours-learning & Observation**	
Total Marks	**Max. Marks:50**	**Min Passing Marks: 20**	
PART -B: Content of the Course			
Total No. of Teaching-learning Periods (45 min. per period) -30 Periods			
Unit	**Topics (Course Contents)**		

I	**Introduction to Horse-Riding and Equine Basics** ➢ History and evolution of horse-riding in sport and culture ➢ Introduction to equine anatomy and physiology ➢ Types of horse breeds and their characteristics ➢ Equipment and tack: saddle, bridle, stirrups, reins, riding attire ➢ Basic grooming and horse care	**07**
II	**Groundwork and Safety Protocols** Approaching, haltering, and leading a horse Stable management and horse behaviour basics Feeding, hydration, and routine checks Safety guidelines for riders and handlers Risk management and emergency procedures	**07**
III	**Basic Riding Techniques** Mounting and dismounting techniques Correct rider posture and balance Use of reins, legs, and seat for communication Walking, halting, and changing directions Basic trot and control exercises	**08**
IV	**Applied Riding Practice and Ethics** Introduction to trail riding or arena riding Group riding etiquette and communication Intro to jumping and dressage (optional for advanced learners) Ethical treatment and welfare of horses Assessment through practical demonstrations and logbook maintenance	**08**

PART-C: Learning Resources

i. https://www.coursera.org/learn/equine

ii. https://www.coursera.org/learn/equine-welfare

iii. https://www.edx.org/learn/animal-behavior

iv. https://www.youtube.com/user/EquestrianCoach

v. https://www.riding-instructor.com/

vi. https://horseandrider.com/

vii. https://equestrian.ca/

viii. https://www.bhs.org.uk/

ix. https://www.udemy.com/courses/search/?q=horse%20riding

x. https://equineinstitute.org/

PAPART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks: 50 Marks

- **Practical (riding techniques, horse care demonstration, logbook):15 marks**
- **End Sem. Exam. (Theory): 35**

Signature of Convener & Members (CBoS)