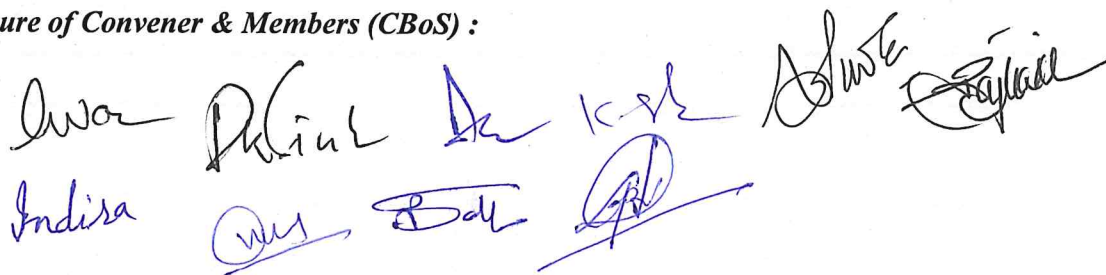


FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)
DEPARTMENT OF CHEMISTRY
COURSE CURRICULUM

PART- A: Introduction			
Program: Bachelor in Science <i>(Certificate / Diploma / Degree/Honors)</i>		Semester - II	Session: 2024-2025
1	Course Code	CHSC-02T	
2	Course Title	FUNDAMENTAL CHEMISTRY-II	
3	Course Type	DSC	
4	Pre-requisite (if, any)	<i>As per Program</i>	
5	Course Learning Outcomes (CLO)	<ul style="list-style-type: none"> ➤ <i>To understand different acid-base theories and solvent system .</i> ➤ <i>To learn the preparation, bonding, and reactions of C-C σ- & π-bonded compounds</i> ➤ <i>To understand the concept and chemistry of aromatic compounds and their reactions</i> ➤ <i>To learn the basic concepts of various states of matter & understand the basic concepts of surface chemistry and chemical kinetics</i> 	
6	Credit Value	3 Credits	<i>Credit = 15 Hours - learning & Observation</i>
7	Total Marks	Max. Marks: 100	Min Passing Marks: 40
PART -B: Content of the Course			
Total No. of Teaching-learning Periods (01 Hr. per period) - 45 Periods (45 Hours)			
Unit	Topics (Course contents)		No. of Period
I	Acid, Base and Solvent System Theories of acids and bases: Arrhenius, Bronsted-Lowry, conjugate acids and bases, relative strengths of acids and bases, the Lux-flood, solvent system and Lewis concepts of acids and bases. HSAB concept: Classification of Acids and Bases According to HSAB Theory (Hard, Borderline, Soft). Applications of HSAB Theory in Inorganic Reactions - Solubility, Selectivity, Redox Reactions Non-aqueous solvents: .Physical properties of a solvent, types of solvents and their general characteristics, Liquid ammonia as a solvent. Acid-base, precipitation and complex, formation reactions. Solutions of alkali and alkaline earth metals in ammonia-application)		11
II	CHEMISTRY OF C-C σ-BONDING Alkanes: Preparation (Wurtz reaction, reduction/hydrogenation of alkenes, Corey-House method). Reactions (mechanisms): halogenation, free radical substitution. Cycloalkanes: Preparation (Dieckmann's ring closure, reduction of aromatic hydrocarbons), Reactions (mechanisms): substitution and ring-opening reactions. Stability of cycloalkanes -Baeyer's strain theory, Sachse and Mohr predictions, Conformational structures of ethane, n-butane and cyclohexane. CHEMISTRY OF C-C π-BONDING Alkenes: Preparation methods (dehydration, dehydrohalogenation, dehydrogenation, Hoffmann and Saytzeff rules, cis and trans eliminations). Reactions (mechanisms): electrophilic and free radical addition (hydrogen, halogen, hydrogen halide, hydrogen bromide, water, hydroboration, ozonolysis, dihydroxylation with KMnO_4). Dienes: 1,2- and 1,4-additions, Diels-Alder reactions. Alkynes: Preparation (dehydrohalogenation, dehydrogenation), Reactions: Acidity, formation of acetylides, addition of water, hydrogen halides and halogens, oxidation,		12

	ozonolysis, hydroboration/oxidation. Aromatic Hydrocarbons Aromatic hydrocarbons: Aromaticity: Hückel's rule, aromatic character of arenes, cyclic carbocations/ carbanions and heterocyclic compounds with suitable examples. Electrophilic aromatic substitution: halogenation, nitration, sulphonation and Friedel-Craft's alkylation/acylation with their mechanism. Directive effects of the groups.	
III	Behaviour of ideal gases: Kinetic theory of gases – postulates and derivation of the equation, $PV = \frac{1}{3} mnc^2$ and derivation of the gas laws- Maxwell's distribution of molecular velocities-effect of temperature-types of molecular velocities-degrees of freedom-Principle of equipartition of energy. Behaviour of Real gases: Deviation from ideal behaviour, derivation of van der Waals, equation of state and critical constants. Liquid state chemistry: structure of liquids(Eyring Theory), Properties of liquids, viscosity and surface tension. Solid state chemistry: Nature of the solid state, law of constancy of interfacial angles, law of rational indices, Miller indices, elementary ideas of symmetry, symmetry elements and symmetry operations, seven crystal systems and fourteen Bravais lattices; X-ray diffraction, Bragg's law, Crystal defects.	11
IV	A. Colloids and surface chemistry: Classification, Optical, Kinetic and Electrical Properties of colloids, Coagulation, Hardy Schulze law, flocculation value, Protection, Gold number, Emulsion, micelles and types, Gel, Syneresis and thixotropy, Physical adsorption, chemisorption, B. Chemical kinetics: Rate of reaction, Factors influencing rate of reaction, rate law, rate constant, Order and molecularity of reactions, rate determining step, Zero, First and Second order reactions, Rate and Rate Law, methods of determining order of reaction, Chain reactions. Temperature dependence of reaction rate, Arrhenius theory, Physical significance of Activation energy, collision theory, demerits of collision theory, non-mathematical concept of transition state theory. C. Catalysis: Homogeneous and Heterogeneous Catalysis, types of catalyst, characteristics of catalyst, Enzyme catalyzed reactions, Industrial applications of catalysis.	11
Keywords	<i>Acid & Bases, Alkanes, Cycloalkanes, Alkenes, Dienes, Alkynes, Aromatic Hydrocarbons, Kinetic theory of gases, Real gases, Intermolecular forces, Crystal structure, Chemical kinetics</i>	

Signature of Convener & Members (CBoS) :



PART-C: Learning Resources

Text Books, Reference Books and Others

Textbooks Recommended:

1. Bahl, A., & Bahl, B. S. (2014). *Organic Chemistry (22nd Ed.)*. S. Chand & Sons.
2. Ahluwalia, V. K., & Goyal, M. (2001). *A Textbook of Organic Chemistry*. Narosa Publishing House.
3. Jain, M. K., & Sharma, S. C. (2017). *Modern Organic Chemistry*. Vishal Publishing Company.
4. Puri, B. R., Sharma, L. R., & Pathania, M. S. (2013). *Principles of Physical Chemistry (46th Ed.)*. Shoban Lal Nagin Chand And Co.
5. Bahl, B. S. A., & Tuli, G. D. (2009). *Essentials of Physical Chemistry (Multicolour Ed.)*. S. Chand & Company Pvt Ltd.
6. Puri, B. R., Sharma, L. R., & Kalia, K. C. (2018). *Principles of Inorganic Chemistry*. Nagin Chand and Co., New Delhi.

Reference Books Recommended:

1. Paula, B. Y. (2014). *Organic Chemistry (7th Ed.)*. Pearson Education, Inc. (Singapore).
2. Solomons, T. W. G. (2017). *Organic Chemistry (Global Ed.)*. John Wiley & Sons.
3. Morrison, R. T., & Boyd, R. N. (2010). *Organic Chemistry (7th Ed.)*. Prentice-Hall Of India Limited.
4. Laidler, K. J., & Meiser, J. H. (2006). *Physical Chemistry (2nd Indian Ed.)*. CBS Publishers.
5. Atkins, P. W., & De Paula, J. (2006). *Physical Chemistry (8th Ed.)*. Oxford University Press.
6. Dogra, S., & Dogra, S. (2006). *Physical Chemistry through Problems (2nd Ed.)*. New Age International.
7. Sangaranarayanan, M. V., & Mahadevan, V. (2011). *Textbook of Physical Chemistry*. University Press.

Online Resources—

- <https://bit.ly/3Gb99iy>
- <https://www.organic-chemistry.org/>
- <https://bit.ly/3GduvMi>
- <https://bit.ly/30TXm8d>
- https://application.wiley-vch.de/books/sample/3527316728_c01.pdf
- <https://www.ncbi.nlm.nih.gov/books/NBK547716/>

Online Resources—

- e-Resources / 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): (By Course Teacher)	Internal Test / Quiz-(2): 20 / 20	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against 30 Marks
	Assignment / Seminar - 10	
	Total Marks - 30	

Indira
Kishor
Anurag
Sudhakar
Kishor
Anurag

End Semester Exam (ESE):	Two section – A & B Section A: Q1. Objective – 10 x1= 10 Mark; Q2. Short answer type- 5x4 =20 Marks Section B: Descriptive answer type qts., 1out of 2 from each unit-4x10=40 Marks
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Name and Signature of Convener & Members of CBoS:

Indira *R. K. S.* *Dr. K. S.* *Shweta* *S. K.*
Indira *Indira* *Indira* *Indira* *Indira*

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

PART- A: Introduction			
Program: Bachelor in Science (Certificate / Diploma / Degree/Honors)		Semester- II	Session: 2024-2025
1	Course Code	CHSC-02P	
2	Course Title	CHEMISTRY LAB. COURSE-II	
3	Course Type	DSC	
4	Pre-requisite (if, any)	<i>As per Program</i>	
5	Course Learning Outcomes (CLO)	<ul style="list-style-type: none"> ➤ <i>Demonstrating and using common glassware for accurate measurements</i> ➤ <i>Studying the functional group analysis organic compounds</i> ➤ <i>Determining melting points to assess compound purity and employing distillation and sublimation techniques to establish boiling points</i> ➤ <i>Equipping with essential skills in measuring liquid surface tension and solution viscosity</i> 	
6	Credit Value	1 Credits	Credit =30 Hours Laboratory or Field learning/Training
7	Total Marks	Max. Marks: 50	Min Passing Marks: 20
PART -B: Content of the Course			
Total No. of learning-Training/performance Periods: 30 Periods (30 Hours)			
Module	Topics (Course contents)		No. of Period
Lab./Field Training/ Experiment Contents of Course	Basic Laboratory Techniques Demonstration of Laboratory Glassware and Equipment, Calibration of Thermometer : 80-82°C (Naphthalene), 113.5°-114°C (Acetanilide), 132.5°C - 133°C (Urea), 100°C (Distilled Water) Functional group Analysis of Organic Compounds , Detection of elements (N, S, and halogens) and functional groups Physical chemistry Surface tension measurements: Determine the surface tension by (i) drop number (ii) drop weight method. Surface tension composition curve for a binary liquid mixture. Viscosity measurement using Ostwald's viscometer, Determination of viscosity of aqueous solutions of (i) sugar (ii) ethanol at room temperature. Study of the variation of viscosity of sucrose solution with the concentration of solute. Viscosity Composition curve for a binary liquid mixture		30
Keywords	<i>Basic laboratory techniques, Equipments, Calibration, Melting points, Qualitative analysis, Physical chemistry, Surface tension, Viscosity</i>		

Signature of Convener & Members (CBoS) :

PART-C: Learning Resources

Text Books, Reference Books and Others

Textbooks Recommended:

1. Ahluwalia, V. K., Dhingra, S., & Gulati, A. (N.D.). *College Practical Chemistry*. University Press.
2. Khosla, B. D., Garg, V. C., & Gulati, A. (2011). *Senior Practical Physical Chemistry*. S. Chand & Co.

Reference Books Recommended:

3. Garland, C. W., Nibler, J. W., & Shoemaker, D. P. (2003). *Experiments in Physical Chemistry (8th Ed.)*. McGraw-Hill.
4. Mendham, J. (2009). *Vogel's Quantitative Chemical Analysis (6th Ed.)*. Pearson Education.
5. Mann, F. G., & Saunders, B. C. (2009). *Practical Organic Chemistry*. Pearson Education.
6. Furniss, B. S., Hannaford, A. J., Smith, P. W. G., & Tatchell, A. R. (2012). *Practical Organic Chemistry (5th Ed.)*. Pearson Education.

Online Resources–

- <http://heecontent.upsdc.gov.in/Home.aspx>
- <https://nptel.ac.in/courses/104/106/104106096/>
- <http://heecontent.upsdc.gov.in/Home.aspx>
- <https://nptel.ac.in/courses/104/106/104106096/>
- <https://www2.chemistry.msu.edu/faculty/reusch/VirtTxtml/introl.htm>
- <https://nptel.ac.in/courses/104/103/104103071/W>

Online Resources–

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

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks: 50 Marks

Continuous Internal Assessment (CIA): 15 Marks

End Semester Exam (ESE): 35 Marks

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

Name and Signature of Convener & Members of CBoS:

Indira
Anurag
Balu
D. K. Sharma
D. K. Sharma
S. K. Singh

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

PART- A: Introduction			
Program: Bachelor in Life Sciences (Certificate / Diploma / Degree/Honors)		Semester - II	Session: 2024-2025
1	Course Code	BOSC -02 T	
2	Course Title	Microbes and Thallophyta	
3	Course Type	Discipline Specific course (DSC)	
4	Pre-requisite (if, any)	As per program	
5	Course Learning Outcomes (CLO)	At the end of this course, the students will be able to 1. Understand about the Microbes and their Importance. 2. Identify edible mushrooms and learn cultivation techniques. 3. Learn about bio-fertilizers and their uses. 4. Understand life cycles of different algae and fungi.	
6	Credit Value	3 Credits	Credit = 15 Hours - learning & Observation
7	Total Marks	Max. Marks: 100	Min Passing Marks: 40
PART -B: Content of the Course			
Total No. of Teaching-learning Periods (01 Hr. per period) - 45 Periods (45 Hours)			
Unit	Topics (Course contents)	No. of Period	
I	Viruses: - general characteristics, nature, structure and nomenclature, Bacteriophages and TMV; Lytic and Lysogenic cycles, transmission and replication of viruses, Symptoms of viral diseases on plants, important plant diseases, viroid, prions. Actinomycetes: general characteristics, Structure, reproduction and economic importance. Mycoplasma, Phytoplasma,: general characteristics, structure, reproduction and their economic uses.	12	
II	Bacteria: History, general character, classification and morphology, Gram positive and Gram-negative bacteria, structure of bacteria shape, size flagella and ultra structure of bacterial cell; Bacterial Growth curve, factors affecting growth of microbes; sporulation, reproduction, recombination in bacteria- Transformation Conjugation and Transduction, and Economic importance. Cyanobacteria: General characteristics, morphology, Heterocyst, cell structure of Cyanobacteria, reproduction and economic importance of Bacteria.	11	
III	Phycology: General characteristic features of Algae. Algae in diversified habitat, Salient features, occurrence, classification and range of thallus organization. Prominent pigments found in Algae. Reproduction classification, general character and life cycle of -Volvox, Oedogonium, Chara, Vaucheria, Ectocarpus and Polysiphonia. Economic importance of algae - Role of algae in soil fertility, algae as biofertilizer, blue green algae and nitrogen fixation. Symbiosis; algal products - Agar, biofuel	11	
IV	Mycology, Mushroom Cultivation, Lichenology & Mycorrhiza: General characteristic features of Fungi, Economic importance and Classification of Fungi, Nutrition, Heterothallism, Physiological specialization, Heterokaryosis & Parasexuality in Fungi. Fungi as biocontrol agent. Classification, general character and life cycle of -Mucor, Phytophthora, Penicillium, Peziza, Ustilago, Puccinia, Agaricus; Colletotrichum, Alternaria. Edible Mushroom- Button and Oyster mushroom and their cultivation. General account of lichens. General account of Mycorrhiza.	11	
Keywords	Mycoplasma, Transduction, Biofertilizer, Parasexuality.		
Signature of Convener & Members (CBoS):			

① Rishway
 ② Khandas
 ③ Sankar
 ④ [Signature]
 ⑤ [Signature]
 ⑥ [Signature]
 ⑦ [Signature]

⑧ [Signature]
 ⑨ [Signature]
 ⑩ [Signature]

PART-C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended –

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

Reference books:

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

Online Resources–

➤ e-Resources / e-learning portals

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

Online Resources–

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

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

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks: 100 Marks

Continuous Internal Assessment (CIA): 30 Marks

End Semester Exam (ESE): 70 Marks

Continuous Internal Assessment (CIA):30 (By Course Teacher)

Internal Test / Quiz-(2): 20 +20
Assignment / Seminar - 10
Total Marks - 30

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

End Semester Exam (ESE): 70

Two section – A & B

Section A: Q1. Objective – 10 x1= 10 Mark; Q2. Short answer type- 5x4 =20 Marks
Section B: Descriptive answer type qts., 1out of 2 from each unit-4x10=40 Marks

Name and Signature of Convener & Members of CBoS:

① Rishwas
② Kunder
③ Nothing
④
⑤ Appal
⑥
⑦
⑧
⑨
⑩

FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)

DEPARTMENT OF BOTANY

COURSE CURRICULUM

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

- ① R. Prasad
- ② Nandya
- ③ Anil Kumar
- ④ M. S. Reddy
- ⑤ D. Prasad
- ⑥ V. S. Reddy
- ⑦ K. S. Reddy

- ⑧ B. S. Reddy
- ⑨ A. S. Reddy
- ⑩ U. S. Reddy

PART-C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended –

1. Practical Botany (Part I) ISBN #:81-301-0008-8 Sunil D Purohit, Gotam K Kukda & Anamika Singhvi Edition:2013 Apex Publishing House Durga Nursery Road, Udaipur, Rajasthan (bilingual).
2. Pandey S.K. (2012). Quick Concept of Botany. Publisher LAP LAMBERT Academic Publishing GmbH & Co. KG, Germany (ISBN: 978-3-8484-3104-5).
3. Dubey, R. C. and Maheshwari. D.K. 2012. Practical Microbiology, S. Chand & Company, Pvt. Ltd., New Delhi.
4. Pandey. B.P. 2014 Modern Practical Botany, (Vol-I) S. Chand and Company Pvt. Ltd., New Delhi.

Online Resources–

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

Online Resources–

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

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks: 50 Marks

Continuous Internal Assessment (CIA): 15 Marks

End Semester Exam (ESE): 35 Marks

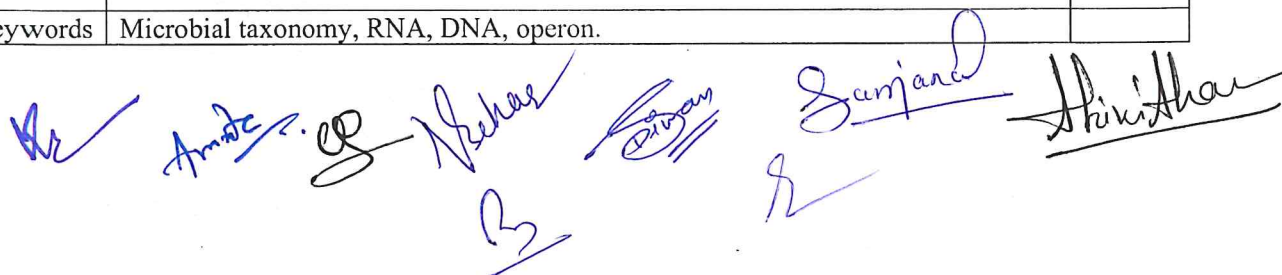
Continuous Internal Assessment (CIA): 15 (By Course Teacher)	Internal Test / Quiz-(2): 10 & 10	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against 15 Marks
	Assignment/Seminar + Attendance - 05 Total Marks - 15	
End Semester Exam (ESE): 35	Laboratory / Field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

Name and Signature of Convener & Members of CBoS:

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

Four Year Undergraduate Program (2024-28)
Department of Biotechnology
Course Curriculum – 2024-28

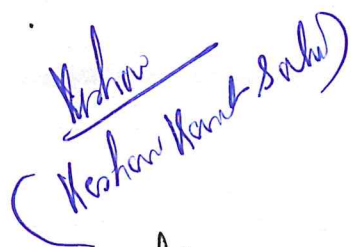
Part A: Introduction		
Program: Bachelor in Life Sciences (Certificate/Diploma/Degree/Honors)		Semester: II Sem
Session:2024-2025		
1	Course Code	BTSC-02-T
2	Course Title	Microbiology and Molecular Biology
3	Course Type	Discipline Specific Course (DSC)
4	Pre-requisite (if any)	As per program.
5	Course Learning Outcomes (CLO)	After completing this course, the students will be able to - <ul style="list-style-type: none"> • Understand various categories of microbes in the living world. • Develop the capability to culture and maintenance of microbes. • Understand the regulatory mechanism for the precursor of life-DNA • Understand the mechanism of genetic expression for the regulation of life.
6	Credit Value	03 Credits (Credit = 15 Hours - learning & observation)
7	Total Marks	Max. Marks: 100 Min Passing Marks: 40
Part B: Content of Course (Theory)		
Total No. of Teaching-learning Periods (01 Hr. per period)- 45 Periods (45 Hours)		
Unit	Topic (Course content)	No. of Period
I	Maintenance of microbes <ol style="list-style-type: none"> 1. Classification of microorganisms and taxonomy. 2. Molecular basis of microbial taxonomy. 3. Growth media for culture of bacterial, viral, and fungal microbes; sterilization. 4. Isolation, purification, and culture methods of microbes (bacteria, virus, and fungi). 	12 (12 Hrs)
II	Microbial life <ol style="list-style-type: none"> 1. Bacterial reproduction- Conjugation, transduction, and transformation. 2. Mycoplasma- Classification, structure, and pathogenesis. 3. Virus- Structure, classification, multiplication, pathogenesis and bacteriophages. 4. Food and water microbes. 	11 (11 Hrs)
III	Nuclear maintenance and expression <ol style="list-style-type: none"> 1. DNA replication. 2. DNA damage and repair. 3. Transcription in prokaryotes and eukaryotes. 4. Processing of RNA- Capping, polyadenylation, and splicing. 	11 (11 Hrs)
IV	Genetic expression <ol style="list-style-type: none"> 1. Genetic code. 2. Translation in prokaryotes and eukaryotes. 3. Operon concept. 4. Recombination. 	11 (11 Hrs)
Keywords	Microbial taxonomy, RNA, DNA, operon.	

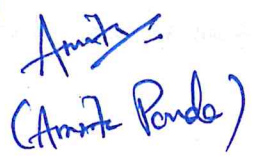



• Part C - Learning Resource
Text Books, Reference Books, Other Resources -
Text Books- <ul style="list-style-type: none"> ➤ Textbook of Microbiology- A K Kushwaha. ➤ Microbiology – Dr. Preeti Sharma. ➤ Introduction To Medical Microbiology- Ananthnarayana's ➤ Cell and Molecular Biology- P K Gupta
Reference Book- <ul style="list-style-type: none"> • Molecular Biology; Watson. • Gene VIII; Benjamin Lewin. • The Cell, A molecular Approach; Geoffrey M. Cooper. • Molecular Biology of the Cell; Alberts • Cell and Molecular Biology; Lodish. • Microbiology – Prescott • Microbiology – Pelczar&Pelczar • General Microbiology I and II – Powar and Dagainawala • Microbiology – Tortora.
Online resources- https://archive.nptel.ac.in/courses/102/103/102103015/ https://onlinecourses.nptel.ac.in/noc24_bt07/preview


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-(2): 20 +20 Assignment / Seminar - 10 Total Marks - 30	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against 30 Marks
End Semester Exam (ESE):	Two section – A & B Section A: Q1. Objective – 10 x1= 10 Mark; Q2. Short answer type- 5x4 =20 Marks Section B: Descriptive answer type qts., 1 out of 2 from each unit- 4x10=40 Marks	

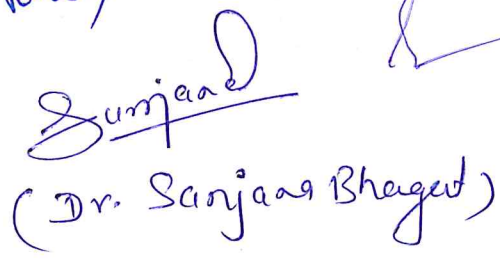
Name and Signature of Convener and Members of CBoS:

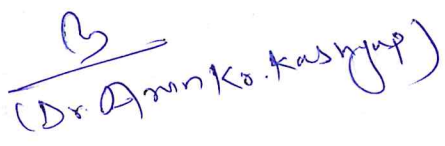

 (Nishu Khand-Sahu)

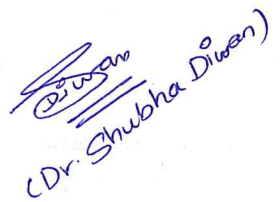

 Anita (Anita Pande)

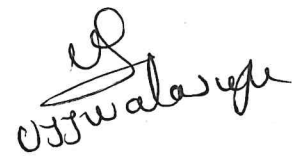

 Dr. Neha Behar


 Dr. Shivani Sharma


 (Dr. Sanjasa Bhagat)


 (Dr. Anurag Kashyap)


 (Dr. Shubha Diven)


 Dr. Swalaxya

Four Year Undergraduate Program (2024-28)
Department of Biotechnology
Course Curriculum

Part A: Introduction		
Program: Bachelor in Life Sciences (Certificate/Diploma/Degree/Honors)		Semester: II Sem
Session: 2024-2025		
1	Course Code	BTSC-02-P
2	Course Title	Microbiology and Molecular Biology
3	Course Type	Discipline Specific Course (DSC) - Practical
4	Pre-requisite (if any)	As per program
5	Course Learning Outcomes (CLO)	After completing this practical course, the students will be able to - <ul style="list-style-type: none"> • Maintenance of microbes. • Identification of microbes. • Isolation of nucleic acid from microbes. • Elucidations of nucleic acids of microbes.
6	Credit Value	01 Credits Credit = 30 Hours Laboratory or Field learning/Training
7	Total Marks	Max. Marks: 50 Min Passing Marks: 20

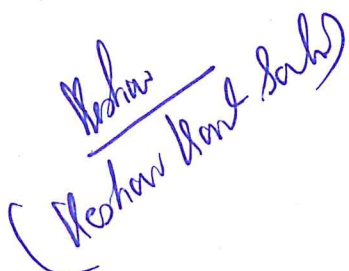

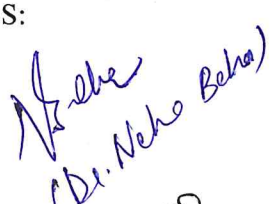

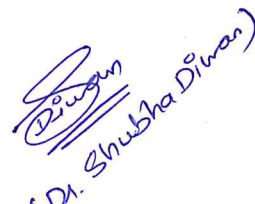
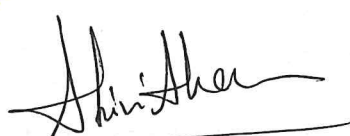
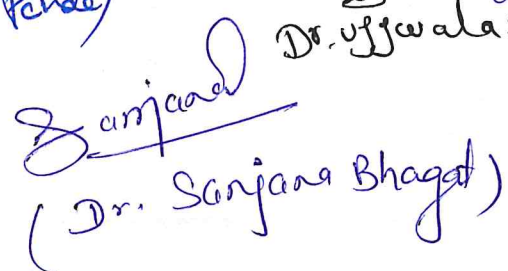

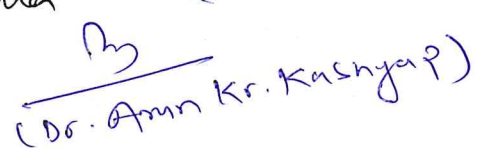
Part B: Content of Course		
Total No. of learning-Training/performance Periods: 30 Periods (30 Hours)		
Module	Topic (Course content)	No. of Period
Lab./Field Training/ Experiment Contents of Course	1. Various techniques for sterilization. 2. Preparation of microbial media. 3. Isolation and culture of microbes from air, soil, and water. 4. Determination of Gram-positive and Gram-negative bacteria. 5. Streak plate method for culturing of microbes. 6. Pour plate method for culturing of microbes. 7. Spread plate method for culturing of microbes. 8. Broth culture method for culturing of microbes. 9. Determination of bacterial growth curve. 10. Isolation of DNA from bacteria. 11. Estimation of DNA. 12. Estimation of RNA. 13. Elucidation of DNA bands by electrophoresis.	30
Keywords	Microbes, sterilization, RNA, DNA.	

• Part C - Learning Resource
Text Books, Reference Books, Other Resources -
Text Books-
<ul style="list-style-type: none"> ➤ Textbook of Microbiology- A K Kushwaha. ➤ Microbiology – Dr. Preeti Sharma. ➤ Introduction To Medical Microbiology- Ananthnarayana's ➤ Cell and Molecular Biology- P K Gupta
Reference Book-
<ul style="list-style-type: none"> • Molecular Biology; Watson. • Gene VIII; Benjamin Lewin.

<ul style="list-style-type: none"> • The Cell, A molecular Approach; Geoffrey M. Cooper. • Molecular Biology of the Cell; Alberts • Cell and Molecular Biology; Lodish. • Microbiology – Prescott • Microbiology – Pelczar&Pelczar • General Microbiology I and II – Powar and Dagainawala • Microbiology – Tortora.
<p>Online resources- https://archive.nptel.ac.in/courses/102/103/102103015/ https://onlinecourses.nptel.ac.in/noc24_bt07/preview</p>

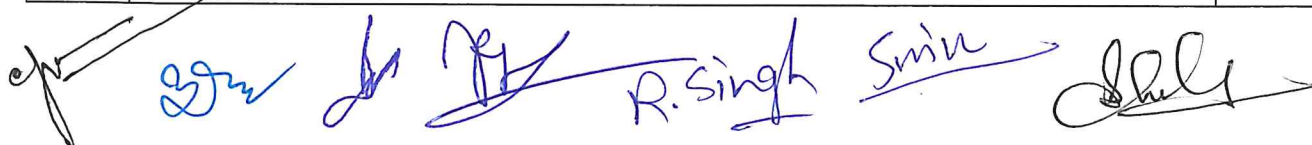
Part D: Assessment and Evaluation		
Suggested Continuous Evaluation Methods:		
Maximum Marks:		50 Marks
Continuous Internal Assessment (CIA):		15 Marks
End Semester Exam (ESE):		35 Marks
Continuous Internal Assessment (CIA) (By course teacher):	Internal Test / Quiz-(2): 10 +10 Assignment / Seminar +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

Name and Signature of Convener and Members of CBoS:

 (Neelam Khand Sahni)
 (Amrit Pande)
 (Dr. Neelam Beha)
 Dr. Ujjwal Sengupta
 (Dr. Shubha Diwan)
 (Dr. Shireni Sharma)
 (Dr. Sanjana Bhagat)
 Dr. Prasad Malhotra
 (Dr. Anu Kr. Kashyap)

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

PART-A: Introduction			
Program: Bachelor in Arts <i>(Certificate / Diploma / Degree/Hons)</i>		Semester - II	
		Session: 2024-2025	
1	Course Code	HIGE 02	
2	Course Title	<i>Ancient Indian History (From Gupta age to 1206 A. D.)</i>	
3	Course Type	GE	
4	Pre-requisite(if, any)	<i>As per Program</i>	
5	Course Learning Outcomes (CLO)	<ul style="list-style-type: none"> ➤ Student will acquire knowledge about ancient period, Life style ➤ They can gather knowledge about the society culture & religion. ➤ Political condition of ancient period and the role of different social class. ➤ Student will learn about the Historiographical trends as well as sources of ancient Indian History ➤ Student will be familiar vedic period, Jainism, Buddhism and all ruling dynasties of Ancient India. 	
6	Credit Value	04	<i>(Credit = 15 Hours - learning & Observation and 30 Hrs for Practices/ Field work)</i>
7	Total Marks	Max. Marks: 70+30=100	Min Passing Marks: 40
PART -B: Content of the Course			
Total No. of Teaching-learning Periods 60 (01 Hr. per period)			
Module / Unit	Topics (Course contents)		No. of Period
I	1. Gupta Dynasty. 2. Samudragupta and his Conquests. 3. Chandragupta Second and his Conquests. 4. Gupta Administration.		15
II	1. Gupta period Golden age of India. 2. Sangam Dynasty – Chola, Cher, Pandya 3. Pallav Dynasty. 4. Chalukya and Rastrakuta.		15
III	1. Harshvardhan – Conquests and Administration. 2. Origin of Rajputs. 3. Culture of Rajput age. 4. Gurjar, Pratihar, Pal and Sen Dynasty.		15
IV	1. India's Relation with South East Asia. 2. Arab Invasion in India 3. Mahmud Ghajnavi. 4. Muhammad Guari..		15



 R. Singh Smita

Keywords
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Signature of Convener & Members:

PART-C

Learning Resources: Text Books, Reference Books and Others

Text Books Recommended –

12. K. L. Khurana – History of India from earliest time to 1526 A. D.
13. K. L. Khurana – Ancient India from earliest time to 1206 A. D.
14. Vincent smith – oxford history of India.
15. L. Prasad – Ancient India –Indus valley civilization to 1200 A. D.
16. रतिभान सिंह नाहर – प्राचीन भारतीय इतिहास एवं संस्कृति
17. बी. एन. लुनिया – प्राचीन भारतीय संस्कृति
18. भार्गव – प्राचीन भारत
19. एस. आर. शर्मा – प्राचीन भारत
20. शांता शुक्ला – भारत का राजनीतिक इतिहास
21. ए. के. मित्तल – भारत का इतिहास प्रारम्भ से 1206 ई.
22. ए. के. मित्तल एवं डॉ. आर अग्रवाल – विश्व का इतिहास 1453 से 1890 ई.

Online Resources–

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

Online Resources–

- e-Resources / 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): (By Course Teacher)	Internal Test / Quiz-(2): 20 & 20	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against 30 Marks
	Assignment/Seminar +Attendance - 10 Total Marks - 30	
End Semester Exam (ESE):	Two section – A & B	
	Section A: Q1. Objective – 10 x1= 10 Mark; Q2. Short answer type- 5x4 =20 Marks	
	Section B: Descriptive answer type qts., 1out of 2 from each unit- 4x10 =40 Marks	

Name and Signature of Convener & Members of CBOS:



Department of Political Science Course Curriculum


PART A INTRODUCTION			
PROGRAM : Bachelor in social science Certificate/Diploma/Degree/Honors		SEMESTER II	Session 2024-25
1	Course code	PSGE 02	
2	Course Title	Constitutional Government in India	
3	Course Type	GE : Generic Elective	
4	Prerequisite(if,any)	As per Program	
5	Course Learning Outcomes (CLO)	After completion of the course, the student shall be able to.. <ul style="list-style-type: none"> • Construct the political ideals mentioned in the preamble of the constitution. • Assess the provisions of citizenship, fundamental rights and duties and their correlation • Examine the role of president and the functioning of the union executive . • Interpret the provisions and functioning of the union legislature and constitutional bodies of functional democracy, like election commission, finance commission and C&AG. 	
6	Credit Value	4 credits	Credit = 15 Hours - learning & Observation and 30 Hrs for Practices/ Field work
7	Total Marks	Max. Marks: 100	Min Passing Marks: 40
PART B - Content of the Course			
Total No. of Teaching-Learning Periods (01 Hr. per period) 60 Period (60 Hours)			
UN IT	Topics (Course Content)		No. of Periods
I	Constitution Citizenship and Rights Making of Indian Constitution : Cabinet mission plan and Constituent assembly. Preamble, features, Sources. Schedules, citizenship. Fundamental Rights and Duties, Directive Principles of State Policy. Constitution Amendment Process		15
II	Union President, Vice President, Council of Ministers and Prime Minister. Federal Parliament Lok Sabha and Rajya Sabha. Supreme court - Organization Functions, Powers, Judicial Review.		15
III	Union and Federal administration controller and auditor general .Centre State Relations: Legislative, Financial, Administrative. Union and state public service commission, Election Commission, Finance Commission.		15
IV	State and Local self government Legislature, Executive: Governor, Council of Ministers and Chief Minister. State High Court - Organization , Functions, Rights.		15
Keywords : Act, assembly, constitution, president, parliament, judiciary, panchayati raj.			


Name and Signature of Convener & Members of BOS

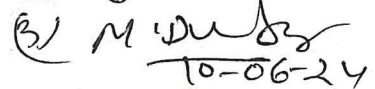
1) S. Anand - 10/06/24
 2) S. Anand - 10/06/24
 3) M. D. D. - 10-06-24
 4) S. Anand - 10/06/24
 5) S. Anand - 10/06/24
 6) S. Anand - 10/06/24
 7) S. Anand - 10/06/24
 8) S. Anand - 10/06/24
 9) S. Anand - 10/06/24
 10) S. Anand - 10/06/24


PART C		Learning Resources: Text Books, Reference Books and Others
Text Books Recommended		
1- आर.सी अग्रवाल (1985) : राष्ट्रीय आंदोलन एवं संवैधानिक विकास , एस चन्द एण्ड कम्पनी , नई दिल्ली ।		
2- डीडी बसु भारत (1986) : भारतीय संविधान एक परिचय, प्रेन्टिस हल, नई दिल्ली ।		
3- एम सत्य राय (1983) : भारत मे राष्ट्रवाद, हिंदी माध्यम कार्यान्वयन निदेशालय दिल्ली विश्वविद्यालय।		
4- सुभाष कश्यप (1996) : हमारा संविधान, नेशनल बुक ट्रस्ट नई दिल्ली		
5- राकेश डेढ़गर्वे (2018) : भारतीय शासन और राजनीति - छ.ग. राज्य हिन्दी ग्रन्थ अकादमी . रायपुर ।		
Reference books		
6- Bipan Chandra (2000): India after Independence, Penguin Books, New Delhi.		
7- Bipan Chandra, M. Mukherjee and A. Mukherjee (2007) : India Since Independence, Penguin Books New Delhi.		
8- D D Basu (2015) Introduction to the Constitution of India, Lexisnexis, Gurgaon.		
9- Subhash C. Kashyap, (1989) Our Parliament, National Book Trust India, New Delhi.		
10- Subhash C. Kashyap, (1994) Our Constitution—An Introduction to India's Constitution and Constitutional Law, National Book Trust India, New Delhi.		
11- W.H. Morris-Jones, (1989) The Government and Politics of India, Universal Book Stall,.		
12- Granville Austin (1999) Indian Constitution: CornerStone of a Nation, Oxford University Press New Delhi		
13- Granville Austin (2004) Working a Democratic Constitution: A History of the Indian Experience Oxford University Press, New Delhi.		
14- M.V. Pylee (1995) An Introduction to the Constitution of India, Vikas Publishing House, New Delhi.		
e-books		
संवैधानिक विकास		
https://egyankosh.ac.in/bitstream/123456789/19930/1/Unit-23.pdf		
भारतीय संविधान		
https://code.mp.gov.in/WriteReadData/Pdf/Act_1950_0000_Pdf_F897_Hindi.pdf		
भारतीय संविधान		
https://egyankosh.ac.in/handle/123456789/58295		
भारतीय संविधान		
https://legislative.gov.in/hi/%E0%A4%AD%E0%A4%BE%E0%A4%B0%E0%A4%A4-%E0%A4%95%E0%A4%BE-%E0%A4%B8%E0%A4%82%E0%A4%B5%E0%A4%BF%E0%A4		
e-learning portals		
Indian constitution , CEC		
https://youtu.be/of2SoO8i8mM?si=B1N2z6b1krHbcauq		
https://youtu.be/e18xmGhdsOg?si=8RS9FouShQLrvbBJ		
https://youtu.be/VK7ZwVE96uc?si=mqE2dygeuRHKq9qc		
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-(2): 20 & 20 Assignment / Seminar - 10 Total Marks - 30	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against 30 Marks
End Semester Exam (ESE):	Two section – A & B Section A: Q1. Objective – 10 x1= 10 Mark; Q2. Short answer type- 5x4 =20 Marks Section B: Descriptive answer type qts., 1 out of 2 from each unit-4 x 10=40 Marks	

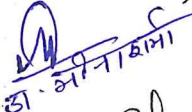
Name and Signature of Convener & Members of BOS:


① डा. विनायक रेड्डी - 

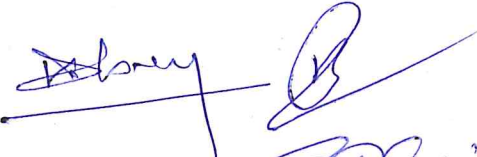
② कु. शोबेदा बेगम Begum  10.06.24


③ M. V. Pylee  10-06-24

④  10/06/24

डा. अनामिका  10/06/24

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 10/06/24

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**FOUR YEAR UNDERGRADUATE PROGRAM(2024-28)
DEPARTMENT OF SOCIOLOGY COURSE CURRICULUM**









PART-A : INTRODUCTION		
PROGRAM: Bachelor in Arts (Certificate/ Diploma/Degree/Honors)		SEMESTER-II
SESSION:2024-25		
SUBJECT: SOCIOLOGY		
1	COURSE CODE:	SOGE-02
2	COURSE TITLE:	CHANGING SOCIAL INSTITUTIONS IN INDIA
3	COURSE TYPE:	DGE 02
4	Pre-requisite	As per Government norms
5	COURSE LEARNING OUTCOME (CLO):	<p>After completion of the course, the student will be able to achieve the following objectives-</p> <ul style="list-style-type: none"> • The students will learn and understand the classical background of Indian society. • Students will learn about the Indian social structure. • The course will enhance understanding about pre dominant issues of Indian society. • This course will enhance the understanding about rural structure, development and issues. • The students will learn about social problems of India.
6	CREDIT VALUE:	04(Credit= 15 Hour- Learning and observation)
7	TOTAL MARKS:	MAX MARKS:100
		MIN PASS MARKS:40

PART-B : CONTENT OF THE COURSE

Total Number of Teaching-Learning Periods(01 hr. Per Period)- 60 Period (60 Hours)

UNIT	TOPICS	No. of Periods
UNIT-I Classical Indian: Society and Changes	1. Classical Indian Society and Changes 2. Ashram, Purusharth 3. Karma: Views on Past and Present 4. Caste Roles and Varna Formulations	15
UNIT-II Indian Social Structure	1. Family Roles and its Changing Nature 2. Marriage and its Challenges 3. Kinship: Principle and Pattern 4. Jajmani and Agrarian Relationship	15
UNIT-III Rural Social System	1. Rural Development and Change 2. Rural Migration and Urbanisation 3. Religiosity and superstition in rural society 4. Problem of Peasants	15
UNIT-IV Social Issues in India	1. Poverty and Unemployment : Causes and Remedies 2. Problem of Corruption: Causes and Remedies 3. Drugs Abuse: Types, Causes and Remedies 4. Cyber Crime: Types, Causes and Remedies	15

Signature of Convener & Members :

①  ②  ③  ④ 
 ⑤  ⑥ 
 ⑦  ⑧ 

PART-C : LEARNING RESOURCES, REFERENCE BOOKS& OTHERS

AUTHOR	TITLE	PUBLISHER
TEXTBOOK		
C.N.Shankar Rao	Indian Social Problems	S Chand
Ram Ahuja	Social Problems in India	Rawat Publication
C.N.Shankar Rao	Sociology of Indian Society	S Chand Publication
REFERENCE		
Rajendra Kumar Sharma	Indian Society: Institutions and Change	Atlantic Publication
B.R.Chauhan	Indian Villages	Rawat Publication
Indra Dewa	Society and Culture in India	Rawat Publication
Online Resources		
1	https://epgp.inflibnet.ac.in	
2	https://vidyamidra.inflibnet.ac.in	
3	https://vidyamidra.inflibnet.ac.in/index.php/search	
4	https://www.swayamprabha.gov.in	

PART-D : ASSESSMENT AND EVALUATION

Suggested Continuous Evaluation Methods:		
Maximum Marks:		
	100 Marks	Continuous Internal Assessment (CIA): 30 Marks
		End Semester Exam (ESE): 70 Marks
Continuous Internal Assessment (CIA): (By Course Teacher)	Internal Test/Quiz-(2): 20 & 20 Assignment/Seminar- 10 Total Marks- 30	Better marks out of the two Test/Quiz + obtained marks in Assignments shall be considered against 30 Marks
End Semester Exam (ESE):	Two section - A & B Section A: Q1. Objective - 10 x 1 = 10 Marks; Q2. Short answer type - 5 x 4 = 20 Marks Section B: Descriptive answer type qts., 1 out of 2 from each unit - 4 x 10 = 40 Marks	

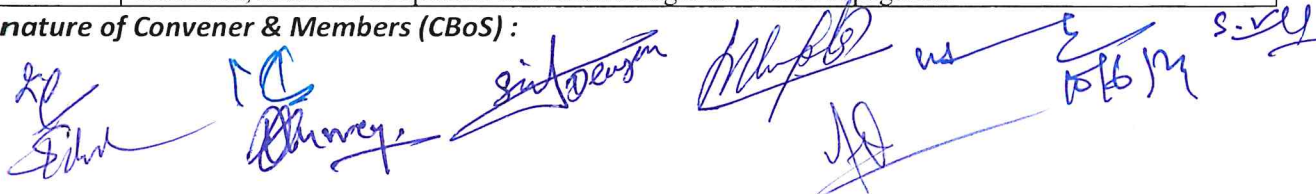
Name and Signature of Convener & Members of CBoS

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②  10.6.24
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FOUR YEARS UNDERGRADUATE PROGRAM (2024-28)
DEPARTMENT OF PHYSICS
COURSE CURRICULUM

PART – A: INTRODUCTION			
Program: Bachelor in Science (Certificate/ Diploma/ Degree/ Honors)		Semester: II	Session: 2024-25
1	Course Code	PHGE-02 T	
2	Course Title	ELECTRICITY AND MAGNETISM	
3	Course Type	Generic Elective Course	
4	Pre-requisite (if any)	As per Program	
5	Course Learning Outcomes (CLO)	After going through the course, the student should be able to: <ul style="list-style-type: none"> ➤ State various laws related with electrostatics, dielectric, electric current, magnetism and electromagnetic induction. ➤ Apply vector (electric fields, Coulomb's law) and scalar (electric potential, electric potential energy) formalisms of electrostatics. ➤ Compare rise and decay of current in LR, CR, LCR circuits. ➤ Apply Biot-Savart law for calculation of magnetic field in simple geographic situations. ➤ Derive and analyze Maxwell's equations. 	
6	Credit Value	03 Credits 1 Credit= 15 Hours for Learning & Observation	
7	Total Marks	Maximum Marks: 100	Minimum Pass Marks: 40
PART – B: CONTENT OF THE COURSE			
Total No. of Teaching-learning Periods (01 Hr. per period) - 45 Periods (45 Hours)			
Unit	Topics (Course contents)		No. of Periods
I	Power plants in Chhattisgarh: An overview of thermal and hydroelectric power plants in Chhattisgarh. Vector Analysis: Divergence & Curl of Vector fields, Line, surface and volume integrals of Vector fields, Gauss-divergence theorem and Stoke's theorem of vectors and its application in electrostatics and magnetostatics. Electrostatics field: Electrostatic Field, electric flux, Gauss's theorem of electrostatics, Applications of Gauss theorem- Electric field due to point charge, infinite line of charge, plane charged sheet, charged conductor.		12
II	Electrostatic potential: Electric potential as line integral of electric field, potential due to a point charge, Calculation of electric field from potential, Capacitance of Parallel plate capacitor, Energy per unit volume in electrostatic field. Dielectric & Electric Currents: Dielectric medium, Polarisation, Displacement vector, Gauss's theorem in dielectrics, Parallel plate capacitor completely filled with dielectric. Steady current, current density J, non – steady current and Continuity equation, Rise and decay of current in LR, CR, LCR circuits.		13
III	Magnetism: Magnetostatics: Biot-Savart's law and its applications- straight conductor, circular coil, solenoid carrying current, Divergence and curl of magnetic field, Magnetic vector potential, Ampere's circuital law, Magnetic properties of materials: Magnetic intensity, magnetic induction, permeability, magnetic susceptibility, Brief introduction of dia, para and ferro-magnetic materials.		10
IV	Electromagnetic Induction: Faraday's laws of electromagnetic induction, Lenz's law, self and mutual inductance, L of single coil, M of two coils, Energy stored in magnetic field. Maxwell's equations and Electromagnetic wave propagation: Equation of continuity of current, Displacement current, Maxwell's equations, Wave equation in free space.		10
Keywords:	Vector calculus, Electrostatics, Dielectrics and Electric Current, Magnetism, Electromagnetic Induction, Maxwell's Equation and Electromagnetic Wave Propagation		

Signature of Convener & Members (CBoS) :



PART – C: LEARNING RESOURCES

Text Books, Reference Books and Others

Text Books

1. Electricity and Magnetism, D C Tayal, 1988, Himalaya Publishing House.
2. Unified Physics – Part II, R. P. Goyal, Shivalal Agrawal and Sons
3. Unified Physics – Navbodh Publications
4. Introduction to Electrodynamics and Electromagnetism, H. C. Verma,

Reference Books

1. Vector analysis – Schaum's Outline, M.R. Spiegel, S. Lipschutz, D. Spellman, 2nd Edn., 2009, McGraw- Hill Education.
2. University Physics, Ronald Lane Reese, 2003, Thomson Brooks/Cole.

Online Resources (e-books/ learning portals/ other e-resources)

1. All e-books of physics <https://www.e-booksdirectory.com/listing.php?category=2>
2. Free physics text book in PDF
https://www.motionmountain.net/?gclid=CjwKCAjwmq3kBRB_EiwAjkNDp5v8Yv6xK1s0Kma0VR0AWGlichRwFfCC0-vpZK1jrPoEOAnBq8fcqRoCILsQAvD_BwE
3. Cambridge University Books for Physics <https://www.cambridgeindia.org/>
4. Books for solving physics problems <https://bookboon.com/en/physics-ebooks>
5. NPTEL Online courses: https://onlinecourses.nptel.ac.in/noc21_ph05/preview
6. <https://archive.nptel.ac.in/courses/115/104/115104088/>
7. Classical Electromagnetism - 1 (Electrostatics) <https://bsc.hcverma.in/course/cee1>
8. Classical Electromagnetism - 2 (Electrostatics) <https://bsc.hcverma.in/course/cee2>

PART – D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks: 100 Marks

Continuous Internal Assessment (CIA): 30 Marks

End Semester Examination (ESE): 70 Marks

Continuous Internal Assessment (CIA): (By course teacher)	Internal Test/ Quiz (2):	20 + 20	Better marks out of the two Test / Quiz + marks obtained in Assignment shall be considered against 30 Marks
	Assignment/ Seminar (1):	10	
	Total Marks:	30	

End Semester Examination (ESE):	Two section – A & B Section A: Q1. Objective – 10 x 1 = 10 Mark; Q2. Short answer type- 5x4 = 20 Marks Section B: Descriptive answer type, 1 out of 2 from each unit- 4 x 10 = 40 Marks
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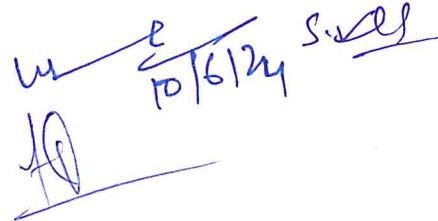
Name and Signature of Convener & Members of CBoS:









 10/6/24

FOUR YEARS UNDERGRADUATE PROGRAM (2024 – 28)

DEPARTMENT OF PHYSICS

COURSE CURRICULUM

PART – A: INTRODUCTION			
Program: Bachelor in Science (Certificate/ Diploma/ Degree/ Honors)		Semester: II	Session: 2024-25
1	Course Code	PHGE- 02 P	
2	Course Title	Electricity & Magnetism	
3	Course Type	Generic Elective Course	
4	Pre-requisite (if any)	As per program	
5	Course Learning Outcomes (CLO)	<p><i>After the completion of the course, Students are expected to understand working laws of Electricity, Magnetism and EMWs. The students will also be able to</i></p> <ul style="list-style-type: none"> ➤ <i>Verify various circuit laws, network theorems, using simple electric circuits. Assemble required parts/devices and arrange them to perform experiments.</i> ➤ <i>Verify various laws in electricity and magnetism such as Lenz's law, Faraday's law and learn about the construction, working of various measuring instruments</i> ➤ <i>Record/ observe data as required by the experimental objectives. Analyze recorded data and formulate it to get desired results.</i> ➤ <i>Interpret results and check for attainment of proposed objectives related to laws of Electricity, Magnetism and its applications</i> 	
6	Credit Value	01 Credit	1 Credit = 30 Hours Laboratory Work
7	Total Marks	Maximum Marks: 50	Minimum Pass Marks: 20
PART – B: CONTENT OF THE COURSE			
Total No. of learning-Training/performance Periods - 30 Periods (30 Hours)			
Sr. No.	Objects (At least 10 of the following or related Experiments)		No. of Periods
1	To use a Multimeter for measuring (a) Resistances, (b) AC and DC Voltages,(c) DC Current, and (d) checking electrical fuses.		30
2	To compare capacitances using De'Sauty's bridge.		
3	Measurement of field strength B and its variation in a Solenoid Determine (dB/dx).		
4	To study the Characteristics of a Series RC Circuit.		
5	To study a series LCR circuit and determine its (a) Resonant Frequency, (b) Quality Factor.		
6	To study a parallel LCR circuit and determine its (a) Anti-resonant frequency and (b) Quality factor Q.		
7	To determine a Low Resistance by Carey Foster's Bridge.		
8	To verify the Thevenin and Norton theorem.		
9	To verify the Superposition, and Maximum Power Transfer Theorem.		
10	To use a vibration magnetometer and study magnetic field.		
11	Study of magnetic field due to a current loop.		
12	Study of magnetic fields using Deflection Magnetometer		
13	Mini Project: Construction and Study of Solenoid and measurement of its magnetic field		
Keywords:	Multimeter, Capacitance Comparison, Magnetic Field, RC Circuit, Series LCR Circuit, Parallel LCR Circuit, Low Resistance Measurement, Electrical Theorems		

Signature of Convener & Members (CBoS) :

PART – C: LEARNING RESOURCES

Text Books, Reference Books and Others

Text Books Recommended-

1. Engineering Practical Physics, S. Panigrahi & B.Mallick,2015, Cengage Learning India Pvt. Ltd.
2. A Text Book of Practical Physics, Indu Prakash and Ramakrishna, 11th Edition, 2011, Kitab Mahal, New Delhi.
3. Unified Practical Physics : R P Goyal, Shivalal Agrawal & Sons
4. Unified Practical Physics: Yugbodh Prakashan
5. Unified Practical Physics: Navbodh Prakashan

Reference Books Recommended-

1. Basic Electrical and Electronics Engineering by S. K. Bhattacharya
2. A Textbook of Electrical Technology by B.L. Theraja and A.K. Theraja (Volumes 1 and 2)
3. Engineering Circuit Analysis by William H. Hayt, Jack E. Kemmerly, and Steven M. Durbin
4. Practical Physics by G.L. Squires

Online Resources (e-books/ learning portals/ other e-resources)

1. Link for e-Books for Physics: Physics Practical:
<https://www.uou.ac.in/sites/default/files/slm/BSCPH-104.pdf>
2. Virtual Lab :<https://vlab.amrita.edu/index.php?sub=1&brch=192>
3. <http://emv-au.vlabs.ac.in/#>
4. <https://www.ae.msstate.edu/vlsm/>
5. <https://nationalmaglab.org/magnet-academy/watch-play/interactive-tutorials>
6. <https://jigyasa-csir.in/cgcri/n12-t4-a3/>

PART – D: ASSESSMENT AND EVALUATION

Suggested Continuous Evaluation Methods:

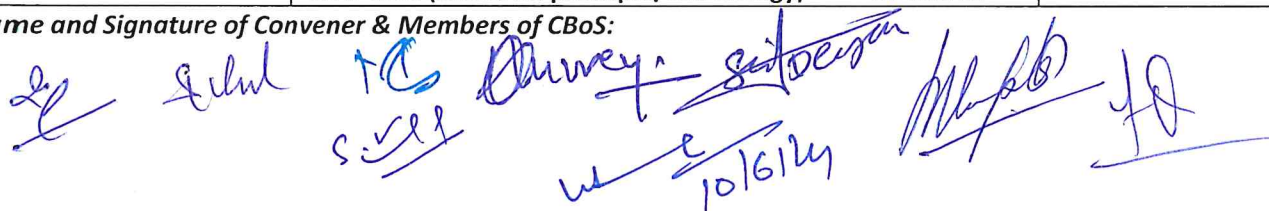
Maximum Marks: 50 Marks

Continuous Internal Assessment (CIA): 15 Marks

End Semester Exam(ESE): 35 Marks

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

Name and Signature of Convener & Members of CBoS:



PART-C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

- Peter Juliff, Program Design, PHI Publications.
- Yashwant Kanetkar, Let us C: BPB Publications.
- E. Balaguruswamy, Programming in ANSI C, Tata McGraw Hill

Reference Books Recommended:

- Y. Kanetkar, Let us C++, B.P.B Publication .
- E. Balaguruswamy, Programming in C++, Tata McGraw Hill.
- R. Kumar, Object Oriented Programming with C++, Prakhar Publication(Hindi)
- Dhupiya, Lakhyani , C++ Programming Alka Publications, Ajmer (Paperback, Dhupiya, Lakhyani)(Hindi)

Online Resources:

- Introduction to C and C++ from SWAYAM/NPTEL
https://onlinecourses.nptel.ac.in/noc22_cs103/preview
<https://www.youtube.com/watch?v=KG4hjVDw-p8&list=PLmp4yIk-B4KrM9uOEduPIVFUkU3jNc6D2&index=2>
- Constant and Inline Function through NPTEL:
<https://www.youtube.com/watch?v=pX6LufLso2M&list=PLmp4yIk-B4KrM9uOEduPIVFUkU3jNc6D2&index=10>
- Pointer and Reference NPTEL
<https://www.youtube.com/watch?v=GtsBZ5e1-cE&list=PLmp4yIk-B4KrM9uOEduPIVFUkU3jNc6D2&index=12>
- Function Overloading NPTEL
<https://www.youtube.com/watch?v=uJGmGAShHeU&list=PLmp4yIk-B4KrM9uOEduPIVFUkU3jNc6D2&index=13>
- Operator Overloading NPTEL
<https://www.youtube.com/watch?v=0jpOwe4d-FE&list=PLmp4yIk-B4KrM9uOEduPIVFUkU3jNc6D2&index=17>
- Dynamic Memory Management NPTEL
<https://www.youtube.com/watch?v=lkFK2X6qIc0&list=PLmp4yIk-B4KrM9uOEduPIVFUkU3jNc6D2&index=18>
- Class and Object NPTEL
https://www.youtube.com/watch?v=wtuks_f3vP4&list=PLmp4yIk-B4KrM9uOEduPIVFUkU3jNc6D2&index=24
- Access Specifiers NPTEL
https://www.youtube.com/watch?v=6ki_W7cXdM0&list=PLmp4yIk-B4KrM9uOEduPIVFUkU3jNc6D2&index=22
- Constructor and Destructor NPTEL
https://www.youtube.com/watch?v=wtuks_f3vP4&list=PLmp4yIk-B4KrM9uOEduPIVFUkU3jNc6D2&index=24
- C++ different topics from W3School
<https://www.w3schools.com/Cpp/default.asp>
- C++ different topics from Javatpoint
<https://www.javatpoint.com/cpp-tutorial>

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-(2): 20 +20	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against 30 Marks
	Assignment / Seminar - 10	
	Total Marks - 30	

End Semester Exam (ESE):	Two section – A & B
	Section A: Q1. Objective – 10 x1= 10 Mark; Q2. Short answer type- 5x4 =20 Marks
	Section B: Descriptive answer type qts..1 out of 2 from each unit-4x10=40 Marks

Name and Signature of Convener & Members of CBoS:

Dr. H.S. Hoke
Chairman

Kum. Gaba

JG

Oral

AN

Sunil

SC
Suresh Thakur

SP
Sneha Anand

YMP

Anjita

Dr. Anand Kumar

Dr. Anand Kumar

ANJEETA KUMAR

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

PART- A: Introduction			
Program: Bachelor in Science (CS) <i>(Certificate / Diploma / Degree)</i>		Semester - II	Session: 2024-2025
1	Course Code	CSSC-02P	
2	Course Title	Lab 2: Programming in C++	
3	Course Type	DSC	
4	Prerequisite	<i>As per program</i>	
5	Course Learning Outcomes (CLO)	<p>At the end of this course, the students will be able to:</p> <ul style="list-style-type: none"> • Understand the fundamental programming concepts and methodologies which are essential to create good C++ programs. • Code, test, and implement a well-structured, robust computer program using the C++ programming language. • Write reusable modules (collections of functions). • Understand design/implementation issues involved with variable allocation and binding, control flow, types, subroutines, parameter passing. • Develop an in-depth understanding of functional, logic, and object-oriented programming paradigms. 	
6	Credit Value	1 Credits	<i>Credit =30 Hours Laboratory or Field Learning/Training</i>
7	Total Marks	Max. Marks: 50	Min Passing Marks: 20
PART -B: Content of the Course			
Total No. of learning-Training/performance Periods: 30 Periods (30 Hours)			
Module	Topics (Course contents)		No. of Period
List of Practical Experiments.	<ol style="list-style-type: none"> 1. Write a program in C++ for addition of two numbers using float data type. 2. Write a program in C++ to find the biggest number between two numbers. 3. Write a program in C++ to find the factorial value of any entered number using do – while loop. 4. Write a program in C++ for various arithmetic operations using switch case statements. 5. Write a program in C++ for Multiplication of two 3X3 matrices. 6. Write a program in C++ to store five books of information using structure. 7. Write a program in C++ to store six employee information using union. 8. Write a program in C++ to calculate simple interest using call by value and call by reference method. 9. Write a program in C++ to find the sum and average of five numbers using class and objects. 10. Write a program in C++ to multiply two numbers using private and public member functions. 11. Write a program in C++ to print structure like this using scope resolution operator 1 1 2 1 2 3 1 2 3 4 1 2 3 4 5 12. Write a program in C++ for constructor and Destructor. 		30

13. Write a program in C++ for multiple inheritance.
14. Write a program in C++ for operator overloading.
15. Write a program in C++ for friend class and friend function.
16. Write a program in C++ for virtual function and virtual class.
17. Write a program in C++ for Exception Handling.
18. Write a program in C++ to open and close a file using file Handling.
19. Given two ordered arrays of integers, write a program to merge the two-arrays to get an ordered array.
20. WAP to display Fibonacci series (i) using recursion, (ii) using iteration
21. WAP to calculate Factorial of a number (i) using recursion, (ii) using iteration
22. WAP to calculate GCD of two numbers (i) with recursion (ii) without recursion.
23. Create a Matrix class using templates. Write a menu-driven program to perform following Matrix Operations (2-D array implementation): a) Sum b) Difference c) Product d) Transpose
22. Create the Person class. Create some objects of this class (by taking information from the user). Inherit the class Person to create two classes Teacher and Student class. Maintain the respective information in the classes and create, display and delete objects of these two classes (Use Runtime Polymorphism).
24. Create a class Triangle. Include overloaded functions for calculating area. Overload assignment operator and equality operator.
25. Create a class Box containing length, breadth and height. Include following methods in it: a) Calculate surface Area b) Calculate Volume c) Increment, Overload ++ operator (both prefix & postfix) d) Decrement, Overload -- operator (both prefix & postfix) e) Overload operator == (to check equality of two boxes), as a friend function f) Overload Assignment operator g) Check if it is a Cube or cuboid
26. Create a structure Student containing fields for Roll No., Name, Class, Year and Total Marks. Create 10 students and store them in a file.
27. Write a program to retrieve the student information from the file created in the previous question and print it in the following format: Roll No. Name Marks
28. Copy the contents of one text file to another file, after removing all whitespaces.
29. Write a program for exception handling.
30. Write a program to insert data into file and to display it.

Note: Concerned teacher can add additional practical exercises as per requirement.

Keywords Array, Function, Structure, union, matrix, constructor, destructor, inheritance.

Name and Signature of Convener & Members of CBoS:

Dr. H.S. Hota
Chairman

[Signature]

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[Signature]

[Signature]

[Signature]
Elores L. Thakur

[Signature]
Sheela Devi
Agar

[Signature]
11/06/24
Dr. V. K. Singh

[Signature]
ANJEEETA KUMAR

PART-C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

- Peter Juliff, Program Design, PHI Publications.
- Yashwant Kanetkar, Let us C: BPB Publications.
- E. Balaguruswamy, Programming in ANSI C, Tata McGraw Hill

Reference Books Recommended:

- Y. Kanetkar, Let us C++, B.P.B Publication .
- E. Balaguruswamy, Programming in C++, Tata McGraw Hill.
- R. Kumar, Object Oriented Programming with C++, Prakhar Publication(Hindi)
- Dhupiya, Lakhyani , C++ Programming Alka Publications, Ajmer (Paperback, Dhupiya, Lakhyani)(Hindi)

Online Resources:

- Introduction to C and C++ from SWAYAM/NPTEL
https://onlinecourses.nptel.ac.in/noc22_cs103/preview
<https://www.youtube.com/watch?v=KG4hjVDw-p8&list=PLmp4ylk-B4KrM9uOEdvPIVFUkU3jNc6D2&index=2>
- Constant and Inline Function through NPTEL:
<https://www.youtube.com/watch?v=pX6LufLso2M&list=PLmp4ylk-B4KrM9uOEdvPIVFUkU3jNc6D2&index=10>
- Pointer and Reference NPTEL
<https://www.youtube.com/watch?v=GtsBZ5c1-cE&list=PLmp4ylk-B4KrM9uOEdvPIVFUkU3jNc6D2&index=12>
- Function Overloading NPTEL
<https://www.youtube.com/watch?v=uJGmGAShHeU&list=PLmp4ylk-B4KrM9uOEdvPIVFUkU3jNc6D2&index=13>
- Operator Overloading NPTEL
<https://www.youtube.com/watch?v=0jpOwe4d-FE&list=PLmp4ylk-B4KrM9uOEdvPIVFUkU3jNc6D2&index=17>
- Dynamic Memory Management NPTEL
<https://www.youtube.com/watch?v=lkFK2X6qIc0&list=PLmp4ylk-B4KrM9uOEdvPIVFUkU3jNc6D2&index=18>
- Class and Object NPTEL
https://www.youtube.com/watch?v=wtuks_f3vP4&list=PLmp4ylk-B4KrM9uOEdvPIVFUkU3jNc6D2&index=24
- Access Specifiers NPTEL
https://www.youtube.com/watch?v=6ki_W7cXdM0&list=PLmp4ylk-B4KrM9uOEdvPIVFUkU3jNc6D2&index=22
- Constructor and Destructor NPTEL
https://www.youtube.com/watch?v=wtuks_f3vP4&list=PLmp4ylk-B4KrM9uOEdvPIVFUkU3jNc6D2&index=24
- C++ different topics from W3School
<https://www.w3schools.com/Cpp/default.asp>
- C++ different topics from Javatpoint
<https://www.javatpoint.com/cpp-tutorial>

PART -D: Assessment and Evaluation

Four Year Undergraduate Program (2024-28)
Department of Biotechnology
Course Curriculum

Part A: Introduction		
Program: Bachelor in Life Sciences (Certificate/Diploma/Degree/Honors)		Semester: II Sem Session: 2024-2025
1	Course Code	BTSEC-01
2	Course Title	Biopesticides and Biofertilizer
3	Course Type	Skill Enhancement Course (SEC)
4	Pre-requisite (if any)	As per requirement.
5	Course Learning Outcomes (CLO)	After completing this course, the students will be able to - <ul style="list-style-type: none"> • Understand the basic concept of biofertilizers and biopesticides. • Understand the significance and applications of biofertilizers and biopesticides. • Develop skills for the production and application of biofertilizers. • Develop skills for the production and application of biopesticides.
6	Credit Value	02 credits (1C + 1C) Credit=15 hours- Theoretical learning and = 30 hours laboratory or field learning/ training.
7	Total Marks	Max. Marks: 50 Min Passing Marks: 20
Part B: Content of Course (Theory)		
Total No. of Teaching-learning Periods Theory- 15 Periods (15 Hrs) and Lab or Field learning/Training 30 periods (30 Hours)		
Module	Topic (Course content)	No. of Period
Theory Contents	Concept of biofertilizers and biopesticides <ol style="list-style-type: none"> 1. Biofertilizers: classification and applications. 2. Symbiotic and asymbiotic process for nitrogen fixation. 3. Methods for production of biofertilizers. 4. Study of VA-mycorrhiza and its application. 5. Biopesticides: classification and applications. 6. Process of production of biopesticides. 7. Importance of <i>Trichoderma</i>, <i>Pseudomonas</i>, and <i>Bacillus</i> species as biocontrol agents. 8. Factors responsible for the effectiveness of bioagents against seed-borne and soil-borne pathogens. 	15
Lab/Field Training Contents	<ol style="list-style-type: none"> 1. Media preparation to culture microorganisms. 2. Collection and isolation of agriculturally important microorganisms. 3. Identification and characterization of microorganisms. 4. Screening of superior strains using in vitro techniques. 5. Inoculum development. 6. Preparation of carrier. 7. Mixing of inoculum and carrier. 8. Efficiency check of developed inoculant by using pot experiments. 	30
Keywords	Biofertilisers, biopesticides, bioagents.	

• Part C - Learning Resource
Text Books, Reference Books, Other Resources -
Text Book- Biofertilisers and biopesticides – K Acharya, S Sen, M Rai
<ul style="list-style-type: none"> • S. Kannaiyan- Biofertiliser Technology-Scientific Publishers. • Environmental Biotechnology- Himalaya Publishing House.
Reference Book-
<ul style="list-style-type: none"> • Dr. Himadri Panda- The Complete Technology Book on Biofertilizer and Organic Farming- NPCS.
Online resources- https://archive.nptel.ac.in/courses/126/105/126105024/ https://archive.nptel.ac.in/courses/102/105/102105058/

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

Name and Signature of Convener and Members of CBoS:

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

PART-A: Introduction			
Program: Bachelor in Life Science (Certificate / Diploma / Degree)		Semester – II/IV/V/VI	Session: 2024-2025
1	Course Code	ZOSEC-01	
2	Course Title	Vermiculture and Vermicomposting	
3	Course Type	Skill Enhancement Course	
4	Pre-requisite (if, any)	<i>As per Program</i>	
5	Course Learning Outcomes (CLO)	<p style="text-align: center;">After successfully completing this course, the students will be able to:</p> <ul style="list-style-type: none"> ➤ Learn the identifiable features of earthworm species for vermiculture and vermicomposting. ➤ Cultivate the skills of vermiculture. ➤ Understand the challenges in vermiculture and vermicomposting. ➤ Analyze the features of different vermicomposting methods. ➤ Create entrepreneurial prospects in this field. 	
6	Credit Value	2 Credits (1C + 1C)	Credit = 15 Hours –Theoretical learning and = 30 Hours Laboratory or Field learning/Training
7	Total Marks	Max.Marks:50	Min Passing Marks:20
PART -B: Content of the Course			
Total No. of Teaching-learning Periods: Theory-15 Periods (15 Hrs) and Lab. or Field learning/Training 30 Periods (30 Hours)			
Module	Topics (Course contents)		No. of Period
Theory Contents	<p>General Introduction: Distribution and habit, habitat. Food: Phytophagous and Geophagous earthworm. Morphology of earthworm. Ecological categories: Epigeic, Endogeic and Anecic earthworms. Ecological requirements: moisture, temperature, light, pH and, organic matter. Ecosystem services: role played by earthworms in soil ecosystem. Difference between vermiculture and vermicomposting. Role of earthworm and vermicompost in growth of plants.</p> <p>Vermiculture: Definition and features. Selective features of earthworms for vermiculture. Vermiculture methods: Wormery, breeding techniques: indoor and outdoor cultures, monoculture and polyculture, merits and demerits. Obstacles in Vermiculture: Prevention and Management.</p> <p>Vermicomposting: Definition and features. Scientific names and distinguishing features of native and exotic vermicomposting earthworms (Native Indian earthworms. <i>Perionyx excovatus</i>, <i>Perionyx ceylanensis</i>, European earthworms. <i>Eisenia fetida</i>, <i>Eisenia andrei</i>, South African earthworms. <i>Eudriluseugeniae</i>), Principle of vermicomposting, Methods of vermicomposting: Low-cost Floor beds, Grow bags & Tank system. Management during vermicomposting (Physical and Biological). Products of vermicomposting, physiochemical features and their utility: earthworm biomass (vermi-protein), vermicompost and vermiwash. Harvesting the vermicompost & storage. Marketing prospects of Vermicomposting in Chhattisgarh and India.</p>		15
Lab./Field Training Contents	<ul style="list-style-type: none"> ➤ Key to identify different types of earthworms. ➤ Identification of materials/waste products for vermiculture and vermicomposting. ➤ Study of systematic position, habits, and habitat & External characters of <i>Eisenia fetida</i>. ➤ Study of Life stages & development of <i>Eisenia fetida</i>. ➤ Culture of earthworms in Grow Bags. ➤ Study of devices and instruments of Vermiculture and Vermicomposting. ➤ Preparation of vermibed, maintenance of vermicompost & management of climatic conditions. ➤ Study the effects of vermicompost & vermiwash on any two short duration plants. ➤ Study of different methods of vermicomposting (NADEP Composting, Bangalore Method, Coimbatore Method & Indore Method). ➤ Creation of set up for vermiwash collection. ➤ Field Visit to Vermiculture & Vermicomposting sites and interaction with self help groups/ personnel engaged in these activities. ➤ Projects/ Assignments/ Chart/ Model preparation. ➤ Practical Record 		30
Keywords	Earthworm, Vermiculture, Vermicomposting, Vermiwash, Grow Bags, NADEP.		
Signature of Convener & Members (CBoS):			

PART-C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended –

- Chauhan, A. (2012) Vermitechnology, Vermiculture, Vermicompost and Earthworms: Vermiculture, Vermicomposting, Vermitechnology and Microbes, Lambert Academic Publishing, Germany.
- National Institute of Industrial Research, (2010): The Complete Technology Book on Vermiculture and Vermicompost, Published by National Institute of Industrial Research, Delhi-7, India.
- Kumar, A. (2005) Verms and Vermitechnology, APH Publishing.
- Bhatnagar & Patla, 2007. Earthworm vermiculture and vermin-composting, Kalyani Publishers, New Delhi.
- Sultan Ahmed Ismail, 2005. The Earthworm Book, Second Revised Edition. Other India Press, Goa, India.
- Panda Himadri: The Complete Technology Book on Vermiculture and Vermicompost (Earthworm) with Manufacturing Process, Machinery Equipment Details & Plant Layout; Asia Pacific Business Press Inc.
- EIRI Board : Hand Book Of Biofertilizers & Vermiculture.

Online Resources–

- https://agritech.tnau.ac.in/org_farm/orgfarm_composting.html#:~:text=In%20the%20Bangalore%20method%20of,laid%20over%20the%20moistened%20layer.
- <https://www.thepharmajournal.com/archives/2021/vol10issue12/PartAR/11-5-248-926.pdf>

Online Resources–

- <https://megbrdc.nic.in/publications/fliers-Pamphlets/nadep-composting-english.pdf>

PART-D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks: 50 Marks

Continuous Internal Assessment (CIA): 15 Marks

End Semester Exam (ESE): 35 Marks

Continuous Internal Assessment (CIA) (By Course Coordinator)	Internal Test / Quiz-(2): 10 & 10	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against 15 Marks
	Assignment/Seminar + Attendance- 05 Total Marks - 15	
End Semester Exam (ESE):	Laboratory / Field Skill Performance: On spot Assessment A. Performed the Task based on learned skill - 20 Marks B. Spotting based on tools (written) - 10 Marks C. Viva-voce (based on principle/technology) - 05 Marks	Managed by Coordinator as per skilling

Name and Signature of Convener & Members of CBoS:

Dr. Subhash Chandra Rahalkar

Dr. Nazreen Ahmed Masani

Dr. Ajit Khandekar

Shobha Ram Yadav

Dr. Lata Meshram

Dr. R.K. Tamboli

FOUR YEAR UNDERGRADUATE PROGRAM - (2024-28)

DEPARTMENT OF HINDI

COURSE CURRICULUM

PART -A : Introduction			
Program: Bachelor in Arts Certificate/Diploma/Degree/Honors		Semester - I	Session: 2024-25
1	Course Code	AEC-03	
2	Course Title	हिन्दी भाषा-1	
3	Course Type	Ability Enhancement Course	
4	Pre-requisite (if any)	As per requirement	
5	Course Learning Outcome (CLO)	1. विद्यार्थी हिन्दी भाषा एवं व्याकरण संबंधी ज्ञान से समृद्ध होंगे। 2. भाषा ज्ञान के माध्यम से भारतीय संस्कृति एवं भावनात्मक एकता के महत्व को समझने की क्षमता विकसित हो सकेगी। 3. मुहावरे एवं लोकोक्तियों का महत्व समझ सकेंगे। 4. व्यंग्य, निबंध एवं कविता विधा से परिचित होंगे। 5. निबंध लेखन एवं अपठित गद्यांश के माध्यम से विद्यार्थियों का बौद्धिक विकास हो सकेगा।	
6	Credit Value	2 Credits	(01 Credit = 15 Hours - learning & Observation)
7	Total Marks	Maximum Marks : 50	Minimum Passing Marks : 20

PART -B : Content of the Course

Total No. of Teaching-Learning Periods (01 Hr. Per Period) - 30 Periods (30 Hours)

Unit	Topics (Course Contents)	No. of Period
I	रचनाएं भारत वंदना – सूर्यकांत त्रिपाठी 'निराला' (कविता) भोलाराम का जीव – हरिशंकर परसाई (व्यंग्य) चोरी और प्रायश्चित – महात्मा गांधी (निबंध)	8
II	हिन्दी व्याकरण एवं शब्द रचना उपसर्ग, प्रत्यय, संधि, समास पर्यायवाची शब्द, विलोम शब्द, अनेकार्थी शब्द, समश्रुत शब्द, अनेक शब्दों के लिए एक शब्द	7
III	हिन्दी व्याकरण एवं रचना पक्ष मुहावरे एवं लोकोक्तियां पारिभाषिक शब्दावली एवं हिन्दी में पदनाम, शब्द शुद्धि, वाक्य शुद्धि	8
IV	रचनात्मक लेखन निबंध लेखन अपठित गद्यांश (नोट विद्यार्थी को किसी एक विषय पर निबंध व प्रदत्त गद्यांश का शीर्षक तथा सारांश लिखना होगा।)	7
Keywords		

Signature of Convener & members (CBoS):

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PART -C : Learning Resource
Text Books, Reference Books and Others
1. भारतीयता के अमर स्वर – डॉ. धनंजय वर्मा, मध्यप्रदेश हिन्दी अकादमी 2. आधुनिक हिन्दी व्याकरण और रचना – डॉ. वासुदेव नंदन 3. हिन्दी भाषा और व्यवहार – डॉ. गंगा चरण त्रिपाठी 4. हिन्दी व्याकरण माला – डॉ. के.आर. गहिया, डॉ. विमलेश शर्मा 5. हिन्दी व्याकरण – कामता प्रसाद गुरु
Online Resources -
1 www.bookspace.in 2 https://libgmm.com 3 https://www.gkexams.com

PART -D : Assessment And Evaluation		
Suggested Continuous Evaluation Methods : Maximum Marks : 50 Marks Continuous Internal Assessment (CIA) : 15 Marks End Semester Exam (ESE) : 35 Marks		
Continuous Internal Assessment : (CIA) : (By Course Teacher)	Internal Test/Quiz-(2) : 10 & 10 Marks Assignment/Seminar+Attendan ce - 05 Total Marks 15	Better marks out of the two Text/Quiz obtained marks in assignment shall be considered against 15 Marks
End Semester Exam (ESE) :	Two Section - A&B Section A : Q1 Objective - 05X1=05 Marks Section A : Q2 Short Answer Type - 5X2=10 Marks Section B : Descriptive Answer Type Qts. 1 out of 2 From Each Unit - 4X5=20 Marks Total =35 Marks	

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