



**SHRI VAISHNAV INSTITUTE OF
MANAGEMENT & SCIENCE, INDORE
(Autonomous)**

Approved by AICTE, New Delhi and Affiliated to DAVV, Indore & RGPV, Bhopal, Madhya Pradesh, India UGC-NAAC Accredited 'A' Grade Institute ISO 9001:2015 Certified

Syllabus

Bachelor of Science (Microbiology)

[B. Sc. (MB)]

Year I / Semester I

w.e.f. Session 2025-26



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Shri Vaishnav Institute of Management & Science, Indore				
B.Sc. (Microbiology) I Semester				
Session : 2025-26				
S.No.	Course Type	Course Code	Subject	Total Credit
1.	Core Course (Major 1) (C-1)	BSCMB-101(T)	General Microbiology (Theory)	4
		BSCMB-101(P)	Study of Microorganisms (Practical)	2
2.	Minor 1 (M-1)	BSCMB-102(T)	Fundamental Organic Chemistry (Theory)	2
		BSCMB-102(P)	Fundamental Organic Chemistry (Practical)	2
3.	Multidisciplinary Course (MDC)	BSCMB-103(T)	Information Technology (Theory)	2
		BSCMB-103(P)	Information Technology (Practical)	1
4.	Ability Enhancement Course AEC-1	AEC-101	Hindi Language & Sanskriti	2
5.	Skill Enhancement Course SEC (VOC) - I	SEC-101	Digital Marketing	3
6.	Internship/Apprenticeship/Project Work/Community Engagement	Pw/ Ap/ CE - 101	Project Work	2
Total Credits				20



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Part A :Introduction			
Program: B.Sc. (Microbiology)	Class: I Year	Semester: 1	Session : July 2025-June 2026
Subject: Microbiology			Theory
1. Course Code	BSCMB-101(T)		
2. Course Title	General Microbiology (Theory)		
3. Course Type (Core Course/ Discipline Specific Elective/ Elective/Generic Elective (Vocational/)	Major -I (Core Course)		
4. Pre-requisite(if any)	To study the course, a student must have had the subject Biology in class 12 th		
5. Course objectives	<ol style="list-style-type: none">1. To understand the history and scope of microbiology.2. To learn the structure, function, and classification of microorganisms.3. To study microbial growth, nutrition, and metabolism.4. To understand microbial genetics and mechanisms of gene transfer.5. To learn principles of microbial control, including sterilization, disinfection, and antibiotics.		
6. Course Outcomes (CO's)	On completion of this course, learners will be able to- CO1: Describe Indian Traditional knowledge and historical background of Microbiology CO2: Explore the historical development of microbiology CO3: Outline classification systems CO4: Examine bacterial growth and reproduction CO5: Examine bacterial cell structure		
6. Credit Value	4 Credits		
7. Total Marks	Max Marks 30+70 Min. Passing Marks: 35		



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Part B- Contents of the Course

No. of Lectures Per Week: 6

Total No. of Lectures Required: 60

Unit	Topics	No. of Lectures
I	<p>Vedic Microbiology</p> <p>1.1 Vedic Microbiology- Introduction and Importance</p> <p>1.2 Microbiology in Vedas and Human Health</p> <p>1.3 Indian Fermented food and beverages from the vedic period to the present time</p> <p>1.4 Probiotic and Prebiotic in Ayurveda</p> <p>1.5 Indian Traditional knowledge and global historical background of Microbiology</p> <p>Keywords: Vedic Microbiology, Fermented Food, Probiotics and prebiotics.</p> <p>Activity: Class debate on whether Vedic Microbiology principles align with modern scientific findings.</p>	12
II	<p>Historical development of Microbiology</p> <p>2.1 Theory of spontaneous generation, Biogenesis and Abiogenesis</p> <p>2.2 Contribution of Anton Von Leeuwenhoek, Louis Pasteur, Robert Koch, Joseph Lister, Edward Jenner, Alexander Fleming, Martinus Beijerinck, Sergei Winogradsky and Elei Metnikoff</p> <p>2.3 Contributions of Indian Scientists in the field of Microbiology</p> <p>Keyword: spontaneous generation, Biogenesis and Abiogenesis</p> <p>Activity: Microbiology Timeline Creation- Students create a timeline of key events in microbiology highlighting the discoveries and contributions of scientists.</p>	12
III	<p>Classification System</p> <p>3.1 Ancient Indian concepts of microorganisms from Ayurveda and traditional texts</p> <p>3.2 Whittaker's Five Kingdom Classification Monera, Protista, Fungi, Plantae and Animalia</p> <p>3.3 Carl Woese's Three Domain Classification Archaea, Eubacteria and Eukarya</p> <p>3.4 Classification of Bacteria Overview of Bergey's Manual of Systematic Bacteriology</p> <p>3.5 Modern Methods of Bacterial Taxonomy</p>	12



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	<p>Keyword: Taxonomy, Domain, Bergey's Manual</p> <p>Activity:</p> <ol style="list-style-type: none">1. Create a comparative chart of microbial classification the Ayurveda and modern microbiology2. "Kingdom Sorting Game" Prepare cards with magic and characteristics of various organisms and students have to correctly classify them based on Whittaker's and Woese's classification system	
IV	<p>Bacterial Cell Structure</p> <p>4.1 Ancient Indian Perspective on Microbial life</p> <p>4.2 Study of Bacteria- Size, Shape and arrangement of Bacterial cells</p> <p>4.3 Structures- External to Plasma Membrane – cell wall, Glycocalyx (capsule, slime layer), flagella, fimbriae, stalk, prostheca</p> <p>4.4 Structures Internal to Cell wall- Cell Membrane, cytoplasm, cytoplasmic inclusions, genome, spores and cysts.</p> <p>Keywords: Bacterial cells, cell wall, glycocalyx</p> <p>Activity: 3D Model making of bacterial cells</p>	12
V	<p>Bacterial Growth and Reproduction</p> <p>5.1 Bacterial Growth- Logarithmic representation of bacterial populations, phases of growth, calculation of generation time and specific growth rate. Techniques of Measurement of Bacterial Growth, Factors affecting bacterial growth</p> <p>5.2 Reproduction in Bacteria – Binary fission, budding and fragmentation</p> <p>5.3 Traditional Indian concepts of microbial growth and reproduction.</p> <p>Keywords: bacterial populations, Binary fission, budding and fragmentation</p> <p>Activity: Provide case studies of bacterial outbreaks and ask students to analyze how growth conditions influenced the spread of disease</p>	12



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Part- C: Learning Resources

Text Books, Resource Books and Other Resources

Suggested Readings:

1. Pelczar M.J., Chan, E.C.S and Krieg, N.R. "Microbiology" Tata McGraw-Hill, New Delhi (2001).
2. Tortora G.J., Funki B.R., and Case C.L., "Microbiology: An Introduction." 9th edition Pearson Education (2008).
3. Willey J.M., Sherwood L.M., and Woolverton C.J., "Prescott's Microbiology." 9th edition McGraw-Hill Higher Education (2013).
4. Madigan, M. T., Martinko, J.M. Dunlop, P.V and Clark D.P., "Brook Biology of Microorganisms, 12th edition Pearson Benjamin Cummings, SanFrancisco (2009).
5. Sumbali, Geeta and Mehrotra, R.S., "Principles of Microbiology". McGraw-Hill Edition (2017).
6. Ananthanarayana, R. and Paniker, C.K.S., "Text Book of Microbiology", 6th Edition Oriental Longman Publications, USA, (2000).
7. Dubey, R.C and Maheshwari D.K., "A Textbook of Microbiology", S.Chand & Company Ltd., New Delhi.(2008).
8. Sharma, P.D., "Microbiology", Rastogi Publications, Meerut. (2014).
9. Singh, R.P., "Applied Microbiology" Kalyani Publishers, New Delhi (2007).
10. Sharnmi.Q.J. "Microbiology-1" Kailash Pustak Sadan, Bhopal ISBN: 978-81-89900-43-4.
11. Sharnmi.Q.J. and Uike, J, "Cell Biology and Immunology" Kailash Pustak Sadan Bhopal ISBN: 978-81-89900-95-3.

Suggested equivalent online courses:

1. <https://www.mooc-list.com/course/small-and-mighty-introduction-microbiology-future-learn>.
2. <https://www.mooc-list.com/course/microbiology-saylororg>
3. <https://www.mooc-list.com/course/bacteria-and-chronic-infection-coursera>
4. <http://www.coursera.org/lecture/bacteria-infection/1-1-introduction-to-bacteria-by-bioinformatician-phd-peder-worning-HZ64m>
5. <http://openstax.org/books/microbiology/pages/1-3-types-of-microorganisms>
6. <http://openstax.org/books/microbiology/pages/4-1-prokaryote-habitats-relationships-and-microbiomes>
7. <https://swayam.gov.in/explorer?searchText=microbiology>.



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Part D-Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks: 100

Continuous Comprehensive Evaluation(CCE) 30

University Exam (UE) 70

Internal Assessment: Continuous Comprehensive Evaluation(CCE): 30	Class Test Assignment/Presentation	30
External Assessment: University Exam Section Time: 03:00 Hours	Section (A): Very Short Questions Section (B): Short Questions Section (C): Long Questions	70
Total Marks	(Internal Assessment + External Assessment) : 30+70	
Credit Value	4	
Minimum Passing Marks	35	



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Part A Introduction			
Program: B.Sc.(Microbiology)	Class: I Year	Semester: I	Session: July 2025-June 2026
Subject: Microbiology			Practical
1. Course Code	BSCMB-101(P)		
2. Course Title	Study of Microorganism		
3. Course Type (Core Course/ Discipline Specific Elective/ Elective/Generic Elective /Vocational/)	Major -1 Core Course		
4. Pre-requisite(if any)	To study the course, a student must have had the subject Biology in class 12 th		
5. Course Objectives	<ol style="list-style-type: none">1. To develop skills in aseptic techniques and safe laboratory practices.2. To learn to culture, isolate, and identify microorganisms.3. To perform staining techniques for bacterial morphology and classification.4. To study microbial growth patterns and measure growth parameters.5. To test microbial susceptibility to antimicrobial agents.		
5. Course Outcomes (CO's)	On successful completion of this course, students will be able to- CO1: Isolate various types of bacteria and yeasts CO2: Perform microscopic study of various bacteria fungi and protozoa CO3: Study the bacterial growth curve CO4: Study the effect of various environmental factors on bacterial growth		
6. Credit Value	2 Credits		
7. Total Marks	Max Marks 30+70	Min Passing Marks: 35	



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Part B –Contents of the Course

No. of Lectures per week: 3

Total No. of Lectures Required: 30

S.No.	Name of the Exercise	No. of Lab Hours
1.	Isolation of autotrophic bacteria and cyanobacteria, Rhizobia, from root nodules.	9
2.	Isolation of Lactobacillus from curd.	3
3.	Isolation of yeast from ripened fruits.	3
4.	Preparation of Temporary wet mount and microscopic examination of Mucor, Aspergillus, Rhizopus and Penicillium	4
5.	Preparation of smear and microscopic examination of Staphylococcus, Lactobacillus, Escherichia, Vibrio and Leptospira	3
6.	Study of the bacterial Growth Curve	2
7.	Study of Effect of pH on Bacterial Growth	2
8.	Study of effect of Temperature on bacterial growth	2
9.	Any other experiment may be designed based on theoretical aspects.	2
Keyword/Tags: Isolation of bacteria, Bacteria cell structure		



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Part C- Learning Resources

Text Books, Reference Books, Other resources

Suggested Reading:

1. Cappuccino, J. and Sherman, N., "Microbiology : A Laboratory Manual", 9th edition Pearson Education Limited (2010).
2. Dubey , R.C. and Maheshwari , D.K., "Practical Microbiology", S.Chand & Co. Ltd., New Delhi (2002).
3. M.Gopal Reddy,M.,Reddy, M.N., Saigopal, D.V.R. and Mallaiah K.V., "Laboratory Experiments in Microbiology". Himalaya Publishing House, Mumbai. (2007).
4. Aneja, K.R., "Laboratory Manual of Microbiology and Biotechnology, 2nd Edition", Meditech Scientific International (2018).
5. Patel , Rakesh J, and Patel Kiran, R., "Experimental Microbiology Vol I and Vol 11", Aditya Prakashan , Ahmedabad (2009).
6. Varghese, Naveena and Joy, V., "Microbiology Laboratory Manual" Ed.I. Aromatic and Medicinal Plants Research Station, Odakkali, Emakulam, Kerala(2014).
7. Shammi. Q.J., "Microbiology-Tools and Techniques", Kailash Pustak Sadan, Bhopal, ISBN. 978-81-89900-38-0 (In Hindi also).
8. Grainger John, Hurst, Janet and Burdass. Danel., "Basic Practical Microbiology: A Manual", The Society for General Microbiology.(2001).

Suggested equivalent digital platforms/websites/online courses:

1. <https://www.mooc-list.com/course/introduction-practical-microbiology-futurelearn>
2. https://study.com/articles/List_of_Free_Online_Microbiology_Courses_and_Training_Options.html



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Part D-Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Internal Assessment	Marks	External Assessment	Marks
Class Interaction/Quiz	30	Viva Voce Practical	70
Attendance		Practical Record File	
Assessments (Charts/Model/Seminar/Rural Service/ Technology/ Dissemination/Report of Excursion/ Lab Visits/ Survey/ Industrial Visit)		Table work/ Experiments	
Total Marks : 100			



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Part A : Introduction			
Programme : B.Sc. (Microbiology)	Class : I Semester	Year : I	Session : July 2025- June 2026
Subject: Chemistry	Theory		
1	Course Code	BSCMB-102(T)	
2	Course Title	Fundamental Organic Chemistry	
3	Course Type (Core Minor 1 Course/Elective/Generic Elective/Vocational....)	Minor 1	
4	Pre-requisite (if any)	To study this course the students must have the subject Chemistry in 12 th Course or equivalent	
5	Course Objective	To enable students to understand and apply fundamental concepts of organic chemistry and traditional Indian knowledge of chemistry, specifically in the areas of: <ol style="list-style-type: none">1. Understanding traditional Indian chemistry: Familiarize students with Bharatiya Traditional Knowledge of Chemistry in the post-Vedic period.2. Organic chemistry fundamentals: Develop students' understanding of structure, bonding, and mechanisms in organic molecules.3. Stereochemistry and reaction mechanisms: Equip students with knowledge of stereochemistry and mechanisms of various organic reactions4. Hydrocarbon chemistry: Enable students to explain the preparation, properties, and structures of alkanes, cycloalkanes, alkenes, and alkynes.	
6	Course Outcomes (CO's)	After completing this course, the student will be able to - CO1: Explain Bharatiya Traditional Knowledge of Chemistry in Post vedic period CO2: Explain Structure and bonding in organic Molecules. CO3: Explain Mechanism of different organic Reactions. CO4: Explain Stereochemistry of organic compounds. CO5: Explain preparation properties and structures of alkanes, cycloalkanes, alkenes and alkynes.	
7	Credit Value	3 Credits	
8	Total Marks	Max. Marks: 30+70	Min. Passing Marks: 35



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Part B Content of the Course

No. of Lectures per week : 3

Total No of Lecture Required: 45

Unit	Topic	No. of Lectures
1	Bharatiya Traditional Knowledge of Chemistry in Post vedic period Samkhya, Bhratsamhita, Nyaya and Vaisesikha of Varahmihira, Sushrut sahinta, Rasashala, tradition of chemicals in Time of Charak and Sushrut. Sankhya-Patanjali System, Evolution of Different forms of Matter from the Vedantic view, The Atomic theory of the Buddhists and Jains. Keyword/tags: Samkhya, Bhratsamhita, Arthashastra of Kautilya, Nyaya and Vaisesikha of Varahmihira, Sushrut sahinta, Buddhists and Jains. Activities: <ol style="list-style-type: none">1. Gather information about traditional Indian cosmetics knowledge and traditional Indian drug knowledge.2. Prepare the Project and Modals related to Ancient Indian Chemistry.3. Field study of BKS in nearby area.	9
2	Structure and bonding- Hybridization, shapes of methane, ethane, ethylene, and acetylene. Vander wall interaction, electronic displacement- mesomeric effect, resonance, hyperconjugation, aromaticity, inductive effect. Hydrogen bonding in organic compounds with the special reference to alcohol, phenols, amines and its consequences, dipole moment, organic acids and bases, their relative strength with emphasis on factors affecting pka value. Keyword/tags: Hybridization, Vanderwall interaction, electronic displacement, dipole moment	9
3	Mechanism of organic reactions homolytic and heterolytic bond fission with suitable examples, types of reagents-electrophiles and nucleophiles, types of reactions and their mechanism-addition elimination and substitution, types, shapes and relative stabilities of reactive intermediates- carbocation, carbanion, free radicals, carbenes, nitrenes. Keyword/tags: homolytic and heterolytic bond fission, electrophiles and nucleophiles.	9



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4	Stereochemistry of organic compounds- Concept of isomerism, types of isomerism, structural isomerism, stereo isomerism, optical isomerism, elements of symmetry, molecular chirality, enantiomers, optical activity, example of optical isomerism, chiral and achiral molecules, diastereoisomers, threo and erythro isomers, resolution of enantiomers, inversion and retention, geometrical isomerism, E-Z nomenclature, confirmational isomerism, Newman projection, Sawhorse projection, Flying wedge formula, Fischer projection, confirmation of ethane, butane and cyclohexane Keyword/tags: isomerism, stereo isomerism, optical isomerism, elements of symmetry	9
5	Alkanes- Open chain and close chain compounds, functional groups, homologous series, classification of aliphatic compounds, nomenclature of aliphatic compounds, IUPAC nomenclature of alkanes, isomerism in alkanes, methods of synthesis -Wurtz synthesis, Kolbe synthesis, Grignard reagent, physical and chemical properties. Cycloalkanes- nomenclature, Bayer strain theory, relative stability of rings, concept of strainless rings. Alkenes- nomenclature, methods of preparation: dehydration of alcohols, dehydrohalogenation of alkyl halides, Saytzeff rule, Hofmann rule, properties of alkene: addition of halogen (electrophilic, free radical, Markovnikov rule), ozonization, polymerization Alkynes- nomenclature, methods of preparation, structure, chemical reactions: electrophilic addition, nucleophilic addition, Ozonisation, oxidation, acidic nature, polymerization and isomerisation. Keyword/tags: functional groups, homologous series, IUPAC nomenclature	9
Activities 1. Extraction of Tulsi, Neem, Amla, Haldi 2. Gather data on the processes used to purify zinc both historically and currently. 3. Gather images and records pertaining to the history of two rust- resistant monuments built in India. 4. Gather information about traditional Indian cosmetics knowledge and traditional Indian drug knowledge. 5. Collection of Medicinal plants and their uses from nearby area (Herbarium Preparation) 6. Chart preparation of Ancient Indian Scientist in Chemistry and their contribution. 7. Field study of BKS in nearby area 8. Educational Tour of Industries and Research Institutes 9. Prepare the Project and Modals related to Ancient Indian		



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Part C – Learning Resources

Text Books, References Books, Other resources

Suggested Readings:

1. History of Chemistry in ancient and Medieval India: Incorporating the History of Hindu Chemistry, 2014 by Ray Prafulla Charndra Acharya, ISBN-10 8121801540, Publisher Chowkhamba Krishnadas Academy
2. Chemistry and Chemical Techniques in India, Author: B. V. Subbarayappa, Publisher: Centre For Studies In Civilizations, Edition:2004, ISBN:818758601X
3. Chemistry and Chemical Techniques in India: Vol 4 Part 1 (History of Science, Philosophy and Culture in Indian Civilization) 1 January 1999, by B. V. Subbarayappa (Editor), ISBN-10 818758601X, Publisher Centre for Studies in Civilisations
4. Dinesh Atomic Structure, Bonding, General Organic Chemistry & Aliphatic Hydrocarbons for B.Sc. – I (CHEM 101TH) 1 January 2020 by P.N.Kapil (Author), Publisher S. Dinesh & Co.
5. Structure and Bonding, Steven Farmer & Dietmar Kennepohl University of Illinois Springfield, Libre text chemistry,
6. Basics of Organic Chemistry A Textbook for Undergraduate Students, Author: Anshul Bansal, ISBN: 978- 981-5223-23-1 (Print) ISBN: 978-981-5223-22-4 (Online) Year of Publication: 2024
7. March's Advanced Organic Chemistry: Reactions, Mechanisms, and Structure, 8th Edition, Michael B. Smith, ISBN: 978-1-119-37180-9. March 2020, Wiley
8. Modern Methods of Organic Synthesis (4th Edition) 4th Edition, by W. Carruthers (Author), Iain Coldham (Author), ISBN-10 0521778301, Publisher Cambridge University Press
9. Reaction Mechanism In Organic Chemistry Paperback 28 June 2016, by Subrata Sen Gupta (Author), SBN-10 019945681X, Publisher Oxford University Press
10. Stereochemistry of Organic Compounds Hardcover -6 September 1994, by Ernest L. Eliel (Author), Samuel H. Wilen (Author), ISBN-10 0471016705, Publisher Wiley-Interscience, Edition 1
11. Nasipuri D_Stereochemistry Of 4ed (499) by D. Nasipuri |1 October 2020, Stereochemistry of Organic Compounds: Principles and Applications by D. Nasipuri | 7 January 2018, Newage International pvt, Itd
12. Stereochemistry of Organic Compounds, Ernest L. Eliel, Samuel H. Wilen, Lewis N. Mander, Wiley, 28 Sept 1994
13. Organic Chemistry: Hydrocarbons Hardcover -1 December 2007 by Dr M S Yadav (Author), ISBN-10 8189741365, Publisher SBS Publishers
14. Hydrocarbons (Alkanes, Alkenes And Alkynes), Amit Arora, Discovery Publishing House, 2006
15. Textbook of Organic Chemistry (LPSPE) Author : Arun Bahl & BS Bahl ISBN : 9789352837304 S Chand Publishing year: 2019



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Suggested equivalent online courses

1. Organic Chemistry-I By Dr. B. S. Balaji Jawaharlal Nehru University, New Delhi https://onlinecourses.swayam2.ac.in/ugc19_ch01/preview
2. Introductory Organic Chemistry I By Prof. Neeraja Dashaputre, Prof. Harinath Chakrapani | ISER Pune https://onlinecourses.nptel.ac.in/noc20_cy30/preview

Part D-Assessment and Evaluation

Suggested Continuous Evaluation Methods

Maximum Marks: 100

Continuous Comprehensive Evaluation (CCE) : 30 marks University Exam (UE) 70 marks

Internal Assessment: Continuous Comprehensive Evaluation (CCE): 30	Class Test Assignment/Presentation	30
External Assessment :	Section(A) : Very Short Questions Section (B) : Short Questions Section (C): Long Questions	70
Total Marks	(Internal Assessment + External Assessment) :	
Credit Value	3 Credits	
Minimum Passing Marks	35	



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Part A : Introduction			
Programme : B.Sc. (Microbiology)	Class : I Semester	Year : I	Session : July 2025- June 2026
Subject: Chemistry			Practical
1	Course Code		BSCMB-102(P)
2	Course Title		Basic Organic Chemistry
3	Course Type (Core Course/Elective/Generic Elective/Vocational....)		Minor 1
4	Pre-requisite (if any)		To study this course the students must have the subject Chemistry in 12 th Course or equivalent
5	Course Outcome		<ol style="list-style-type: none">1. Calibration of Thermometer: Ensure thermometer accuracy.2. Decolourization and Crystallization of Charcoal: Demonstrate charcoal's decolourizing property and crystallization process.3. Stereo chemical Study via Models: Understand 3D structure and stereoisomerism.4. Synthesis of Organic Compounds: Synthesize compounds and apply organic reaction principles.
6	Course outcomes (CO's)		By the end of this course students will be able to the following aspects of Laboratory in chemical analysis: CO1: Calibration of Thermometer CO2: Decolourization and Crystallization of Charcoal CO3: Stereo chemical Study of Organic Compounds via Models. CO4: Synthesis of Different Organic Compounds
7	Credit Value	1 Credit	
	Total Marks	Max. Marks: 30+70	Min. Passing Marks:35



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Part B- Content of the Course		
Unit	Topics	No. of Lectures
1	Calibration of Thermometer 03 1. 80-82° (Naphthalene) 2. 113.5-114° (Acetanilide) 3. 132.5-133° (Urea)	03
2	Crystallization Concept of induction of crystallization, Phthalic acid from hot water (using fluted filter paper and steamless funnel), Acetanilide from boiling water.	03
3	Decolorisation and crystallization using charcoal Decolorisation of brown sugar (sucrose) with animal charcoal using gravity filtration. Crystallization and decolorisation of impure naphthalene (100g of naphthalene mixes with 0.3 g of Congo Red using 1g decolorizing carbon) from ethanol.	03
4	Stereochemical Study of Organic Compounds via Models R and S configuration of optical isomers E, Z configuration of geometrical isomers Conformational analysis of cyclohexanes and substituted cyclohexanes	03
5	Synthesis of Organic Compounds a) Acetylation of salicylic acid, aniline, glucose and hydroquinone, Benzoylation of aniline and phenol	03
Note	Students should visit any chemical industry to learn or observe the process and preparations practically and submit the report of that industrial visit also	
Keywords/Tags: Stereochemical Study of Organic Compounds via Models, Calibration of Thermometer, Crystallization, Mixed melting point		

Part – C : Learning Resources
Textbooks, Reference Books, Other Resources
Suggested Readings:
Text Books
1. Dr. M.M.N. "Tandon unified practical chemistry" Shiva Lal Agarwal & co.



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2. Sudha Goyal (Author), R. P. Singh V. K. Singh (Author), Prashant Singh Ashish Dwivedi (Author) B.Sc. Chemistry Practical I , Krishna Prakashan Media
3. Reinhart Keese. Martin P. Brändle. Trevor P. Toube Practical Organic Synthesis: A Student's Guide John Wiley & Sons, Inc..
4. Sudha Goyal B.Sc. Chemistry Practical III Krishna Prakashan Media
5. Furniss, B.S., Hannaford, A.J., Smith, P.W. G., Tatchell, A.R., «Vogel's Text Book of Practical Organic Chemistry", Pearson Education, 2005, 5h Edn.
6. Gurthu, J.N., Kapoor, R., "Advanced Experimental Chemistry", S. Chand and Co., 1987.
7. Sundaram, S., Krishnan, P., Raghavan, P.S., "Practical Chemistry (Part II)", S. Viswanathan Co. Pvt., 1996.
8. Mohd A A, Ramesh K P, Anuradha S, Bassa S, Advanced Laboratory Techniques in Chemistry, Scientific International Publishing house, Tamilnadu, 2024

Reference Books:

1. Furniss, B.S., Hannaford, A.J., Smith, P.W. G., Tatchell, A.R., «Vogel's Text Book of Practical Organic Chemistry", Pearson Education, 2005, 5th Edn.

Suggestive Digital Platform Web Links:

1. <https://vlab.amrita.edu/?sub=2&brch=190&sim=338&cnt=1>
2. <http://www.columbia.edu/itc/barnard/biology/biobc2004/edit/experiments/Experiment1-Spec.pdf>
3. [http://web.pdx.edu/ralfw/uploads/1/0/2/6/10260941/pulse oximetry laboratory guide.pdf](http://web.pdx.edu/ralfw/uploads/1/0/2/6/10260941/pulse%20oximetry%20laboratory%20guide.pdf)
4. [https://www.chem.purdue.edu/courses/chm224/Lab-Experiments/expt4 GENESYS V2.pdf](https://www.chem.purdue.edu/courses/chm224/Lab-Experiments/expt4_GENESYS%20V2.pdf)
5. http://lgervind.faculty.mic.edu/biology/101/101_lab/spectrophotometry/4%20Spectrophotometer%20Fa17.pdf
6. [https://www.edag.com/w/images/6/6e/EXPO11_The pH Electrode and Potentiometric Titrations PDF.pdf](https://www.edag.com/w/images/6/6e/EXPO11_The_pH_Electrode_and_Potentiometric_Titrations_PDF.pdf)
7. <https://www.philadelphia.edu.jo/academics/ajaber/uploads/CHEM%20540-Chapter%202-Potentiometry-061.pdf>
8. <https://www.tau.ac.il/~adavanal/PotentiometricTitrations.htm>
9. [https://chem.libretexts.org/Bookshelves/Analytical_Chemistry/Book%3A_Analytical_Chemistry2.1_\(Harvey\)/11%3A_Electrochemical_Methods/11.02%3A_Potentiometric_Methods](https://chem.libretexts.org/Bookshelves/Analytical_Chemistry/Book%3A_Analytical_Chemistry2.1_(Harvey)/11%3A_Electrochemical_Methods/11.02%3A_Potentiometric_Methods)
10. <https://www.chem.purdue.edu/courses/chm224/Lab-Experiments/Exp8.pdf>
11. [https://www.shcollege.ac.in/wp-content/uploads/NAAC_Documents_IV_Cycle/Criterion-W/2.3.2/ppt/Dr Ignatious ConductometricTitration.pdf](https://www.shcollege.ac.in/wp-content/uploads/NAAC_Documents_IV_Cycle/Criterion-W/2.3.2/ppt/Dr_Ignatious_ConductometricTitration.pdf)
12. https://www.analytik.ethz.ch/praktika/phys_anal/POL/Anleitung_ENG.pdf
13. <https://nph.onlinelibrary.wiley.com/doi/pdf/10.1111/i.1469-8137.1948.tb05089.x>
14. http://chemistry.du.ac.in/study_material/4103-A/MS/MS Polarography.pdf



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16. [https://fac.ksu.edu.sa/sites/default/files/abbe experiment.pdf](https://fac.ksu.edu.sa/sites/default/files/abbe%20experiment.pdf)
17. <https://web.mst.edu/~tbone/subjects/tbone/chem224/riproc.pdf>
18. http://www.fbml.ff.vu.lt/sites/default/files/74_en.pdf
19. https://wp.optics.arizona.edu/mnofziger/wp-content/uploads/sites/31/2016/05/OPTI202L-20_Lab10-0MD2.pdf
20. <http://davjalandhar.com/dbt/chemistry/SOP%20LabManuals/B.Sc.%20BT%20SEM620IV.pdf>
21. <http://vlab.amrita.edu/?sub=1&brch=195&sim=545&cnt=1>

Suggested Equivalent Online Courses:

1. <https://www.my-mooc.com/en/mooc/basic-analytical-chemistry/>
2. <https://www.my-mooc.com/en/mooc/principles-electronic-biosensors-purdue-nano535x/>



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Part D-Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Internal Assessment	Marks	External Assessment	Marks
Class Interaction /Quiz	30	Viva Voce on Practical	70
Attendance		Practical Record File	
Assignments (Charts/ Model Seminar / Rural Service/ Technology Dissemination/ Report of Excursion/ Lab Visits/Survey / Industrial visit)		Table work/Experiments	
Total Marks: 100			



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PART-A : Introduction			
Programme : B.Sc. (Microbiology)		Class : I Semester	Year : I
Subject : Information Technology		Theory	
1.	Course Code	BSCMB-103(T)	
2.	Course Title	Information Technology	
3.	Course Type (Core Course/DSE/Minor/MD-ID/SEC/VOC)	Multidisciplinary	
4.	Pre-Requisite (if any)	No Pre-Requisite	
5.	Course Objectives	1. To understand and apply IT components and their applications in real-life scenarios. 2. To develop digital literacy, ethical awareness, and cyber hygiene practices among learners. 3. To familiarize learners with IT tools for office work, including the use of Indian languages. 4. To introduce learners to emerging technologies such as Artificial Intelligence (AI) and cloud platforms.	
6.	Course Outcomes (COs)	On completion of this course, learners will be able to: CO 1. Understand IT components & its applications CO 2. Promote digital literacy, ethical awareness, and cyber hygiene. CO 3. Exposure to IT tools for office work including Indian languages CO 4. Encourage healthy and mindful habits through yoga and Indian values. CO 5. Introduce learners to emerging technologies like AI and cloud platforms.	
7.	Credit Value	2 Credits	
8.	Total Marks	Max. Marks: 100	Min. Passing Marks: 35



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PART-B :Content of the Course		
No. of Lectures per week : 02		
Total No. of Lectures required : 30		
Unit	Topics	No. of Lectures required
I	Fundamentals of Information Technology & Indian Knowledge Systems History of Computing: From Ancient Indian contributions (e.g., binary logic in Pingala's Chandahśāstra) to modern IT Overview of Computer Systems: Hardware, Software, I/O Devices, Memory Operating Systems (Windows/Linux), File Management Introduction to Number Systems with Indian numeral history Concept of Digital India and e-Governance initiatives Activity : 1. Visit to a Digital Seva Kendra (Common Service Center) 2. Create a poster on Indian IT innovations (ISRO, Aadhaar, etc.)	7
II	Office Tools, Language & Communication in IT Word Processing, Spreadsheets, and Presentations Use of local languages in IT (Unicode, Google translation tools, Indic typing tools) English for IT: Email Writing, IT vocabulary, presentation skills Language models and voice-to-text (Google Lens, ChatGPT, AI typing tools) UPI and QR Code : Introduction, Functionality, Challenges and Application in Indian context. Activity : 1. Prepare a bilingual presentation (English + regional language) 2. Draft an email for a job application and create a digital resume	7
III	Internet, AI Tools & Cyber security Awareness Introduction to Internet, Cloud, and Email Cyber security basics: Phishing, Malware, Identity Theft Digital Ethics and Indian perspectives on "Dharma in Technology" Hands-on: Google Workspace, ChatGPT, Canva, Gemini, Indian AI tools Cybercrime awareness: Government portals (CERT-IN, Cyber Crime Reporting Portal).	6



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	Activity : 1. Mock simulation of cybercrime reporting 2. Create a "Stay Safe Online" digital awareness video or poster.	
IV	<p>Text and Image Data: Introduction, Storage Formats for pictures, Image compression fundamentals, Image acquisition with Digital Camera. Audio Data: Introduction, Audio Signals, Acquisition and Storage, Compression Video Data: Introduction, Capturing a moving scene with Video Camera, Compression, MPEG compression standard.</p> <p>Activity :</p> <ol style="list-style-type: none">1. Understand how digital images are captured, stored in various formats, and compressed, while analyzing the impact of these factors on quality and size.2. Understand how audio and video data are captured, stored, and compressed, and how different formats and compression levels affect quality and file size.	5
V	<p>IT Profession, Indian Values, Yoga & Social Impacts of Technology</p> <p>Careers in IT: Freelancing, BPO, Data Entry, Web Development, AI</p> <p>Work ethics, time management, and digital wellbeing Indian Values: Satya, Ahimsa, and Seva in Tech Service Yoga for concentration, posture correction, and stress management for IT users</p> <p>Social implications: Digital divide, screen addiction, misinformation.</p> <p>Activity : 1. Daily 5-minute yoga for eyes and back (Demonstration & practice) 2. Conduct a debate: "Has Technology made us more connected or more isolated?"</p>	5



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Part – C : Learning Resources	
Textbooks, Reference Books, Other Resources	
Suggested Readings:	
<ul style="list-style-type: none">• Introduction to Information Technology By RAJARAMAN V., PHI Learning Pvt. Ltd. (Fourteenth Printing, Third Edition, January 2018)• “Fundamentals of Information Technology” – Alexis Leon & Mathews Leon• Vedic Mathematics 2005, Sterling Publishers Pvt. Ltd. ISBN 978-81-7963-001-3 Reprint 2006, 2009• “Digital Literacy Curriculum” – MeitY (Govt. of India)	
Suggestive Digital Platform Web Links:	
<ul style="list-style-type: none">• National Digital Library of India (NDLI) en.wikipedia.org/wayback• SWAYAM “Fundamentals of Information Technology” (AMU) swayam.gov.in+11onlinecourses.swayam2.ac.in+11classcentral.com+11. https://www.nielit.gov.in/content/digital-literacy-courses	
Suggested Equivalent Online Courses:	
<ul style="list-style-type: none">• Diksha Portal, NPTEL, Cyber Surakshit Bharat• MyGov Cyber Safety Module• AI Tools Practice : ChatGPT, Bard/Gemini, Canva, Grammarly, Scratch/Python IDEs• SWAYAM – Fundamentals of IT (AMU) – Comprehensive coverage of Module I, including history, hardware, OS, memory, number systems, and an intro to cybersecurity onlinecourses.swayam2.ac.in+15onlinecourses.swayam2.ac.in+15testbook.com+15.• SWAYAM – Course in Information Technology (Savitribai Phule Pune Univ.) – A 30-module, 8-week program with cloud introduction, Google Workspace, e-Governance concepts and basic security onlinecourses.swayam2.ac.in+1swayam.gov.in+1.• IIT Madras C Programming & Assembly Language (SWAYAM) – Ideal for Module IV: hands-on programming, logical thinking, algorithms, flowcharts, and connection to hardware fundamentals	



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Part D: Assessment and Evaluation		
Internal Assessment Continuous Comprehensive Evaluation (CCE): 30 Marks		Total Marks : 100
External Assessment Time :03:00 Hours	Section (A): Very Short Questions Section (B): Short Questions Section (C): Long Questions	Marks : 70 Marks
Total Marks	(Internal Assessment + External Assessment) : 30+70= 100 Marks	
Credit Value	2 Credits	
Minimum Passing Marks	35 Marks	



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Part A Introduction			
Programme : B.Sc. (Microbiology)	Class : I Semester	Year : I	Session : July 2025-June 2026
Subject: Information Technology			
1. Course Code	BSCMB-103(P)		
2. Course Title	Information Technology (Practical)		
3. Course Type (Core Course/ Discipline Specific Elective/ Elective/Generic Elective /Vocational/)	Multi Disciplinary Course		
4. Pre-requisite(if any)	No Pre-requisite		
5. Course Objectives	<ol style="list-style-type: none">1. To familiarize students with basic computer hardware components and their functionality.2. To develop skills in using office productivity software (word processor, spreadsheet, presentation software).3. To introduce students to basic networking concepts and internet applications.4. To develop practical skills in using IT tools for documentation, data analysis, and presentation.5. To familiarize students with cyber hygiene practices and online safety measures.		
5. Course Outcomes (CO's)	<p>On successful completion of this course, students will be able to-</p> <ul style="list-style-type: none">CO1. Assemble, disassemble, and identify computer hardware components.CO2. Proficient in using office software (word processor, spreadsheet, presentation software) to create documents, reports, and presentations.CO3. Understand basic networking concepts and be able to configure and troubleshoot simple networks.CO4. Apply IT tools for data analysis, documentation, and presentation in real-world scenarios.CO5. Demonstrate awareness and practices of cyber hygiene, online safety, and digital citizenship.		
6. Credit Value	2 Credit		
7. Total Marks	Max Marks 30+70		Min Passing Marks: 35



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Part B –Contents of the Course		
No. of Lectures per week: 2		
Total No. of Lectures Required: 30		
S.No.	Name of the Exercise	No. of Lab Hours
1.	<p>1. Identify and List Computer System Components Open a PC, identify hardware parts (RAM, HDD, motherboard, I/O devices), and create a labelled diagram.</p> <p>2. Install and Compare OS (Windows vs Linux) Dual-boot or virtual install Linux (Ubuntu), compare file systems, UI, and commands.</p> <p>3. File Management Operations Create folders, copy/move/delete files, use command-line (Windows CMD or Linux terminal).</p> <p>4. Number System Converter Using Spreadsheet Convert between Decimal, Binary, Octal, and Hexadecimal.</p> <p>5. Explore Digital India Portals Navigate portals like UMANG, MyGov, or eDistrict and note their services.</p> <p>6. Create a Document with Word Processor Prepare a report with headings, bullet points, image insertion, and page formatting.</p> <p>7. Use Spreadsheets for Budget/Attendance Calculation Formulas, charts, conditional formatting, and data filtering.</p> <p>8. Prepare a Presentation with Animations Slides with images, transitions, and speaker notes (topic: e-Governance or AI in India).</p> <p>9. Type a Paragraph in Hindi or Your Local Language Using Google Input Tools or Indic Keyboard with Unicode support.</p> <p>10. Translate a Passage Using Google Translate Translate English to any Indian language, check accuracy, and voice pronunciation.</p> <p>11. Practice Email Writing & IT Vocabulary Compose a formal IT-related email; identify 20 IT-specific terms.</p> <p>12. Test Voice-to-Text Using Google Lens or ChatGPT Speak a paragraph and convert it to digital text. Analyze accuracy and limitations.</p> <p>13. QR Code Scanner & UPI Demo (Mock Activity) Generate a QR code using a tool, and simulate UPI-based payments (no real transactions).</p> <p>14. Create and Share a Document Using Google Workspace Collaborate on Google Docs or Sheets with comments and version history.</p> <p>15. Visit CERT-IN and Cybercrime Portals Explore the Government's cybercrime reporting portal and note key features.</p>	30



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Part C- Learning Resources	
Text Books, Reference Books, Other resources	
Suggested Reading:	
Suggested equivalent digital platforms/websites/online courses:	
	<ul style="list-style-type: none">16. Hands-on with AI Tools (ChatGPT, Gemini, etc.) Ask an AI to generate a bio, convert text to summary, or translate content. Document outputs.17. Capture an image, audio, and video using a smartphone or digital camera. Department of Higher Education, Madhya Pradesh Information Technology 6 Save each file in multiple formats (e.g., JPEG, PNG, WAV, MP3, MP4) and record file sizes. Compare quality and size across formats to understand storage and compression.18. Record audio and video clips and compress them using Audacity and Hand Brake tools. Analyze quality differences and calculate compression ratios.19. Draw a Flowchart for a Real-Life Task E.g., Making tea, submitting an online form.20. Daily Yoga Routine for Digital Wellness Follow a 15-min yoga/stretch session for posture & stress relief. Log benefits weekly.



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Part D-Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Internal Assessment	Marks	External Assessment	Marks
Class Interaction/Quiz	10	Viva Voce Practical	10
Attendance	10	Practical Record File	10
Assessments (Charts/Model/Seminar/Rural Service/ Technology/ Dissemination/Report of Excursion/ Lab Visits/ Survey/ Industrial Visit)	10	Table work/ Experiments	50
Total Marks : 100			



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आधार पाठ्यक्रम प्रथम प्रश्न पत्र - हिन्दी भाषा और संस्कृति (भाग - अ) परिचय

कार्यक्रम : यूजी लेवल प्रमाण पत्र	कक्षा : बी.सी.ए (प्रथम सेमिस्टर)	जुलाई-दिसंबर 2025
विषय	Ability Enhancement Course (AEC)	
पाठ्यक्रम कोड	AEC-101	
पाठ्यक्रम का शीर्षक: पाठ्यक्रम का प्रकार	हिन्दी भाषा और संस्कृति Ability Enhancement Course (AEC)	
पाठ्यक्रम अपेक्षित	कक्षा 12 उत्तीर्ण किसी भी विषय समूह से प्रमाण पत्र किया हो, पात्र है।	
पाठ्यक्रम अध्ययन के उद्देश्य (लर्निंग ऑब्जेक्टिव)	1.विद्यार्थियों को भारतीय ज्ञान परंपरा से परिचित कराना तथा इससे लाभान्वित करना। 2.हिंदी के प्रमुख रचनाकारों एवं उनकी महत्वपूर्ण रचनाओं का अध्ययन कर विद्यार्थियों का साहित्यिक ज्ञान बढ़ाना। 3.पाठ्य सामग्री के माध्यम से देश की संस्कृति, चेतना, संस्कार एवं राष्ट्रीय भावना से परिचित कराना। 4.व्याकरण और भाषा ज्ञान की मूलभूत समझ विकसित करना। 5.सामान्य और विशेष शब्दावली के अध्ययन द्वारा भाषा और संस्कृति की समझ को बढ़ावा देना।	



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	<p>6. विशेष शब्दावली (बीज शब्द) के माध्यम से विद्यार्थियों के बोध एवं शब्द ज्ञान का स्तर बढ़ाना।</p> <p>7. विद्यार्थियों को प्रतियोगी परीक्षाओं की तैयारी हेतु आवश्यक भाषा ज्ञान एवं साहित्यिक दक्षता प्रदान करना।</p>	
पाठ्यक्रम अध्ययन की उपलब्धि (लर्निंग आउटकम) CLO	<p>1. भारतीय ज्ञान परम्परा से विद्यार्थियों को अवगत एवं लाभान्वित करवाना।</p> <p>2. इस पाठ्यक्रम के अध्ययन से विद्यार्थी हिन्दी के प्रसिद्ध रचनाकारों एवं उनकी रचनाओं से परिचित हो सकेंगे।</p> <p>3. पठित रचनाओं के माध्यम से विद्यार्थी देश की संस्कृति चेतना, संरक्षण एवं राष्ट्रीय भावना से परिचित हो सकेंगे।</p> <p>4. व्याकरण एवं भाषा ज्ञान का बोध।</p> <p>5. सामान्य शब्दावली और विशेष शब्दावली के अध्ययन द्वारा भाषा एवं संस्कृति बोध का विकास करना।</p> <p>6. विशेष शब्दावली (बीज शब्द / की वर्ड) से परिचित करवाते हुए बोध के स्तर को विकसित करना।</p> <p>7. प्रतियोगी परीक्षाओं हेतु तैयार करना।</p>	
क्रेडिट	02 क्रेडिट	
कुल अंक	100 अंक	
उत्तीर्ण अंक	35 अंक	



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(भाग- ब) कोर्स सामग्री

व्याख्यान की कुल संख्या : वर्ष में अधिकतम 30 घंटे

इकाई	विषय	व्याख्यान की संख्या
इकाई -1	<p>1 भारतीय ज्ञान परम्परा एक परिचय</p> <p>2 भारतीय ज्ञान परम्परा और हिन्दी भाषा</p> <p>3 महर्षि पाणिनि जीवन एवं दर्शन</p> <p>गतिविधियाँ -</p> <p>भारतीय ज्ञान परम्परा पर आधारित पोस्टर सृजन</p> <p>भारतीय ज्ञान परम्परा से संबंधित ग्रन्थों / पुस्तकों का अवलोकन</p>	6 घंटे
इकाई -2	<p>1 मैथिलीशरण गुप्त : परिचय</p> <p>पाठ: मातृभूमि (कविता)</p> <p>2 सूर्यकांत त्रिपाठी 'निराला' : परिचय</p> <p>पाठ: भारत वंदना (कविता)</p> <p>3 प्रेमचन्द्र : परिचय</p> <p>पाठ : शतरंज के खिलाड़ी (कहानी)</p> <p>गतिविधियाँ -</p> <p>कविता का सस्वर वाचन</p> <p>कहानी वाचन</p>	6 घंटे
इकाई -3	<p>1 वैचारिक - भारतीय भाषाओं में राम</p> <p>2 आचार्य रामचन्द्र शुक्ल : परिचय</p> <p>पाठ : उत्साह (भावमूलक निबन्ध)</p> <p>3 रामधारी सिंह दिनकर : परिचय</p> <p>पाठ : भारत एक है (संस्कृति) लेख</p> <p>4 शरद जोशी : परिचय</p>	6 घंटे



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	<p>पाठ : अफसर (व्यंग्य)</p> <p>गतिविधियाँ -</p> <p>निबंध लेखन का अभ्यास</p> <p>भारतीय संस्कृति पर आलेख लेखन</p>	
इकाई -4	<p>हिन्दी व्याकरण</p> <p>1 शब्द रचना : उपसर्ग एवं प्रत्यय</p> <p>2 शब्द प्रकार : तत्सम, तद्धव, देशज, विदेशी संकर नव</p> <p>निर्मित शब्द</p> <p>3 पर्यायवाची, विलोमार्थी, अनेक शब्द के लिए एक शब्द</p> <p>गतिविधियाँ -</p> <p>शब्द रचना संबंधी समूह चर्चा</p> <p>देशज-विदेशी शब्द सूची बनाना</p>	6 घंटे
इकाई -5	<p>हिन्दी व्याकरण</p> <p>1. हिन्दी के प्रमुख विराम चिह्न</p> <p>2. संक्षेपण</p> <p>3. बीज शब्द - धर्म, अद्वैत, भाषा, अवधारणा</p> <p>गतिविधियाँ -</p> <p>अनुच्छेद / श्रुतलेख के माध्यम से विराम चिन्हों का अभ्यास</p> <p>संक्षेपण का अभ्यास</p>	6 घंटे



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सार विन्दु (की वर्ड) / टैग	
सर्च करें:	
मैथिलीशरण गुप्तः	मैथिलीशरण गुप्त की कविता - मातृभूमि
सूर्यकांत त्रिपाठी 'निराला': भारत वंदना	सूर्यकांत त्रिपाठी निराला : भारत वंदना
प्रेमचन्द	प्रेमचन्द - शतरंज के खिलाड़ी
रामधारी सिंह 'दिनकर'	भारत एक है।
आचार्य रामचन्द्र शुक्ल	उत्साह निबन्ध
भारतीय ज्ञान परम्परा	भारतीय ज्ञान परम्परा और हिन्दी भाषा
धर्म क्या है ?	
शब्द रचना, शब्द प्रकार पर्यायवाची शब्द	
विलोम शब्द अनेक शब्द के लिए एक शब्द	
विराम चिह्न	
संक्षेपण	



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(भाग- स)	
अनुशंसित अध्ययन संसाधन	
पाठ्य पुस्तके, सन्दर्भ पुस्तके, अन्य संसाधन	
1.	प्रेमचन्द्र - मानसरोवर, खण्ड - 3
2.	आचार्य रामचन्द्र शुक्ल - चिन्तामणि, भाग -1
3.	शरद जोशी - "कहा जाता है" (व्यंग्य संग्रह)
4.	डॉ. वासुदेव नन्दन प्रसाद : आधुनिक हिन्दी व्याकरण और रचना, भारती भवन, ठाकुर बाड़ी रोड, पटना, बिहार
5.	डॉ. राजेश्वर चतुर्वेदी, हिन्दी व्याकरण - उपकार प्रकाशन, आगरा, उ.प्र.
6.	भारतीय ज्ञान परम्परा - विविध आयाम सम्पादक प्रो. सरोज शर्मा, शिप्रा प्रकाशन - नई दिल्ली
7.	प्राचीन भारतीय ज्ञान परम्परा लेखक - डॉ. अश्विन कुमार राठौर, प्रकाशक श्री सौर्झनाथ, प्रकाशन- नागपुर
8.	हिन्दी ज्ञान कोश
9.	इंटरनेट सामग्री - टैग में उल्लेखित

भाग - द



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अनुशंसित मूल्यांकन विधि

अधिकतम अंक - 100

केवल बाह्य मूल्यांकन

आकलन: अनुभाग विश्वविद्यालय परीक्षा समय - 2 घण्टे	(अ) तीन अतिलघु प्रश्न (प्रत्येक 50 शब्द) (ब) चार लघु प्रश्न (प्रत्येक 200 शब्द) (स) दो दीर्घ प्रश्न (प्रत्येक 500 शब्द)	03 X 04 = 12 04 X 13 = 52 02 X 18 = 36 कुल अंक 100
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PART-A : Introduction

Programme : B.Sc. (Microbiology)	Class : I Semester	Year : I	Session : July 2025- June 2026
Subject : Digital Marketing		Theory	
1.	Course Code	SEC-101	
2.	Course Title	Digital Marketing	
3.	Course Type	SEC	
4.	Pre-Requisite	NIL	
5.	Course Objectives	1. To develop a comprehensive understanding of digital marketing concepts and tools. 2. To Integrate Indian cultural and traditional insights into digital marketing strategies. 3. To design and execute a real digital marketing campaign.	
6.	Course Outcomes (CO's)	On successful completion of this course, the students will be able to: CO1: Explain the concepts and tools of digital marketing. CO2: Apply digital marketing strategies using Indian cultural and traditional insights. CO3: Design and execute a digital marketing campaign. CO4: Analyze the legal frame work and ethical responsibilities involved in digital marketing.	
7.	Credit Value	3 Credits	
8.	Total Marks	Max.Marks:100	Min. Passing Marks:35



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PART B: Content of the Course (Theory)

No. of Lectures per week : 03

Total No. of Lectures required :45

Unit	Topics	No. of Lectures
I	<p>Introduction to Digital Marketing: Meaning, scope, and significance of digital marketing; Difference between digital and traditional marketing; Overview of digital marketing channels: SEO, SEM, Social Media, Email; Career opportunities in digital marketing.</p> <p>Practical Activities-</p> <ul style="list-style-type: none">Students analyze different digital marketing channels(e.g., social media, search engines, email, display ads) and identify their advantages and disadvantages.Students debate ethical issues in digital marketing,Students will analyze Indian brands (e.g., Amul, Tanishq, Paper Boat, Fab India) that integrate traditional values with modern marketing approaches.Group presentation or written report based on selected case.	18
II	<p>Customer Research: Digital Consumer Behavior: Characteristics and factors affecting; Digital Marketing Strategy and Campaign Planning: Segmentation and targeting in the digital environment;</p> <p>Practical Activity-</p> <ul style="list-style-type: none">List out various e-commerce apps/platforms.Students will explore campaigns (e.g., Surf Excel's "Daag Acche Hain-Holi", Cadbury's Diwali campaigns) to study targeting, emotions, platform use, and outcomes. Comparative analysis and class discussion to be encouraged.Choose a marketing-related topic (e.g., influencer marketing, consumer behaviour trends, and sustainability in branding).Create engaging and informative content using simple tools like Canva or Google Docs.	15



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III	<p>Legal & Ethical Issues in Digital Marketing: Meaning of ethics in digital marketing, Importance of ethical behavior for brand image and customer trust; Data Protection Laws in India</p> <p>Practical Activity-</p> <ul style="list-style-type: none">Students examine real or hypothetical digital ads and identify potential legal or ethical violations.Role-play a scenario where a marketing team debates whether to use consumer data without consent.	12
<p>Keywords/Tags: Digital Marketing, Content Marketing, Legal & Ethical Issues, Customer Research, Strategy, Technology</p>		



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Part C-Learning Resources

Text Books, Reference Books, Other resources

- Mathur, Vibha & Arora, Saloni. (2020). Digital Marketing. PHI Learning.
- Babu KG Raja Sabarish, Anbazhagan B, Meenakumari S. (2023). Digital Marketing. Sultan Chand & Sons.
- Swaminathan T. N. & Karthik Kumar. (2019). Digital Marketing: From Fundamentals to Future. Cengage India.
- Chaffey, D. (2022). Digital marketing: Strategy, implementation and practice (8th ed.). Pearson.
- Deiss, R., & Henneberry, R. (2020). Digital marketing for dummies (2nd ed.). Wiley.
- Mahadevan, B. (2022). Textbook on Indian knowledge systems. Indian Institute of Management Bangalore.
- The Readers Paradise. (2025). Indian knowledge system: Principles and practices.

Suggestive digital platforms weblinks:

SWAYAM Course: Digital Marketing

https://onlinecourses.swayam2.ac.in/ugc19_hs26/preview



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Part D- Assessment and Evaluation		
Suggested Continuous Evaluation Methods:		
Internal Assessment: No Internal Assessment	Class Test Assignment/Presentation	Nil
	Section (A): Objective Type Questions	10 Marks
External Assessment: Time : 03.00 Hours	Section (B): Short Questions (200 Words Each)	40 Marks
	Section (C): Long Questions (500 Words Each)	50 Marks
Total Marks	(Internal Assessment + External Assessment) : $30+70=100$	
Credit Value	3	
Minimum Passing Marks	35	



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PART – A: Introduction			
Program: BBA/ BCA/ B. Sc.	Class: I Year	Semester: I	Session : July 2025- June 2026
Subject: Project Work		Theory / Practical: Practical	
1	Course Code	PW/ Ap/ CE - 101	
2	Course Title	Project Work	
3	Course Type (Core Course/DSE/Minor/MID/SEC/VOC)	Project Work (PW) PW/Ap/ CE	
4	Pre-Requisite (if any)	Open for all	
5	Course Objectives (CO)	1: To develop practical understanding of basic management and business concepts. 2: To enhance analytical and problem-solving skills through field or desk research. 3: To improve teamwork, communication, and presentation skills. 4: To familiarize students with local business practices and entrepreneurship. 5: To cultivate data collection, interpretation, and reporting skills.	
6	Course Outcomes (COs)	CO1: Students will be able to apply theoretical concepts to real-world business scenarios. CO2: Students will be able to demonstrate improved research and analytical skills using surveys, interviews, or observation. CO3: Students will be able to enhance team coordination and professional communication. CO4: Students will be able to gain exposure to local industries, markets, and entrepreneurial challenges. CO5: Students will be able to prepare structured reports and presentations effectively.	
7	Credit Value	02	
8	Total Marks	Max. Marks: 100	Min. Passing Marks: 35



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PART – B: Content of the Course	
No. of Lectures per week: Theory (02 Hours per week)	
Total No. of Lectures required: P: 60 Hours	
<p>As part of the Skill Based Activity students are required to undertake Project Work. It is designed to provide practical exposure, industry orientation and application of classroom learning in real business scenarios. For this, students are required to:</p> <ol style="list-style-type: none">1. Select an Industry/Organization - Identify a suitable industry or organization for undertaking the project work.2. Observe Operations - Visit the organization to observe its operations, processes, and overall working environment.3. Understand Organizational Structure - Interact with employees at various levels to comprehend the hierarchy and organizational structure.4. Choose a Functional Area - Select a specific functional area (e.g. Marketing or Human Resources or Operations or Finance) for detailed study.5. Collect and Analyze Data - Gather and analyze data related to the chosen area using both primary sources (interviews, discussions, surveys) and secondary sources (reports, websites, manuals).6. Prepare and Present Report - Compile a comprehensive project report that includes the company profile, observations, data analysis, key learnings, and actionable recommendations.	No. of Lectures 60



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Part C: Assessment and Evaluation

Suggested Continuous Evaluation Method:

External Assessment	Marks
Viva Voce on Practical (20 Marks)	
Practical Record File (20 Marks)	100
Table Work/Exercise Assigned (60 Marks)	
Total Marks: 100	



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Syllabus

Bachelor of Science (Microbiology)

[B. Sc. (MB)]

Year I / Semester II

w.e.f. Session 2025 -2026



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B.Sc. (Microbiology) II Semester				
Session: January - June 2026				
S. No.	Course Type	Course Code	Subject	Total Credit
1.	Major II (Core Course)	BSCMB – 201 (T)	Microbial Tools and Techniques (Theory)	4
		BSCMB - 201 (P)	Microbial Tools and Techniques (Practical)	2
2.	Major II (Core Course)	BSCMB - 202 (T)	Microbial Diversity and Growth (Theory)	4
		BSCMB - 202 (P)	Microbial Diversity and Growth (Practical)	2
3.	Minor II	BSCMB - 203 (T)	Applied Chemistry (Theory)	3
		BSCMB - 203 (P)	Applied Chemistry (Practical)	1
4.	Ability Enhancement Course	AEC - 201	English Language & Indian Culture	2
5.	Value Added Course	VAC - 201	भारत बोध (Understanding India)	2
Total Credits				20



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Part A : Introduction		
Programme : B.Sc. (Microbiology) Class : I Year Semester: II Session : January – June 2026		
Subject: Microbiology		Theory / Practical : Theory
1.	Course Code	BSCMB - 201 (T)
2.	Course Title	Microbial Tools and Techniques (Theory)
3.	Course Type (Core course/ Discipline specific Elective /Elective/ Generic/ Elective/ Vocational)	(Major-II) (Core Course)
4.	Pre requisition	To study this course a student must have the subject Biology in class XII
5.	Course Objectives	1. To understand the fundamental principles and techniques used in microbiology laboratories. 2. To develop skills in handling and manipulating microorganisms safely and efficiently. 3. To learn various methods for isolating, culturing, and identifying microorganisms. 4. To understand the principles of sterilization, disinfection, and antimicrobial agents. 5. To apply microbial techniques in various fields such as medicine, environment, and industry.
6.	Course Outcomes (COs)	On completion of this course, learners will be able to : CO1. Develop an understanding of the Indian traditional knowledge and Vedic Microbiology. CO2. Understand different methods of sterilization and isolation of pure cultures. CO3. Identify the operation of different kinds of CO4. Instruments and microscopes. CO5. Apply serial dilution technique to isolate the bacteria.
7.	Expected Job Role/Career Opportunities	<ul style="list-style-type: none">• Research & Development• Microbiological Testing Laboratories• Quality Control / Quality Assurance• Industrial Microbiologist• Environmental Microbiologist
8.	Credit Value	Theory - 4 credit
9.	Total Marks	Max. Marks: 30 + 70 Min. Passing Marks: 35



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Part B- Content of the Course		
Total No. of Lectures required:60 hrs		
Unit	Topics	No of lecture
1	Indian Traditional Knowledge and Vedic Microbiology: 1.1 Microbial Symbolism in Hinduism, Buddhism and Jainism. 1.2 Yajna- Technology and Vedic Microbiology- <i>Agni Hotra</i> process and Microbial control. 1.3 Role of Fire rituals in microbial control. 1.4 Indian Tradition Knowledge of Nirjantukarana Keywords: <i>microbial symbolism, Vedic microbiology Agni Hotra, Fire rituals. nirjantukarna.</i> Activity: Group discussion on "The role of fire rituals in Microbial Control"	8
2	Microscopy and Staining: 2.1 Microscopy- Principles and applications of simple and compound Bright-field microscopy. Dark-field microscopy, Fluorescence microscopy, Phase-contrast microscopy, transmission electron microscopy and Scanning electron microscopy. 2.2 Preparation for Light Microscope Examination- Wet-mount and hanging-drop techniques, Preparation for smear and fixation. 2.3 Staining- Principles of staining, negative staining, simple staining, differential staining (Gram and acid-fast staining), flagella staining, capsule and endospore staining. 2.4 Traditional Indian concept of microorganisms. Keywords: <i>microscopy, Light microscope, Wet mount, Hanging drop method, staining.</i> Activity: Quiz covering different microscopy techniques, their principles, and applications.	13
3.	Instruments: 3.1 Ancient Indian weighing and measurement systems 3.2 Electronic Balance, Autoclave, Centrifuge, Colony counter, Deep freezer, homogenizer, Hot air Oven, Incubator, Laminar air flow, Magnetic stirrer, pH Meter, Spectrophotometer, Vortex mixture, Water bath, Water distiller, Chromatography chambers, Anaerobic chamber and Electrophoresis apparatus. Keywords: <i>Instruments, microbiology laboratory.</i> Activity: Matching activity where students pair instruments with their correct	13



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	functions and applications in microbiology.	
4	<p>Sterilization and Culture Medium:</p> <p>4.1 Physical methods of sterilization: Dry heat, Moist heat, Radiation. Filtration and Incineration.</p> <p>4.2 Chemical methods of sterilization: Phenol and phenolic compounds, Alcohol, Halogens and Detergents.</p> <p>4.3 Traditional Indian antimicrobial agents.</p> <p>4.4 Types of culture media: Natural, Synthetic, Complex, enriched and selective. Anaerobic (Thioglycolate broth, Robertson's media, Microaerophilic), broth culture of aerobic bacteria.</p> <p>Keywords: Physical Sterilization, Chemical Sterilization, Culture Media</p> <p>Activity: Sterilization Decision-Making Game" - Students are given different contamination scenarios and must choose the most effective sterilization method.</p>	13
5	<p>Isolation, Cultivation and Preservation:</p> <p>5.1 Natural microbial population: Pure culture</p> <p>5.2 Isolation of microbial population: From air, water and soil.</p> <p>5.3 Methods for isolation: Streak plate, pour plate and spread plate. Serial dilution and Micromanipulator methods. Cultivation on liquid and solid media. Isolation of microorganisms on potato slice and bread.</p> <p>5.4 Maintenance and preservation for short-term and long-term.</p> <p>5.5 Preservation techniques in traditional knowledge</p> <p>5.6 Cultivation of anaerobic bacteria and accessing non-cultivable microorganisms.</p> <p>Keywords: Pure culture, Isolation of microbes, Preservation of Microbes.</p> <p>Activity: Engage students in a discussion to explore and justify short term and long-term preservation methods for different microbes.</p>	13



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Part C-Learning Resources

Text Books, Reference Books, Other resources

1. Pelczar, M.J., Chan, E.C.S. and Krieg, N.R., "Microbiology". Tata McGraw-Hill, New Delhi. (2001).
2. Tortora G.J., Funke B.R., and Case C.L., "Microbiology: An Introduction". 9th edition Pearson Education. (2008).
3. Willey J.M., Sherwood L.M., and Woolverton C.J., "Prescott's Microbiology". IP edition McGraw Hill Higher Education. (2013).
4. Madigan, M.T., Martinko, J.M., Dunlap, P.V. and Clark D.P., "Brock Biology of Microorganisms" 12th edition. Pearson Benjamin Cummings, San Francisco. (2009).
5. Sumbali, Geeta and Mehrotra, R.S., "Principles of Microbiology". McGraw Hill Edition. (2017).
6. Ananthanarayana, R. and Panicker, C.K.S., "Text Book of Microbiology". 6th Edition. Oriental Longman Publications, USA. (2000).
7. Dubey, R.C. and Maheshwari, D.K., "A Textbook of Microbiology". S. Chand & Company Ltd., New Delhi. (2008).
8. Sharma, P.D., "Microbiology". Rastogi Publications, Meerut. (2014).
9. Singh, R.P., "Applied Microbiology". Kalyani Publishers, New Delhi. (2007).
10. Shammi, Q.J., "Microbiology-I". Kailash Pustak Sadan. Bhopal. ISBN:978-81-89900-43-4.
11. Shammi, Q.J. and Uike, J., "Cell Biology and Immunology". ISBN:978-81-89900-95-3.
12. Thomas, S.S., "Microbial Mysteries of India: India's Rich Legacy in Microbiology". Kitab Writing Publication Mumbai, (2023).
13. Chakradhar Frend, Shriji KurupVedic Microbiology, *Volume 1 of Vedinformatics Oiosciences series*, Dilip and Dipika Doctor, International Vedic Vision, 2007
14. Dubey R.0 Vedic Microbiology: A Scientific Approach , 1 October 2021

Suggested equivalent digital platforms/ weblinks/ online courses:

1. <https://www.mooc-list.com/course/small-and-mighty-introduction-microbiology-futurelearn>
2. <https://www.mooc-list.com/course/microbiology-saylororg>
3. <https://www.mooc-list.com/course/bacteria-and-chronic-infections-coursera>
4. <https://www.coursera.org/lecture/bacterial-infections/1-1-introduction-to-bacteria-by-bioinformatician-phd-peder-worning-HZ64m>
5. <https://openstax.org/books/microbiology/pages/1-3-types-of-microorganisms>
6. <https://openstax.org/books/microbiology/pages/4-1-prokaryote-habitats-relationships-and-microbiomes>
7. <https://swayam.gov.in/explorer?searchText=microbiology>
8. <https://pmc.ncbi.nlm.nih.gov/articles/PMC7810802/>
9. <https://www.researchgate.net/profile/Chakradhar->



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Frend/publication/325320951_VEDIC_MICROBIOLOGY Microbiology in the VedasA Revived-History/links/5df708d94585159aa4808738/VEDIC-MICROBIOLOGY-Microbiology-inthe-Vedas-A-Revived-History.pdf

10. Microbial Mysteries Of India: India's Rich Legacy In Microbiology - Sanjo S Thomas Google Books

Part D-Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks: 100

Continuous Comprehensive Evaluation (CCE): 30

University Exam (UE): 70

Time: 03.00 Hours

Internal Assessment: Continuous Comprehensive Evaluation (CCE):	Class Test Assignment/Presentation Total	15 15 30
External Assessment: University Exam Section	Section(A): Short Questions Section (B): Very Short Questions Section (C) : Long Question	70



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Part A: Introduction		
Programme: B.Sc. Microbiology Class: I Year Semester: II Session: January-June 2026		
Subject: Microbiology	Theory / Practical : Practical	
1. Course Code	BSCMB – 201 (P)	
2. Course Title	Microbial Tools and Microbial Techniques (Practical)	
3. Course Type (Core course/ Discipline specific Elective /Elective/ Generic/ Elective/Vocational	Major II (Core Course)	
4. Pre requisition	To study this course a student must have the subject Biology in class XII	
5. Course Objectives	1. To enable students to understand the fundamental concepts and principles of microbiology covered in the course. 2. To provide basic knowledge of laboratory equipment (glassware, microscopes, and instruments) used in microbiology labs.	
6. Course Outcomes (COs)	On completion of this course, the learners will be able to: CO1. Understand basic knowledge of glassware, microscopes and different instruments used in the microbiology laboratory. CO2. Understand basic media preparation technique, autoclaving. Cleaning and sterilization of glassware. Preparation of liquid and solid culture media. Isolation of microorganisms by different plating methods.	
7. Expected Job Role/Career Opportunities	<ul style="list-style-type: none">• Research & Development• Microbiological Testing Laboratories• Quality Control / Quality Assurance• Industrial Microbiologist• Environmental Microbiologist	
8. Credit Value	Practical – Credit 2	
9. Total Marks	Max. Marks: 100	Min. Passing Marks: 35



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Part B - Content of the Course

Total No. of Lectures required:30 hrs

S.No.	Name of Exercise	No. of lecture
1.	Demonstration and briefing about principles and working of basic instruments. Keywords/Tags: Basic instruments, Culture media, Pour plate, Streak plate, Spread plate	4
2.	Basic media preparation technique, autoclaving, cleaning and sterilization of glassware.	6
3.	Preparation of liquid culture media- Peptone water, nutrient broth.	2
4.	Preparation of solid culture media- Nutrient agar (agar slant/ agar plate)	2
5.	Isolation of microbes from water, soil and air by serial dilution agar plating method.	3
6.	Isolation of fungi from water, soil and air by serial dilution agar plating method.	3
7.	Isolation of microorganisms by pour plate method.	3
8.	Isolation of microorganisms by streak plate method.	3
9.	Isolation of microorganisms by spread plate method.	3
10.	Any other experiment may be designed on the basis of theoretical aspects.	1

Keywords/Tags: Basic instruments, Culture media, Pour plate, Streak plate, Spread plate.



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Part C-Learning Resources

Text Books, Reference Books, Other resources

1. Suggested Readings: Part C-Learning Resources Text Books, Reference Books, Other resources 1. Cappuccino, J. and Sherman, N., "Microbiology: A Laboratory Manual", 9 edition. Pearson Education Limited. (2010).
2. Dubey, R.C. and Maheshwari, D.K., "Practical Microbiology", S. Chand & Co. Ltd., New Delhi. (2002).
3. M. Gopal Reddy, M., Reddy, M.N. Saigopal, D.V.R. and Mallaiah K.V., "Laboratory Experiments in Microbiology", Himalaya Publishing House, Mumbai. (2007).
4. Aneja, K.R., "Laboratory Manual of Microbiology and Biotechnology. 2nd edition". Meditech Scientific International. (2018).
5. Patel, Rakesh J. and Patel Kiran, R.. "Experimental Microbiology Vol. I and II", Aditya Prakashan, Ahmadabad. (2009).
6. Varghese, Naveena and Joy, V., "Microbiology Laboratory Manual" Ed. 1, Aromatic and Medicinal Plants Research Station, Odakkali, Emakulam, Kerala. (2014).
7. Shammi, Q.J. "Microbiology- Tools and Techniques". Kailash Pustak Sadan, Bhopal. ISBN: 978-81-89900-38-0 (in Hindi also).
8. Grainer. John, Hurst. Janet and Burdass. Dariel, "Basic Practical Microbiology: A Manual", The Society for General Microbiology. (2001).

Suggested equivalent digital platforms/ weblinks/

online courses:

1. <https://www.mooc-list.com/course/introduction-practical-microbiology-futurelearn>
2. https://study.com/articles/List_of_Free_Online_Microbiology_Courses_and_Training_Options.html



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Part D-Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks:	100
Continuous Comprehensive Evaluation (CCE)	30
University Exam (UE)	70

Internal Assessment	Marks	External Assessment	Marks
Continuous Comprehensive Evaluation (CCE) : 30	10	Viva Voce Practical	10
Class Interaction/Quiz		Practical Record File	
Attendance		Table work/ Experiments	10
Assessments (Charts/Model/Seminar/Rural Service/ Technology/ Dissemination/Report of Excursion/ Lab Visits/ Survey/Industrial Visit)	10		50
Total Marks:100			



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Part A: Introduction			
Programme: B.Sc. (Microbiology)		Class: I Year	Semester: II
Subject: Microbiology		Theory/ Practical : Theory	
1.	Course Code	BSCMB-202 (T)	
2.	Course Title	Microbial Diversity and Growth (Theory)	
3.	Course Type (Core Course/ Discipline Specific Elective/ Elective/ Generic Elective /Vocational/)	Major - III (Core Course)	
4.	Pre-requisite (if any)	To study the course, student must have had the subject Biology in class XII	
5.	Course objectives	1. To understand the diversity and classification of microorganisms. 2. To study the structure and ecological roles of major microbial groups. 3. To learn microbial nutritional types and metabolic strategies. 4. To understand microbial growth patterns and factors affecting growth. 5. To apply microbial diversity and growth concepts to real-world applications.	
6.	Course Outcomes (COs)	On completion of this course, learners will be able to: CO1. Develop an understanding of ancient Indian literature and traditional knowledge related to microbes. CO2. Classify bacteria based on their key characteristics. CO3. Explain the nutritional requirements for bacterial growth. CO4. Explore the diversity of fungi and algae. CO5. Develop a foundational understanding Protozoa,	
7.	Expected Job Role/career opportunities	<ul style="list-style-type: none">• Clinical Microbiologist• Research Scientist• Quality Control (QC) / Quality Assurance (QA) Officer• Industrial Microbiologist• Environmental Microbiologist	
8.	Credit Value	Theory - 4 Credits	
9.	Total Marks	Max Marks:30+70	
		Min. Passing Marks:35	



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Part B-Contents of the Course		
Total No. of Lectures required: 60 hrs		
Unit	Topics	No. of Lectures
1	Ancient Indian Traditional knowledge of Microbes 1.1 Introduction & historical background of microbes in ancient Indian literature 1.2 Introduction to Ancient Indian bacteriology, krimi and sukshmijivanu 1.3 Sage Scientist Kannva- Introduction and Their contribution to microbial biodiversity' 1.4 Indian indigenous knowledge- various types of fermented foods Keywords: Sage scientist Kannva, krimi and sukshmijivam, traditional fermented foods, Ancient Indian bacteriology Activity: Storytelling the journey of microbes, Creative storytelling	8
2	Virology 2.1 Ancient Indian concept of disease and invisible agents. 2.2 Discovery and general properties of viruses, the concept of viroid, virusoids, Satellite viruses and Prions. 2.3 Overview of viral structure and nucleic acid features of key Viruses such as Influenza, HIV, TMV and Bacteriophage. 2.4 Viral taxonomy Classification of viruses, focusing on the Baltimore system. 2.5 Vital Replication Overview of viral replication including assembly, maturation and release in lytic and lysogenic cycles. Keywords: virus. classification of virus replication of virus, Structure of Viruses Activity: Virus 3D Model Building, Mystery Virus Investigation students are given symptoms and genetic data of a functional virus and must determine its structure, classification and replication method.	13



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3	<p>Archae bacteria and Eubacteria</p> <p>3.1 General Characteristics of Archaeabacteria and Eubacteria</p> <p>3.2 Phylogenetic Overview of Archaeabacteria</p> <p>3.3 General characteristics Structural features and Ecological significance of Major Groups of Archaeabacteria, Methanogens. Halophiles. Thermophiles.</p> <p>3.4 General characteristic. Structural features and Ecological significance of Important Groups of Eubacteria. Mycoplasma. Actinomycetes. Rickettsia, Chlamydia, and Cyanobacteria</p> <p>3.5 Nutritional Requirements and Categories in Bacteria</p> <p>3.6 Key differences between Archaeabacteria and Eubacteria</p> <p>3.7 Ancient Indian concepts of microbes</p> <p>Keyword: Archaeabacteria, Eubacteria, Phylogenetic</p> <p>Activity: Bacterial Classification Challenges, students classify given bacteria species as Archaeabacteria or Eubacteria based on their characteristics</p>	13
4	<p>Mycology</p> <p>4.1 Fungi Characteristics and classification Cellular structure and thallus organization of fungi</p> <p>4.2 Classes of Fungi General features, structure, nutrition and reproduction of different fungal groups - Phycomycetes. Ascomycetes, Basidiomycetes and Deuteromycetes</p> <p>4.3 Study of Specific Fungi Phytophthora, Morchella, Claviceps and Cercospora</p> <p>4.4 Diversity of fungi - Nutritional. Physiological and Ecological Diversity</p> <p>4.5 Traditional Indian Knowledge on Fungi.</p> <p>Keywords: Phycomycetes. Ascomycetes, Basidiomycetes and Deuteromycetes</p> <p>Activity: Fungal classification challenge- students categorize given fungal species into Phycomycetes. Ascomycetes, Basidiomycetes and Deuteromycetes</p>	13
5	<p>Phycology and Protozoa</p> <p>5.1 Algae General Characteristics of Algae Occurrence, thallus organization, algal cell ultra-structure, pigments, food reserves, vegetative, asexual and sexual reproduction Outline of classification of algae with emphasis on Phytoplankton</p> <p>5.2 Study of Specific Algae: Chiarella, Pinnularia and Navicula</p> <p>5.3 Lichens-General account</p> <p>5.4 Protozoa-General characteristics, classification and economic Importance of Protozoa.</p> <p>5.5 Algae and protozoa in Vedic literature</p> <p>Keywords: Algae, phytoplankton, Lichens, Protozoa</p> <p>Activity: Protozoa in everyday life debate. Split the class into teams to debate the positive and negative effects of protozoa</p>	13



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Part-C:Learning Resources

Text Books, Resource Books and Other Resources

Suggested Readings:

1. Mehrotra, R.S.and Aneja. K.R., "An Introduction to Mycology" New Age Press, New Delhi
2. Kumar, HD and H N. Singh, "A Text book on Algae", (Macmillan international college edition 1079)
3. Pelczar M., Chan E C S and Krieg, N R "Microbiology", Tata McGraw Hill Publishing Co.Ltd. New Delhi.
4. Prescott, M J, Harley, J P and Klein, D A, "Microbiology", 5" Edition WCB McGraw Hill, New York, (2002).
5. Dubey, R C and Maheshwari, D K., "A Text book of 'Microbiology", S.Chand &Company Ltd, New Delhi (2008).
6. Sharma, P D. "Microbiology", Rastogi Publications, Meerut. (2014)
7. Aneja, KR, "Laboratory Manual of Microbiology and Biotechnology". 2ndcdition, Meditech Scientific International (2018).
8. Patel, Rakesh J. and Patel, Kiran, R, "Experimental Microbiology Vol I and Vol II" Aditya Prakashan (2009).

Suggested equivalent online courses:

1. www.nosorg/media/documents/dmlt/microbiology
2. <https://enviromicro-journals.onlinelibrarywiley.com/doi/10.1111/jam.15382>
3. [https://researchgate.net/publication/224897771 Ancient Indian bacteriology](https://researchgate.net/publication/224897771)
4. [http://krepublishers.com/02-journals/JBD/JBD-07-0-000-16-web/JBOD-07-2-000-16-Abst/PDF/JBD-07-02-101-16-055-Padhy-s/JBD-07-2101-16-055-Padhy-S-Tx\(3\).pmd.pdf](http://krepublishers.com/02-journals/JBD/JBD-07-0-000-16-web/JBOD-07-2-000-16-Abst/PDF/JBD-07-02-101-16-055-Padhy-s/JBD-07-2101-16-055-Padhy-S-Tx(3).pmd.pdf)



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Part D:Assessment and Evaluation

Suggested Continuous Evaluation Methods:		
Maximum Marks:		100
Continuous Comprehensive Evaluation (CCE) :		30
University Exam (UE) :		70
Time : 03:00 hours		
Internal Assessment	Class Test	15
Continuous Comprehensive Evaluation(CCE)	Assignment/Presentation	15
	Total	30
External Assessment	Section(A):Very Short Questions	
University Exam Section	Section(B):Short Questions	70
	Section(C):Long Questions	



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Part A : Introduction			
Programme: B.Sc. (Microbiology)		Class: I Year	Semester: II
Subject: Microbiology		Theory / Practical : Practical	
1.	Course Code	BSCMB – 202 (P)	
2.	Course Title	Microbial Diversity and Growth (Practical)	
3.	Course Type(Core Course/ Discipline Specific Elective/ Elective/Generic Elective/Vocational)	Major-III (Core Course)	
4.	Pre-requisite (if any)	To study the course, a student must have had the subject Biology in class XII	
5.	Course Objectives	1. To acquire hands-on skills in the isolation, cultivation, and maintenance of diverse microorganisms. 2. To perform microscopic observation and characterization of microbial morphology. 3. To determine the effect of physical and chemical factors on microbial growth. 4. To carry out quantitative analysis of microbial growth using growth curves and viable counts. 5. To practice aseptic techniques and culture methods for bacteria, fungi, and actinomycetes.	
6.	Course Outcomes (COs)	On successful completion of this course, learners will be able to: CO1. Acquire the knowledge of nutritional requirement of bacteria for growth CO2. Develop understanding of viruses and viral diseases CO3. Understand diversities in habitats of fungi and algae CO4. Develop a basic idea about protozoa CO5: Apply microbiological techniques for identification, characterization, and analysis of microorganisms	
7.	Expected Job Role/career opportunities	<ul style="list-style-type: none">• Clinical Microbiologist• Research Scientist• Quality Control (QC) / Quality Assurance (QA) Officer• Industrial Microbiologist• Environmental Microbiologist	
8.	Credit Value	Practical -2 Credits	
9.	Total Marks	Max Marks 30+70	Min Passing Marks:35



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Part B –Contents of the Course

Total No. of Lectures Required: 30 hrs

S. No.	Name of the Exercise	No. of Lab Hours
1.	Gram staining	2
2.	Acid-fast staining	2
3.	Isolation of bacteria from soil, water and air	6
4.	Isolation of fungi from soil, water and air	6
5.	Isolation of algae from water	3
6.	Identification of common Bacteria, fungi and Phyto planktons	4
7.	Study of common algae and fungi through permanent slides and specimens	2
8.	Study of common protozoan through permanent slides	2
9.	Any other practical (s) based on theory paper Each practical of 2 hours will be continued for 2-3 days	3
Keyword/Tags: Gram staining, Acid fast staining. Bacterial. Algae		



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Part C- Learning Resources	
Text Books, Reference Books, Other resources	
Suggested Reading:	
1. Aneja. K R "Laboratory Manual of Microbiology and Biotechnology 2 nd edition Meditech Scientific International (2018). 2. Patel, Rakesh J and Patel. Kiran, R, "Experimental Microbiology", Vol I and Vol II Aditya Prakashan (2009). 3. Dubey. R C and Maheswari, D K, "Practical Microbiology" S Chand & Co Ltd. New Delhi (2002). 4. Gopal Reddy. M. Reddy. M N., Saigopal, D V R and Mallaiah KV . "Laboratory Experiments in Microbiology" Himalaya Publishing House, Mumbai (2007).	
Suggested equivalent digital platforms/websites/online courses: 1. https://wwwmooc-list.com/course/introduction-practical-microbiology-futurelearn	

Part D-Assessment and Evaluation				
Suggested Continuous Evaluation Methods:				
Maximum Marks:		100		
Continuous Comprehensive Evaluation (CCE)		30		
University Exam (UE)		70		
Internal Assessment	Marks	External Assessment	Marks	
Continuous Comprehensive Evaluation (CCE) : 30				
Class Interaction/Quiz	10	Viva Voce Practical	10	
Attendance	10	Practical Record File	10	
Assessments (Charts/Model/Seminar/Rural Service/ Technology/ Dissemination/Report of Excursion/ Lab Visits/ Survey/Industrial Visit)	10	Table work/ Experiments	50	
Total Marks:100				



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Part A : Introduction			
Programme: B.Sc. (Microbiology)	Class : I Year	Semester: II	Session: January - June 2026
Subject: Chemistry		Theory/ Practical: Theory	
1. Course Code		BSCMB – 203 (T)	
2. Course Title		Applied Chemistry (Theory)	
3. Course Type (Core Course/Elective/Generic Elective/Vocational)		Minor II	
4. Pre-requisite (if any)		To study this course the students must have the subject Chemistry in XII Course or equivalent	
5. Course Objective		1. To analyze ancient engineering in urban drainage, metallurgy, and brick-making. 2. To classify drugs by their therapeutic action and identify chemical causes of diseases. 3. To identify chemical pollutants and evaluate scientific methods for their prevention and control. 4. To explain the biochemical functions of food components (nutrients) in body metabolism. 5. To understand the chemical processes behind paper pulping and the structure of textile fibers.	
6. Course Outcomes (COs)		On completing this course, the learners will be able to : CO1. Understand Indigenous Technology in Harappan Period. CO2. Understand Chemistry of medicines, common diseases and their causes. CO3. Understand Pollution, its causes, prevention and control CO4. Acquire knowledge of various components of food and their role in the body CO5. Understand chemistry of paper and textiles	
7. Expected Job role/ Career Opportunity		Pharmaceuticals: Pharmacologist, Drug Inspector. Environmental: Pollution Control Officer Food Science: Food Technologist, Nutritionist, Quality Safety Officer. Industrial: Textile Chemist, Lab Analyst.	
8. Credit Value		Theory –3 credit	
9. Total Marks		Max. Marks: 30+70	Min. Passing Marks: 35



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Part B Content of the Course		
Total No. of lectures: 45		
Unit	Topic	No. of Lectures
1	<p>Indigenous Technology in Harappan Period Introduction, Indus or Harappan Civilization, Later Pottery, Knowledge of metallurgy after & during the Harappans, weight measurement, medical science, Jewell making, Dyeing, Pigments, Philosophers Stone, Wootz Steel, Gold, Silver, Mercury, Tin, Lead, Gun Powder, Glass making, Paints, Perfumes.</p> <p>Keywords/Tags: Indus and Harappan Civilization, Later Pottery, Wootz Steel, Glass making, Paints, Perfumes</p> <p>Activities:</p> <ol style="list-style-type: none">1. Gather data on the processes used to purify zinc both historically and currently.2. Gather images and records pertaining to the history of two rust-resistant monuments built in India.3. Prepare the Project and Modals related to Ancient Indian Chemistry4. Educational Tour of Industries and Research Institutes	9
2	<p>Chemistry of medicine Common diseases and their causes, concept of analgesic, antibiotics, anti depressant, antihypertensive, antipyretics and anticoagulants. Concept of bronchodilators, vaccines, anta acids and diuretics, drug metabolism-absorption, distribution, metabolism and excretion (ADME)</p> <p>Keywords/Tags: analgesic, antibiotics, anti depressant, antihypertensive, antipyretics, anticoagulants</p>	9
3	<p>Pollution and its causes Air pollution- causes, effect and prevention Water pollution- sources and effect of water pollution Soil pollution- sources and effect of soil pollution Noise pollution- causes and effect of noise pollution, prevention e-waste pollution- causes and effect of e-waste pollution, prevention. Radioactive pollution- causes and effects of radioactive pollution, prevention, nuclear weapons, nuclear power plants, Chernobyl disaster</p> <p>Keywords/Tags: Air pollution, Water pollution, Soil pollution, Noise pollution, e-waste pollution</p>	9
4	<p>Components of food and their role in the body Carbohydrates- simple sugar- glucose, fructose and their chemical properties. Complex carbohydrates- starch, cellulose and their digestion. Proteins- amino acids as building blocks of proteins, protein structure-primary, secondary, tertiary and quarternary, denaturation of protein and its application in cooking.</p> <p>Lipids/ fats- triglyceride, phospholipids, cholesterol, mono saturated and poly saturated fatty acids, role of fats in cell membrane and hormone production</p>	9



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	<p>Vitamins- classification of vitamins, water soluble and fat soluble, chemical structure and function of key vitamins- vitamin C, vitamin A, vitamin D, vitamin B complex.</p> <p>Minerals- essential minerals- calcium, iron, sodium, potassium etc. mineral bioavailability and factors affecting absorption</p> <p>Keywords/Tags: Carbohydrates, Proteins, Lipids/ fats, Vitamins, Minerals</p>	
5	<p>Chemistry of paper and textile</p> <p>Fiber Chemistry: Classification of natural and synthetic fibers (cotton, wool, silk, polyester, nylon, acrylic), Chemical structure of fibers and their relation to properties</p> <p>Textile Wet Processing, introduction to dyes, identification of fibers and dyes</p> <p>Paper making chemistry- Pulping, Kraft process, Sulfite process, Bleaching, Additives and fillers</p> <p>Keywords/Tags: natural and synthetic fibers, Wet Processing, dyes, Pulping, Bleaching</p>	9
	<p>Activities:</p> <ol style="list-style-type: none">1. Extraction of Tulsi, Neem, Amla, Haldi2. Gather data on the processes used to purify zinc both historically and currently.3. Gather images and records pertaining to the history of two rust-resistant monuments built in India.4. Gather information about traditional Indian cosmetics knowledge and traditional Indian drug knowledge5. Collection of Medicinal plants and their uses from nearby area (Herbarium Preparation)6. Chart preparation of Ancient Indian Scientist in Chemistry and their contribution7. Field study of BKS in nearby area8. Educational Tour of Industries and Research Institutes9. Prepare the Project and Modals related to Ancient Indian chemistry	



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Approved by AICTE, New Delhi and Affiliated to DAVV, Indore & RGPV, Bhopal, Madhya Pradesh, India Accredited by UGC-NAAC with 'A' Grade

Part C-Learning Resources	
Text Books, Reference Books, Other resources	
Suggested Readings:	
<ol style="list-style-type: none">1. Traditional Systems of Medicine Hardcover -30 January 2006 by M.Z. Abdin (Author), Y.P. Abrol (Author), ISBN-10 8173197075, Publisher Narosa Publishing House2. Traditional System of Herbal Drugs Used for Various Aliments Paperback- 19 November 2024 by Priya V (Author), Ragavi K K (Author), Publisher LAP Lambert Academic Publishing3. TEXTBOOK OF MEDICINAL CHEMISTRY 4ED VOL 1 (PB 2022) by ALAGARSAMY V. 1 January 2022, Publisher: CBS Publishers & Distributors Pvt. Ltd4. Textbook Of Medicinal Chemistry Part-I Authors: Dr. Amit G. Nerkar, Dr. Narendra M. Gowekar, Mrs.Trupti Somnath Kajale (shahane), ISBN-13 978-93-95581-67-7 Mahi publication5. Pollution: Causes, Effects and Control, Roy M. Harrison, Royal Society of Chemistry, 20016. A Primer on Earth Pollution: Pollution Types and Disposal, Editors: J. Senthil Kumar, P. Ponmurugan, A. Vinoth Kanna, ISBN: 978-981-14-7653-2 (Print) ISBN: 978-981-14-7655-6 (Online), Year of Publication: 20207. Food: The Chemistry of its Components, By Tom Coulte, ISBN: 978-1-83916-814-7, Publication date: 11 Oct 2023, Royal Society of Chemistry8. Chemical and Functional Properties of Food Components, 4th Edition, Edited By Hanna Staroszczyk, Zdzislaw E. Sikorski, December 19, 20249. Textile and Paper Chemistry and Technology, 1 January 1978 by Jett C. Arthur (Editor), Publisher American Chemical Society10. Historic Textile and Paper Materials: Conservation and Characterization (Advances in Chemistry Series) Hardcover - Import, 1 February 1986 by Howard L. Needles (Editor), Publisher Amer Chemical Society	
Suggested equivalent online courses:	
<ol style="list-style-type: none">1. Medicinal Chemistry By Prof. Harinath Chakrapani ISER Pune https://onlinecourses.nptel.ac.in/noc20_cv16/2. Air Pollution and Control By Prof. Bhola Ram Gurjar IIT Roorkee https://onlinecourses.nptel.ac.in/noc23_cel4/	



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Part D-Assessment and Evaluation		
Suggested Continuous Evaluation Methods:		
Maximum Marks:		100
Continuous Comprehensive Evaluation (CCE):		30
University Exam (UE):		70
Time: 03.00 Hours		
Internal Assessment: Continuous Comprehensive Evaluation (CCE):	Class Test Assignment/Presentation Total	15 15 30
External Assessment: University Exam Section	Section(A): Short Questions Section (B): Very Short Questions Section (C) : Long Question	70



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Part A : Introduction			
Programme: B.Sc (Microbiology)	Class : I Year	Semester: II	Session: January - June 2026
Subject: Chemistry			Theory/Practical: Practical
1. Course Code			BSCMB-203(P)
2. Course Title			Applied Chemistry (Practical)
3. Course Type (Core Course/Elective/Generic Elective/Vocational)			Minor II
4. Pre-requisite (if any)		To study this course the students must have the subject Chemistry in XII Course or equivalent	
5. Course Objective		<ul style="list-style-type: none">• To prepare talcum Powder• To prepare shampoo• To prepare enamels• To estimate different compounds• To Synthesis different Drugs• To determine Optical Activity• To separate and estimate by Solvent extraction	
6. Course Outcomes (COs)		On completion of this course, learners will be able to: CO1. Prepare talcum Powder CO2. Prepare shampoo CO3. Prepare enamels CO4. Estimate different compounds CO5. Synthesis of Different Drugs CO6. Determine Optical Activity CO7. Separate and Estimate Components by Solvent extraction	
7. Expected Job Role/ Career Opportunity		<ul style="list-style-type: none">• Cosmetic Scientist• Paint & Coating Chemist• Pharmaceutical Scientist• Analytical Chemist• Extraction Specialist• Quality Assurance Manager	
8. Credit Value		Practical – 1 credit	
9. Total Marks		Max. Marks: 30+70	Min. Passing Marks:35



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Part B- Content of the Course		
Total No. of Lectures- 15 hrs.		
S.No.	Topics	No. of Lectures
1.	Preparations 1. Preparation of Talcum Powder 2. Preparation of Shampoo 3. Preparation of Enamels	03
2.	Estimations 1. Estimation of Iodine from salt 2. Estimation of sweeteners	03
3.	Synthesis of Drug 1. Paracetamol 2. Sulphanilamide	03
4.	Colloids To prepare arsenious sulphide sol and compare the precipitating power of mono-, bi- and trivalent cations. Optical Activity 1. Determination of refractive index and specific refraction of given liquids. [Any two liquids from, CCl_4 , CHCl_3 , benzene, xylene, toluene, ethyl alcohol]	03
5	Solvent Extraction 1. Separation and estimation of $\text{Mg}(\text{II})$ and $\text{Fe}(\text{III})$ Ion Exchange Method 1. Separation and estimation of $\text{Mg}(\text{II})$ and $\text{Zn}(\text{II})$	03
Note	Students should visit any chemical industry to learn or observe the process and preparations practically and submit the report of that industrial visit also	

Keywords/Tags: Solvent Extraction, Colloids, Synthesis of drug, Preparation and Estimations



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Part C-Learning Resources	
Text Books, Reference Books, Other resources	
Suggested Readings:	
Text Books	
1. Timir Tripathi Chromatography and Centrifugation Methods Daya Publishing House 2. Prof. Sarin A. Chavhan, Prof. Sushilkumar A. Shinde A Guide to Chromatography Techniques Notion Press 3. Vinay Prabha Sharma Practical Organic Chemistry Pragati Prakashan 5. Dr. M.M.N. "Tandon unified practical chemistry" Shiva Lal Agarwal & co. 6. Sudha Goyal (Author), R. P. Singh V. K. Singh (Author), Prashant Singh Ashish Dwivedi (Author) B.Sc. Chemistry Practical I, Krishna Prakashan Media 7. Reinhart Keese, Martin P. Brändle, Trevor P. Toube Practical Organic Synthesis: A Student's Guide John Wiley & Sons, Inc., 8. Sudha Goyal B.Sc. Chemistry Practical III Krishna Prakashan Media 9. Furmiss, B.S., Hannaford, A.J., Smith, P.W. G., Tatchell, A.R., "Vogel's Text Book of Practical Organic Chemistry", Pearson Education, 2005, 5h Edn. 10. Gurthu, J.N., Kapoor, R., "Advanced Experimental Chemistry", S. Chand and Co., 1987. 11. Sundaram, S., Krishnan, P., Raghavan, P.S., "Practical Chemistry (Part I)", S. Viswanathan Co. Pvt., 1996. 12. Mohd A A, Ranmesh K P, Anuradha S, Bassa S, Advanced Laboratory Techniques in Chemistry, Scientific International Publishing house, Tamilnadu, 2024	
Reference Books	
13. Furniss, B.S., Hannaford, A.J., Smith, P.W. G., Tatchell, A.R., "Vogel's Text Book of Practical Organic Chemistry", Pearson Education, 2005, 5h Edn.	
Suggestive digital platforms web links	
14. https://vlab.amrita.edu/?sub=2&brch=190&sim=338&cnt=1 15. http://www.columbia.edu/itc/barnard/biology/biobc2004/edit/experiments/Experiment1-Spec.pdf 16. http://web.pdx.edu/~ralfw/uploads/1/0/2/6/10260941/pulse oximetry laboratory guide.pdf 17. https://www.chem.purdue.edu/courses/chm224/Lab-Experiments/expt4_GENESYS%20V2.pdf 18. http://lgervind.faculty.mic.edu/biology/101/101_lab/spectrophotometry/4%20Spectrophotometer%20Fa17.pdf 19. https://www.edag.com/w/images/6/6e/EXPO11_The pH Electrode and Potentiometric Titrations PDF.pdf 20. https://www.philadelphia.edu.jo/academics/ajaber/uploads/CHEM%20540-Chapter%202-Potentiometry-061.pdf 21. https://www.tau.ac.il/~adavanal/PotentiometricTitrations.htm 22. https://chem.libretexts.org/Bookshelves/Analytical_Chemistry/Book%3A_Analytical_Chemistry 2.1 (Harvey)/11%3A Electrochemical Methods/11.02%3A Potentiometric Methods 23. https://www.chem.purdue.edu/courses/chm224/Lab-Experiments/Exp8.pdf 24. https://www.shcollege.ac.in/wp-content/uploads/NAAC%20Documents%20IV%20Cycle/Criterion-I/2.3.2/ppt/Dr%20Ignatious%20Conductometric%20Titration.pdf 25. https://www.analytik.ethz.ch/praktika/phys_anal/POL/Anleitung_ENG.pdf 26. https://nph.onlinelibrary.wiley.com/doi/pdf/10.1111/1469-8137.1948.tb05089.x 27. http://llchemistry.du.ac.in/study_material/4103-A/MSc%20Polarography.pdf 28. https://fac.ksu.edu.sa/sites/default/files/abbe%20experiment.pdf 29. https://web.mst.edu/~tbone/subjects/tbone/chem224/riproc.pdf 30. http://www.fbml.ff.vu.lt/sites/default/files/74_en.pdf	



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31. <https://wp.optics.arizona.edu/mnofziger/wp-content/uploads/sites/31/2016/05/OPTI202L-Lab10-0MD2.pdf>
32. <http://davjalandhar.com/dbt/chemistry/SOP%20LabManuals/B.Sc.%20BT%20SEM%20V.pdf>
33. <https://vlab.amrita.edu/?sub=1&brch=195&sim=5458cnt=1>

Suggested equivalent online courses:

1. <https://www.my-mooc.com/en/mooc/basic-analytical-chemistry/>
2. <https://www.my-mooc.com/en/mooc/principles-electronic-biosensors-purdue-nano535x/>

Part D-Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks:	100
Continuous Comprehensive Evaluation (CCE)	30
University Exam (UE)	70

Internal Assessment	Marks	External Assessment	Marks
Continuous Comprehensive Evaluation (CCE) : 30			
Class Interaction/Quiz	10	Viva Voce Practical	10
Attendance		Practical Record File	
Assessments (Charts/Model/Seminar/Rural Service/ Technology/ Dissemination/Report of Excursion/ Lab Visits/ Survey/Industrial Visit)	10	Table work/ Experiments	10
Total Marks:100			50



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PART-A : Introduction

Programme : B.Sc./BCA/BBA /BBA FT/BBA HA

Class : I Year

Semester : II

Session : January - June 2026

Subject : Ability Enhancement Course		Theory / Practical: Theory	
1.	Course Code	AEC – 201	
2.	Course Title	English Language and Indian Culture	
3.	Course Type	Ability Enhancement Course	
4.	Pre-Requisite	Not Required	
5.	Course Objectives	<ol style="list-style-type: none">1. To imbibe values which make students aware of national heritage and making them responsible citizens.2. To critically read texts to identify main ideas, infer meanings, and assess the author's purpose.3. To use grammar and vocabulary effectively for communication.4. To write appropriate correspondence and reports for various professional and social contexts.5. To prepare students for various competitive exams by developing English Language competence.	
6.	Course Outcomes (COs)	<p>On completion of this course, learners will be able to:</p> <p>CO1. Imbibe values which make them aware of national heritage and making them responsible citizens.</p> <p>CO2. Critically read texts to identify main ideas, infer meanings, and assess the author's purpose.</p> <p>CO3. Use grammar and vocabulary effectively for communication.</p> <p>CO4. Write appropriate correspondence and reports for various professional and social contexts.</p> <p>CO5. Prepare for various competitive exams by developing their English Language competence.</p>	
7.	Expected Job Role/career opportunities	<ul style="list-style-type: none">• Content Writer• Copy Editor• Proofreader• Corporate Communication Executive• Customer Relationship Executive	
8.	Credit Value	Theory – 2 Credits	
9.	Total Marks	Max. Marks: 100	Min. Passing Marks: 35



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PART B: Content of the Course (Theory)

Total No. of Lectures: 30 Hrs.

Unit	Topics	No. of Lectures
I	<p>Understanding Indian Culture</p> <p>1. Rabindranath Tagore "Where the mind is without fear" 2. Swami Vivekananda - "Chicago Speech (1893)" 3. R. K. Narayan - "Astrologer's Day" 4. Introduction to Sundarkand of Valmiki's Ramayan 5. A.L Basham: "The wonder that was India" (an excerpt)</p> <p>Keywords: Heritage, Diversity, Pluralism, Values, Patriotism, Spirituality, Humanism, Social Harmony, Tradition, Modernity.</p> <p>Activity:</p> <ul style="list-style-type: none">• Group Discussion on theme - "fearless thinking & nationalism" (Tagore), "religious harmony & tolerance" (Vivekananda), "social observations" (R.K. Narayan).• Creative Expression-Poster or Collage on "What Indian culture means to me,"• A short presentation on a specific cultural aspect of the students' home state (e.g., a festival, a craft, a local custom).	12
II	<p>Comprehension Skills</p> <p>1. Reading Techniques: Skimming, Scanning 2. Identifying the Main Idea and Theme 3. Making Inferences and Drawing Conclusions 4. Analysing unseen passages on Indian history, society, and art.</p> <p>Keywords - Inference, Main Idea, Theme, Tone, Purpose, Context Clues, Summary, Paraphrasing, Critical Reading</p> <p>Activity:</p> <ul style="list-style-type: none">• Worksheets with unseen passages followed by questions on comprehension, vocabulary, and inference.• Summarizing articles from newspapers or magazines on cultural or social issues in India.	02



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III	<p>Basic Language Skills</p> <p>Grammar:</p> <ol style="list-style-type: none">1. Parts of Speech2. Articles3. Subject-Verb Agreement4. Tenses and their application <p>Vocabulary:</p> <ol style="list-style-type: none">1. Synonyms, Antonyms, Homonyms, and Homophones2. One-word substitutes3. Word formation: Suffixes and Prefixes <p>Keywords-Tense, Agreement, Clause, Phrase, Synonym, Antonym, Prefix, Suffix.</p> <p>Activity:</p> <ul style="list-style-type: none">• Grammar exercises (fill-in-the-blanks, error correction, sentence transformation).• Vocabulary-building games and quizzes.	08
IV	<p>Writing Skills</p> <ol style="list-style-type: none">1. The Writing Process: Pre-writing, Drafting, Revising, and Editing2. Paragraph Writing: Structure, Topic Sentence, and Coherence.3. Letter writing: Formal/Informal <p>Keywords: Cohesion, Coherence, Topic Sentence, Drafting, Revising, Editing</p> <p>Activity:</p> <ul style="list-style-type: none">• Paragraph on given topics (e.g., "My Favourite Indian Festival," or "The Importance of Technology in Modern India").• Letter/Application writing exercises• Essay Writing on contemporary relevant issues.	04
V	<p>Situational Conversation-Context, Audience, Purpose, Type, Register</p> <ol style="list-style-type: none">1. Meeting/Greeting - Introducing Self, Introducing people to one another2. Apologies/Responses3. Enquiring about a Course/ Requesting Information4. Agreeing/Disagreeing (with a Proposal) <p>Keywords - Register, Tone, Style, Audience, Purpose,-Context, Etiquette, Persuasion.</p>	04



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	<p>Activity:</p> <ul style="list-style-type: none">Introducing and Greeting (e.g., formal business meeting, college orientation, conference with a guest speaker, informal club gathering).Debate-Agreeing & Disagreeing with Proposals - such as: "The college should make attendance optional for lectures."	
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Part C-Learning Resources

Text Books, Reference Books, Other resources

- Tagore, R (1912). Gitanjali (Song Offerings). London: Macmillan. "Where the Mind is Without Fear" is Poem No. 35 in this collection.
- Complete Works of Swami Vivekananda. Vol. 1. Advaita Ashrama (Publication Department of Ramakrishna Math, Belur Math, Kolkata).
- Swami Tapasyananda, Sundarkandam of Srimad Valmiki Ramayana, Sri ram Krishna Math, Madras
- Narayan, R.K. Malgudi Days. Indian Thought Publications; 1st edition (11 December 2019); ISBN-10: 9788185986173
- Cultural Heritage of India by S. Radhakrishnan & Haridas Bhattacharyya (ed.)
- A Course in English Grammar and Composition by Geetha Nagaraj
- Functional English by Dr. P. Kiranmai Duit & Geetha Rajeevan (Foundation Books/Cambridge India)
- Communicative English by E. Suresh Kumar, P. Srechari, and J. Savithri (Orient Black Swan)
- Practical English Usage by Michael Swan (Oxford)
- Modern English Grammar by N. Krishnaswamy, Macmillian Publication
- Developing Reading Skills: A Practical Guide to Reading Comprehension Exercises" by Francoise Grellet (Cambridge)
- Writing Skills by Norman Coe, Robin Rycroft & Pauline Ernest (Cambridge)

Suggested Equivalent Online Course

- NPTEL Course- "Communication Skills" (by IIT Kharagpur)
<https://nptel.ac.in/courses/109/106/109106175/>
- Swayam Course - "English Language for Competitive
https://onlinecourses.nptel.ac.in/noc23_hs51/preview_Exargs" (by IIT Madras)
- British Council India - "Learn English: Speaking and Writing Skills"
<https://www.britishcouncil.in/english/courses-adults/learnonline>
- Coursera "Write Professional Emails in English" (by Georgia Tech)
<https://www.coursera.org/learn/professional-emails-english>



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Part D- Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks : 100 Marks

External Assessment: University Exam Section: Time : 03.00 Hours	Section (A): Very Short Questions (50 Words)	5*4=20
	Section (B): Short Questions (200 Words)	5*10=50
	Section (C): Long Questions (500 Words)	2*15=30



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PART – A: Introduction			
Programme: B.Sc./BCA/BBA /BBA FT/BBA HA		Semester: II	
Class: I Year		January-June 2026	
Subject: Value Added Course (VAC)		Theory / Practical: Theory	
1.	Course Code	VAC – 201	
2.	Course Title	भारत बोध (Understanding India)	
3.	Course Type (Core Course/DSE/Minor/M D-ID/SEC/VOC)	VAC	
4.	Pre-Requisite (if any)	Class 12 th Pass	
5.	Course Objectives	<ol style="list-style-type: none">1. To develop a fundamental understanding of India's historical, cultural, and Constitutional Nature (Sanvidhanik Swaroop).2. To develop awareness among students towards the Indian education system, the tradition of knowledge, and national values.3. To help students understand the India's independence movement, democratic development, and global role.4. To make students responsible citizens by providing knowledge of the rights and duties enshrined in the Constitution.	
6.	Course Outcomes (COs)	<p>On completion of the course, learners will be able to:</p> <ul style="list-style-type: none">CO1. Develop a fundamental understanding of India's historical, cultural, and social diversity.CO2. Develop awareness towards the Indian knowledge tradition and national values.CO3. Understand the India's independence movement, development journey, and global role.CO4. Become responsible citizens by acquiring knowledge of the rights and duties enshrined in the Constitution.	
7.	Expected Job Role / Career Opportunities	<ul style="list-style-type: none">• Civil service candidates• Social workers• Journalists/media professionals• Counselors/motivational trainers• Legal assistants	
8.	Credit Value	2 Credits	
9.	Total Marks	Max. Marks: 100	Min. Passing Marks: 35



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PART – B: Content of the Course		
No. of Lectures per week: 02 Hours per week)		
Total No. of Lectures Required: T: 30 Hours		
Unit	Topics	No. of Lectures
I	<p>Indian History and Cultural Heritage Characteristics of the Sindhu, Vedic, and Classical periods Indian concepts of co-existence and diversity Cultural Symbols: Religious architecture, music, dance and folk traditions Modern relevance of texts such as “Vasudhaiva Kutumbakam” and “Sarve Bhavantu Sukhinah”</p> <p>Activity: The program "Dialogue with the People"-discussion and note-taking about traditional lifestyle-values and knowledge from an elder of the family or community</p> <p>Assignment: Write a short essay (about 500 words) with pictures on any cultural heritage/festival/folk art of your village or town.</p>	06
II	<p>Indian Constitution and Civic Duties The Vedic Concept of State Duties(Vedic Rajdharma) and the modern Constitution Fundamental Rights and Duties: Dharma-Kartavya-Naitikta Youth citizens and their democratic participation Role of Education to Nation-Building</p> <p>Activity: “Public Policy Dialogue” – Organizing a Mock Constituent Assembly among students, where the fundamental values of India are presented and discussed.</p> <p>Assignment 1: Analyze any one fundamental right and its related duty from a Vedic/classical perspective.</p> <p>Assignment 2: Write an essay (400 words) on the role of youth in Indian democracy, from the perspective of “From Swaraj to Suraj”.</p>	06



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III	<p>Indian Knowledge Tradition and Educational Perspective Sources of Indian knowledge: Vedas, Upanishads, Philosophy, Smriti, Folk literature Gurukul Tradition: Student-centered learning, oral tradition, and memory-based learning Purpose of Education: Self-realization (Atmokarsha) and social welfare (Lokasangraha) Role of the Teacher: "Acharya Devo Bhava"- character building and contribution to social reconstruction</p> <p>Activity 1: Knowledge-sharing session: Demonstration of traditional teaching methods (dialogue, memorization-based learning).</p> <p>Activity 2: Recreation of Shlokas and meaning- based discussion - Especially from Shikshavalli and Bhagavad Gita etc.</p> <p>Assignment 1: Explain the objectives of Indian education based on any Vedic hymn or Upanishadic statement.</p> <p>Assignment 2: Write a short essay on examples of Guru-Shishya tradition or life values observed in your school, village, or family.</p>	06
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IV	<p>India's Philosophy of Life and the Concept of a Sustainable Future Indian Life Perspective: Purusharth Chatushtaya, Ashrama system, Duty-Based Ethics Harmony with Nature: Yagya, Panchamahabhutas, ecological cycle and environmental balance Indian Economic Thought: Arthashastra, Swadeshi, labour culture, and public sector enterprises Indian Concept of Sustainable development and environmental balance</p> <p>Activity 1: Poster or slogan writing on “Simple Living, High Thinking”</p> <p>Activity2: Group presentation on Indian environmental traditions (yagya, tree worship, river, festivals, etc.)</p> <p>Assignment 1: Panchamahabhutas and Indian life perspective</p> <p>Assignment 2: Journey from ‘Swadeshi’ to ‘Atmanirbhar Bharat’ (Self-reliant India)</p>	06
V	<p>Contemporary India and Global Role Role of Religious, Cultural, and Intellectual Leadership in the Indian independence movement India's contributions: Space science, Yoga, diplomacy, peace philosophy Atmanirbhar Bharat: Integration of tradition and innovation India's soft power in the global context and its role in a multipolar world</p> <p>Activity 1: Student presentation on policy alternatives (Indian Model vs Western Model)</p> <p>Activity 2: Essay writing on the theme “<i>India @ 2047</i>”</p> <p>Assignment 1: Global India and Possibilities of Cultural Leadership</p> <p>Assignment 2: Technology and Ethics: Exploring the Indian Model of Integration</p>	06



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Part – C: Learning Resources	
Textbooks, Reference Books, Other Resources	
Suggested Readings:	
<ol style="list-style-type: none">1. Katdre, Indumati – Bharatiya Shiksha: Sankalpana evam Swaroop/ Punarsrijan, Prakashan Seva trust, Ahmedabad2. Kumar, Krishan – PrachinBharatiya Shiksha Paddhati, Shri Saraswati Sadan, Delhi3. Saluja, Chand Kiran (2023) – Shiksha: BharatiyaPariprekshya Sanskrit Samvardhan Pratishtan, New Delhi4. Kapoor, Kapil & Singh, Avdhesh Kumar (Editor), (2005) – Indian Knowledge Systems (Khand 1-2) Indian Institution of Advance Study, Shimla; D.K. Printworld, New Delhi	
Textbooks:	
<ol style="list-style-type: none">1. Swaroop, Devendra – Sanskriti: Ek Naam – Roop, Anek Pratiman Pratibha Prakashan, New Delhi2. Swaroop, Devendra (Editor), (2010) – Rashtriya Shiksha Andolan ka Itihas (Hindi Sanskaran) Prabhat Pratisthan, New Delhi3. Agrawal, Vasudev Sharan (Editor), (2023) – Rashtra, Dharma aur Sanskriti (Nibandh Sanchayan). Prabhat Prakashan, New Delhi	
Reference Books:	
<ol style="list-style-type: none">1. Mishra, Rameshwar Pankaj (2024) – Advitiya samajshastra, Prabhat Prakashan, New Delhi2. Pandey, Om Prakash (Editor) (2023) – Bharat Vaibhav, Rashtriya Pustak Nyas (NBT) , New Delhi3. Subbarayappa, B.V. – Bhartiya Vigyan Parampara, Rashtriya Pustak Nyas (NBT) , New Delhi	
Suggestive Digital Platform Web Links:	
<ul style="list-style-type: none">● https://www.youtube.com/watch?v=VUOyldPx8h4● https://www.youtube.com/watch?v=1livkUGjeFA&list=PLfGFNxUDX0eholQwKZ2ekqaxY3PDtoDq-&index=4● https://www.youtube.com/watch?v=SuMnvLxc9ic● https://www.youtube.com/watch?v=iPuRqFlmoSc● https://www.youtube.com/watch?v=YZQeUq5d48Q&list=PL_a1TI5CC9RG8wPaNNDOk6VjSdhe0K3HE&index=6● https://www.youtube.com/watch?v=9PLs_N6WbxE	



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Part – D: Assessment and Evaluation		
Only External Assessment		Total Marks: 100
External Assessment End Semester Exams Time: 03 Hours	(A) Five Short Answer Type Questions (B) Five Long Answer Type Questions	Total Marks: 100
Total Marks	100	
Credit Value	02	
Minimum Passing Marks	35	



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भाग अ : परिचय		
कार्यक्रम : बी.एस.सी./बी.सी.ए/बी.बी.ए./बी.बी.ए. एफ.टी./बी.बी.ए. एच.ए.		
कक्षा : I वर्ष	सेमेस्टर: II	सत्र: जनवरी – जून 2026
विषय: Value Added Course (VAC)		Theory/ Practical: Theory
1. पाठ्यक्रम कोड	VAC – 201	
2. पाठ्यक्रम शीर्षक	भारत बोध (Understanding India)	
3. पाठ्यक्रम प्रकार (कोर्स कोर्स/ वोकेशनल) डीएसई / माइनर /एमडी-आईडी / एसईसी / वीओ सी)	VAC	
4. पूर्वापेक्षा (यदि कोई हो)	कक्षा 12 वी उत्तीर्ण	
5. पाठ्यक्रम का उद्देश्य	<ol style="list-style-type: none"> भारत के ऐतिहासिक, सांस्कृतिक और संवैधानिक स्वरूप की मूलभूत समझ विकसित करना। भारत शिक्षा पद्धति, ज्ञान परंपरा और राष्ट्रीय मूल्यों के प्रति छात्रों में संवेदनशीलता उत्पन्न करना। भारत की स्वतंत्रता संग्राम, लोकतांत्रिक विकास और वैश्विक भूमिका को समझने में सहायता करना। संविधान में निहित दायित्वों एवं आधिकारों की जानकारी देकर छात्रों को जिम्मेदार नागरिक बनाना। 	
6. पाठ्यक्रम अध्ययन की उपलब्धियां (कोर्स लर्निंग आउटकम)	<ol style="list-style-type: none"> इस कोर्स का अध्ययन करने के बाद विद्यार्थी में, विद्यार्थी भारत की ऐतिहासिक, सांस्कृतिक और सामाजिक विविधता की मूलभूत समझ विकसित कर सकेंगे। विद्यार्थी भारतीय ज्ञान परंपरा और राष्ट्रीय मूल्यों के प्रति संवेदनशीलता विकसित कर सकेंगे। विद्यार्थी भारत के स्वतंत्रता संग्राम, विकास यात्रा और वैश्विक भूमिका को समझ सकेंगे। विद्यार्थी संविधान में निहित अधिकारों एवं कर्तव्यों का ज्ञान प्राप्त कर जिम्मेदार नागरिक बन सकेंगे। 	
7. संभावित नौकरी भूमिकाएँ/ करियर अवसर	<ul style="list-style-type: none"> • सिविल सेवा अभ्यर्थी • सामाजिक कार्यकर्ता • पत्रकार / मीडिया प्रोफेशनल • काउंसलर / मोटिवेशनल ट्रेनर • कानून से जुड़े सहायक कार्य 	



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8.	क्रेडिट मान	02
9.	कुल अंक	अधिकतम अंक: 100 न्यूनतम अंक: 35

भाग ब—पाठ्यक्रम सामग्री	
प्रति सप्ताह कक्षाओं की संख्या: 2 घंटे प्रति सप्ताह	
आवश्यक व्याख्यानों की कुल संख्या : थ्योरी (T) 30 घंटे	
ईकाई	विषय
I	<p>भारतीय इतिहास और सांस्कृतिक विरासत</p> <ul style="list-style-type: none"> सिन्धु, वैदिक, और शास्त्रीय काल की विशेषताएँ सह—अस्तित्व और बहुलता की भारतीय अवधारणा सांस्कृतिक प्रतीक : धर्म स्थापत्य, संगीत, नाट्य, लोकाचार 'वसुधैव कुटुम्बकम्', 'सर्वे भवन्तु सुखिनः' जैसे सूत्रों की आधुनिक प्रासंगिकता <p>गतिविधियां :</p> <ul style="list-style-type: none"> 'लोक से संवाद' कार्यक्रम—परिवार या समुदाय के किसी बुजुर्ग से पारंपरिक जीवन—मूल्य एवं ज्ञान पर चर्चा, और उसका लेखा—जोखा। <p>असाइनमेंट विषय:</p> <ul style="list-style-type: none"> अपने गाँव या नगर की किसी स्थानीय सांस्कृतिक धरोहर/पर्व/लोककलाओं का लघु लेख चित्रों सहित तैयार करें (500 शब्द)।
II	<p>भारतीय संविधान और नागरिक दायित्व</p> <ul style="list-style-type: none"> वैदिक राजधर्म और आधुनिक संविधान मूल अधिकार और कर्तव्य : धर्म—कर्तव्य – नैतिकता युवा नागरिक और लोकतांत्रिक भागीदारी शिक्षा का राष्ट्रनिर्माण में योगदान <p>गतिविधियाँ:</p> <ul style="list-style-type: none"> 'जननीति संवाद'—छात्रों के बीच मॉक संविधान सभा या युवा संसद का आयोजन, जिसमें भारत के मूल मूल्य प्रस्तुत करें। <p>असाइनमेंट विषय:</p> <ul style="list-style-type: none"> किसी एक मौलिक अधिकार और उससे जुड़े कर्तव्य का वैदिक/शास्त्रीय दृष्टिकोण से विश्लेषण करें। भारतीय लोकतंत्र में युवाओं की भूमिका पर 'स्वराज से सुराज तक' दृष्टिकोण में निबंध (400 शब्द)



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III	<p>भारतीय ज्ञान परंपरा और शिक्षा दृष्टिकोण</p> <ul style="list-style-type: none">भारतीय ज्ञान के स्रोत : वेद, उपनिषद, दर्शन, स्मृति, लोक साहित्यगुरुकुल परंपरा: शिष्य-कैदित शिक्षण, वाचिक परंपरा और स्मृति आधारित अधिगमशिक्षा का उद्देश्य : आत्मोत्कर्ष एवं लोकसंग्रहशिक्षक की भूमिका 'आचार्य देवो भवः' चरित्र निर्माण, सामाजिक पुनर्निर्माण में योगदान <p>गतिविधियाँ:</p> <ul style="list-style-type: none">ज्ञानवार्ता गोष्ठी-शास्त्रीय शिक्षा पर आधारित शिक्षण पद्धति (उदाहरण: संवाद, स्मृति आधारित अभ्यास) का डेमो प्रस्तुत करना।श्लोक-गायन और उसका अर्थात् संवाद-विशेष रूप से शिक्षावल्ली (तैतिरीयोपनिषद), गीता आदि से। <p>असाइनमेंट विषय:</p> <ul style="list-style-type: none">किसी वैदिक ऋचा या उपनिषद वाक्य के आधार पर भारतीय शिक्षा के उद्देश्य का विवेचन करें।अपने विद्यालय/ग्राम/परिवार में देखे गए गुरु-शिष्य परंपरा या जीवन-परमार्थ के उदाहरण पर लघु लेख।
IV	<p>भारत का जीवन – दर्शन और सतत भविष्य की अवधारणा</p> <ul style="list-style-type: none">भारतीय जीवन –दृष्टि: पुरुषार्थ चतुष्टय, आश्रम व्यवस्था और कर्तव्य आधारित नैतिकताप्रकृति के साथ सामंजस्य: यज्ञ, पंचमहाभूत ऋतुचक्र और पर्यावरण संतुलनभारतीय अर्थदर्शन: अर्थशास्त्र, स्वदेशी, श्रम-संस्कृति और लोक-उद्यमसतत विकास और पर्यावरणीय न्याय की भारतीय अवधारणा <p>गतिविधियाँ:</p> <ul style="list-style-type: none">'सादा जीवन उच्च विचार' विषय पर पोस्टर या स्लोगन लेखनभारतीय पर्यावरणीय परंपराओं (जैस यज्ञ, वृक्ष-पूजन, नदी महोत्सव आदि) पर समूह प्रस्तुति <p>असाइनमेंट विषय:</p> <ul style="list-style-type: none">पंचमहाभूत और भारतीय जीवन-दृष्टिस्वदेशी से 'आत्मनिर्भर भारत' तक की यात्रा



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V	<p>समकालील भारत और वैश्विक भूमिका</p> <ul style="list-style-type: none"> ● स्वतंत्रता संग्राम में धार्मिक, सांस्कृतिक और बौद्धिक नेतृत्व की भूमिका ● भारत का योगदान: अंतरिक्ष विज्ञान, योग, कूटनीति, शांति दर्शन ● 'आत्मनिर्भर भारत' परंपरा और नवाचार का समन्वय ● वैश्विक परिप्रेक्ष्य में भारत 'सॉफ्ट पावर', बहुध्रुवीय विश्व में भूमिका <p>गतिविधियाँ:</p> <ul style="list-style-type: none"> ● छात्रों द्वारा नीति – विकल्प प्रस्तुत करना (Indian Model vs Western Model) ● "भारत @ 2047" विषय पर निबंध <p>असाइनमेंट विषय:</p> <ul style="list-style-type: none"> ● "ग्लोबल भारत और सांस्कृतिक नेतृत्व की संभावना" ● "तकनीक और नैतिकता : भारतीय समन्वय की खोज"
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<p>भाग—स: अध्ययन संसाधन</p> <p>पाठ्यपुस्तकों, संदर्भ पुस्तकों, अन्य संसाधन</p>	
<p>अनुशंसित पाठ्यसामग्री</p> <ol style="list-style-type: none"> 1. काटदरे, इंदुमति। भारतीय शिक्षा : संकल्पना एवं स्वरूप / पुनरुत्थान प्रकाशन सेवा ट्रस्ट, अहमदाबाद। 2. कुमार, कृष्ण। प्राचीन भारतीय शिक्षा पद्धति। श्री सरस्वती सदन, दिल्ली। 3. सलूजा, चंद किरण (2023)। शिक्षा: भारतीय परिप्रेक्ष्य। संस्कृत सर्वर्धन प्रतिष्ठान, नई दिल्ली। 4. कपूर, कपिल एवं सिंह, अवधेश कुमार(संपादक)। (2005)। Indian Knowledge Systems (खंड 1-2)। इंडियन इंस्टिट्यूट ऑफ एडवार्स्ड स्टडी, शिमला; डी.के. प्रिंटवर्ल्ड, नई दिल्ली। <p>पाठ्यपुस्तकें:</p> <ol style="list-style-type: none"> 1. स्वरूप, देवेद्र। संस्कृति एक: नाम—रूप अनेक प्रतिभा प्रकाशन, नई दिल्ली। 2. स्वरूप, देवेद्र। (संपादक)। (2010)। राष्ट्रीय शिक्षा आंदोलन का इतिहास (हिंदी संस्करण)। प्रभात प्रतिष्ठान, नई दिल्ली। 3. अग्रवाल, वासुदेव शरण (संपादक)। (2023)। राष्ट्र, धर्म और संस्कृति (निबंध संचयन)। प्रभात प्रकाशन, नई दिल्ली। <p>संदर्भपुस्तकें:</p> <ol style="list-style-type: none"> 1. मिश्र, रामेश्वर 'पंकज '(2024)। अद्वितीय समाजशास्त्र। प्रभात प्रकाशन, नई दिल्ली। 2. पाण्डेय, ओम प्रकाश (संपादक)। (2023)। भारत वैभव। राष्ट्रीय पुस्तक न्यास (एनबीटी), नई दिल्ली। 3. सुब्बारायपा, बी.वी.। भारतीय विज्ञान परंपरा। राष्ट्रीय पुस्तक न्यास (एनबीटी), नई दिल्ली। 	



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अनुशासित डिजिटल प्लेटफॉर्म वेब लिंक:

- <https://www.youtube.com/watch?v=VUOyldPx8h4>
- <https://www.youtube.com/watch?v=1livkUGjeFA&list=PLfGFNxUDX0eholQwKZ2ekqaxY3PDtoDq-&index=4>
- <https://www.youtube.com/watch?v=SuMnvLxc9ic>
- <https://www.youtube.com/watch?v=iPuRqFlmoSc>
- https://www.youtube.com/watch?v=YZQeUq5d48Q&list=PL_a1TI5CC9RG8wPaNNDOk6VjSdhe0K3HE&index=6
- https://www.youtube.com/watch?v=9PLs_N6WbxE

भाग-द: आकलन एवं मूल्यांकन

केवल बाह्य मूल्यांकन		कुल अंक: 100
बाह्य मूल्यांकन अंतिम सेमेस्टर परीक्षा समय: 03 घंटे	(अ) पांच लघु प्रश्न (ब) पांच दीर्घ उत्तरीय प्रश्न	कुल अंक: 100
अधिकतम अंक	100	
क्रेडिट मान	02	
न्यूनतम उर्त्तीण अंक	35	