SHRI VAISHNAV INSTITUTE OF MANAGEMENT & SCIENCE, INDORE
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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 (Biotechnology)

[B. Sc. (BT)]

Year I / Semester II

w.e.f. Session 2025 -2026

Scheme No. 71, Gumasta Nagar, Indore-452009 Madhya Pradesh, Ph. : 0731-2780011, 2789925
Toll Free No. : 1800 233 2601 Website : www.svimi.org E-mail address : svimi@svimi.org

B.Sc. (Biotechnology) II Semester				
Session: January - June 2026				
S. No.	**Course Type**	**Course Code**	**Subject**	**Total Credit**
1.	Major II (Core Course)	BSCBT - 201 (T)	Biochemistry (Theory)	4
		BSCBT - 201 (P)	Lab Work for Biochemistry (Practical)	2
2.	Major III (Core Course)	BSCBT - 202 (T)	Microbiology and Immunology (Theory)	4
		BSCBT - 202 (P)	Lab Work for Microbiology and Immunology (Practical)	2
3.	Minor II	BSCBT - 203 (T)	Applied Chemistry (Theory)	3
		BSCBT - 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

Part A: Introduction		
Programme: B.Sc. (Biotechnology)	**Class: I Year**	**Semester: II** **Session: January- June 2026**
Subject: Biotechnology	**Theory/ Practical : Theory**	
1.	**Course Code**	BSCBT – 201(T)
2.	**Course Title**	Biochemistry (Theory)
3.	**Course Type (Core Course/DSE/Minor/MD-ID/SEC/VOC)**	Major-II (Core Course)
4.	**Pre-requisite(if any)**	To study this course, a student must have the subject Biology in XII class/Certificate course/Diploma
5.	**Course Objectives**	1. To develop a strong foundational understanding of core concepts in physical, chemical, and biological sciences that forms the basis of modern biotechnology. 2. To equip students with essential knowledge and technical skills required to pursue careers in biotechnology research, academia, and industry. 3. To promote interdisciplinary learning and problem-solving abilities by integrating principles from multiple scientific domains relevant to biotechnology. 4. To familiarize students with current technological advancements and industrial applications in biotechnology, preparing them for real-world professional environments. 5. To familiarize students with current technological advancements and industrial applications in biotechnology, preparing them for real-world professional environments.
6.	**Course Outcomes (COs)**	On completion of this course, learners will be able to: CO1: Identify career opportunities in biotechnology, including medical laboratory technician roles in hospitals, diagnostic centers, and pathological laboratories. CO2:Apply biochemical concepts to analyze metabolic pathways, molecular interactions, and cellular responses related to human health and disease. CO3: Explain the biochemical roles, structures, and regulatory functions of proteins and enzymes involved in major cell-signaling pathways. CO4: Describe the biochemical basis of genetic mutations and evaluate the enzymatic repair mechanisms that maintain DNA stability and prevent cellular damage. CO5:Illustrate the biochemical mechanisms underlying DNA replication, transcription, translation, and the regulation of gene expression.

7.	**Expected Job Role & Career Opportunities**	• Medical Laboratory Technician • Molecular Biology Research Assistant • Molecular Diagnostic Technologist • Quality Control (QC) Analyst • Enzymologist
8.	**Credit Value**	**Theory** - 4 Credits
9.	**Total Marks**	**Max.Marks:30+70** **Min. Passing Marks: 35**

Part B:Content of the Course		
Total No. of Lectures required:60 hrs		
Unit	**Topics**	**No. of Lectures**
I	**Chemistry of Water** Properties of Water, Interaction of Water, Role of Water in Bio molecular Structure, Acid and Bases, Buffer solutions. Basic characteristics of small molecules: Nomenclature and Classification of Inorganic Compounds (Oxides, Salts Acids, Bases, lonic Molecular and Coordination Compounds). Nomenclature and Classification of Organic Compounds (Alkynes, Cyclic Hydrocarbons, Aromatic Compounds Alcohols, Ethers, Aldehydes, Ketones, Amines. Amides)	12
	Suggested Activities: I. Collection of water from different sources and its analysis. II. Chart on classification of organic and inorganic compounds III. Collection of different type of acid and base nature of fruit juice and others.	
II	**Carbohydrates:** Sources, Structures, Characteristics, Nomenclature. Classification and Functions. Metabolism.	12
	Suggested Activities: I. Group discussion on biochemistry of glucose metabolism. II. Questionnaire preparation on sources of carbohydrates and their function.	
III	**Proteins:** Sources, Structures, Characteristics, Nomenclature, Classification, and Functions.	12
	Suggested Activities: I. Discussion on different source of functional proteins. II. Model making of 3D structure of protein.	
IV	**Lipids:** Sources, Structures, Characteristics, Nomenclature, Classification, and Functions. Metabolism.	12
	Suggested Activities: I. Quiz on types of lipids and fats. II. Assignment on metabolism of fat. III. Poster making on structure of lipids.	
V	**Nucleic Acid:** Sources, Structures, Characteristics, Nomenclature, Classification and Functions.	12
	Suggested Activities Activity- I. Model making of Watson and Crick .Model of DNA II. Project on forms of DNA from different organisms. III. Counseling of genetic related disorder.	

Note: One activity from every Unit is must for students.

Part–C:Learning Resources
Text Books, Reference Books, Other resources
Textbooks 1. Text book of Biochemistry-S P Singh 2. Experimental Biochemistry Beedu Rao and Vijay Deshpandey 3. Biochemistry a Lab Manual Farrel and Taylor 4. Introductory practical Biochemistry-Sashemy and Singh 5. Laboratory Manual and Practical Biochemistry T.N.Pattabirarman-All India Publishers & Distribution. 6. Lab Manual for Biochemistry-Shivnenja Shankar-Jaypee Publication
Suggestive Digital Platform WebLinks: 1. https://epgp.inflibnet.ac.in 2. https://www.eshiksha.mp.gov.in/mpdhe
Suggested Equivalent Online Courses: 1. https/@sbs.acs.org/los/bichaw(forBiochemistry). 2. https://pubs.acs.org/loi/bipes,tutps://guideslihohedu/biotech(forbiotechnology) 3. http://www.freebookcentre.net/Biology/BioTechnology-Books.html e books on biotechnology https://www.phindia.com/Books/ShoweBooks/MTExNA/Biotechnologyebooksonbiotechnology 4. https://bookauthority.org/tsooks/best-biotechnology-cbooksebooksonbiotechnology 5. http//www.mphindigranthacademy.org

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

Part A: Introduction		
Programme- B.Sc.(Biotechnology)	**Class: I Year Semester: II Session: January-June 2026**	
Subject: Biotechnology	**Theory/Practical: Practical**	
1.	**Course Code**	BSCBT – 201(P)
2.	**Course Title**	Lab Work for Biochemistry (Practical)
3.	**Course Type**	Major- II (Core Course)
4.	**Pre-requisite(If any)**	To study this course, a student must have the subject Biology in XII class.
5.	**Course Objectives**	1. To establish a strong foundational understanding of biotechnology by integrating core concepts from physical, chemical, and biological sciences. 2. To develop interdisciplinary scientific skills needed to meet the growing work force demands in biotechnology research, academia, and industry. 3. To introduce students to modern technological advancements and their applications in various areas of biotechnology. 4. To equip students with fundamental knowledge and practical skills essential for engaging in industrial processes, laboratory work, and research activities. 5. To cultivate analytical thinking and scientific aptitud**e** necessary for contributing to innovation and supporting the ongoing biotechnology revolution.
6.	**Course Outcomes (COs)**	On completion of this course, learners will be able to: CO1. Perform fundamental biochemical experiments with accuracy, including preparation of buffers, estimation of biomolecules, and analysis of enzyme activity using standard laboratory techniques. CO2.Apply appropriate laboratory instruments and analytical methods to generate, record, and interpret biochemical data effectively. CO3. Demonstrate good laboratory practices, including safety procedures, documentation, team work, and the ability to analyze experimental results to understand underlying biochemical principles.

7.	**Expected Job Role & Career Opportunities**	• Medical Laboratory Technician • Molecular Biology Research Assistant • Molecular Diagnostic Technologist • Quality Control (QC) Analyst • Enzymologist
8.	**Credit Value**	**Practical** -2 Credits
9.	**Total Marks**	**Max.Marks:100** **Min. Passing Marks:35**

Part B:Content of the Practical Course	
Total No. of Lectures required:30	
S.No.	**List of Experiments/Exercise/Practicals**
1.	Determining the pH of various fruit juices.
2.	Preparing physiological buffers.
3.	Quantitative analysis of carbohydrates.
4.	Quantitative analysis of proteins by Lowry method
5.	Quantitative analysis of lipids.
6.	Determining the saponification value of lipids.
7.	Separation of plant dyes by paper chromatography.
8.	Separation of amino acids by TLC.

Part C:Learning Resources
Text Books, Reference Books, Other resources
Textbooks 1. Biochemistry-Bhatia and Kohli, R. D. Publishers 2. Biochemistry-Dr. Vijay Kumar, Mahendra Prasad, J.P.B.Publishers 3. Test book of Biochemistry-S.P.Singh 4. Experimental Biochemistry-Beedu Rao and Vijay Deshpandey 5. Biochemistry-A Lab Manual-Farrel and Taylor 6. Introductory Practical Biochemistry-Sawhemy and Singh 7. Laboratory Manual and Practical Biochemistry-T.N.Pattabiraman-All India Publishers & Distribution 8. Lab Manual for Biochemistry-Shivnenja Shankar-Jaypee Publications
Suggestive Digital Platform WebLinks: 1. https://epgp.inflibnet.ac.in 2. https://www.eshiksha.mp.gov.in/mpdhe
Suggested Equivalent Online Courses: https/@sbs.acs.org/los/bichaw(forBiochemistry). https://pubs.acs.org/loi/bipes, tutps://guides lih oh edu/biotech (for biotechnology) http://www.freebookcentre.net/Biology/BioTechnology-Books.html e books on biotechnology https://www.phindia.com/Books/ShoweBooks/MTExNA/Biotechnologyebooksonbiotechnology https://bookauthority.org/tsooks/best-biotechnology-cbooksebooksonbiotechnology http//www.mphindigranthacademy.org

Part D: Assessment and Evaluation (Practical)	
Scheme of Practical Examination:-	**Max. Marks:100**
Internal Assessment	
Class Interaction	
Quiz	
Seminar	
Assignments(Charts, Rural Service, Technology Dissemination/Excursion/Lab Visit/Industrial Training	
External Assessment	**Max. Marks: 100**
Major Experiment	15
Minor Experiment-1	5+10
Minor Experiment-2	5+10
Spotting	15
Viva-Voce	10+10
Practical Record	10+10

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Part A : Introduction		
Programme: B.Sc. (Biotechnology)	**Class: I Year** **Semester: II** **Session: January- June 2026**	
Subject: Biotechnology	**Theory/ Practical : Theory**	
1.	**Course Code**	BSCBT – 202 (T)
2.	**Course Title**	Microbiology and Immunology (Theory)
3.	**Course Type (Core Course/DSE/Minor/MD-ID/SEC/VOC)**	Major-III (Core Course)
4.	**Pre-requisite (if any)**	To study this course, a student must have the subject Biology in XII class/Certificate course/Diploma
5.	**Course Objectives**	1. To provide foundational knowledge of microorganisms—their structure, physiology, classification, and roles in the environment, industry, and human health. 2. To introduce students to the principles of immunology, including components of the immune system and mechanisms of immune responses against pathogens. 3. To develop practical skills in microbiological techniques, such as culturing, staining, isolation, identification, and handling of microbes under aseptic conditions. 4. To explain host–pathogen interactions, microbial pathogenesis, and the immunological basis of infectious and immune-mediated diseases. 5. To familiarize students with applications of microbiology and immunology in clinical diagnostics, vaccines, antimicrobial therapy, biotechnology, and public health.

6.	**Course Outcomes (COs)**	On completion of this course, learners will be able to: CO1: Describe the structural, physiological, and genetic characteristics of microorganisms and explain their roles in health, disease, and the environment. CO2: Demonstrate proficiency in essential microbiological techniques, including culturing, staining, isolation, identification, and safe handling of microbes. CO3: Explain the components and functions of the immune system, including innate and adaptive immune responses to pathogens. CO4: Analyze the mechanisms of microbial pathogenicity and evaluate host–pathogen interactions and immune defense strategies. CO5: Apply microbiological and immunological concepts to real-world applications such as diagnostics, antimicrobial therapy, vaccination, biotechnology, and public health.
7.	**Expected Job Role/Career Opportunities**	• Clinical Microbiologist • Biomedical Scientist • Immunologist • Research Scientist • Biosafety Officer
8.	**Credit Value**	**Theory** - 4 Credits
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 Lectures**
I	History, Basic concepts of Microbiology and Culture Media preparation Sukshmjeevanu Vigyan (Microbiology) in Vedas History, Basic Concepts of Microbiology: Fundamental, History and evolution of microbiology, Development of microbiology, Application of microbiology in human welfare. Classification, General characteristic and structure of Bacteria, Fungi and Viruses. Media Preparation: Methods and Types: Culture, Minimal, Selective, differential, Transport media. Synchronous, Batch and Continuous culture.	12
	Suggested Activities: I. Assignment on evolution of prokaryotes and their diversity. II. Collection of photographs of different microbes of India. III. Chart preparation of different types of culture media	
II	**Microbial Growth and Growth measurement:** Microbial Growth: Definition of growth, Mathematical expression of growth, Growth Curve, Generation time, Growth yield, Effect of nutrients on growth. Factor affecting growth: Nutrient, Temperature, Oxygen, pH, Osmotic pressure. Growth Measurement: Measurement of Growth (Direct and Indirect methods): cell number, Cell Mass and Cell Activity, Cell Count: Turbidometric method, Plate count method, Membrane count method, Dry weight and Wet method by measurement of cellular activity.	12
	Suggested Activities: I. Discussion on nutrient needs of microorganism. II. Video making on nutritional growth. III. Diagrammatic view of spectrophotometer and microscope	
III	**Basics of Immunology:** Basics of Immunology the ayurvedic concept of Immunity Vyadhikshamatva A historical Perspective of immunology in context of Indian knowledge system- Acharya Charka and Susruta. Basic of Immunology: Concept of Innate and Acquired immunity, Phygocytosis complement and Inflammatory responses. Immune cells and organs : Structure, Function and Properties of immune cells – Stem cell, T-cell, B-cell , NK-cell, Macrophagus, Neutrophil, Eosinophil, Basophil, Mastcell, Dendritic cell. Immune organ: Bone marrow, Thymus, Lymph Node, Spleen, Lymphatic System.	12

	Suggested Activities: I. Question making on Ayurvedic concept of immunity. II. Model preparation of immune cells. III. Report making on immune organs.	
IV	**Immunoglobulins and Immune response:** **Immunoglobulins** Antigens : Characteristics of an antigen : Foreignness, Molecular size, Chemical Composition and Hetrogeneity, Antigen Adjuvants, Epitopes, Haptens. Antibodies: Structure, Types, Functions and Properties of antibodies Antigentic determinant on antibodies (Isotypic, Allotypic, Idiotypic) Monoclanal, Polyclonal and Chimeric antibody. **Immune response** : Generation of immune response: Primary and Secondary immune response, generation of Humoral response (Plasma and Memory Cell) cell activation, Co-stimulatory signals), Killing Mechanisms by CTL and NK cells. Introduction to tolerance.	12
	Suggested Activities: I. Survey of immuno diagnostics methods. II. Poster on antigen-antibody interaction and blood profiling.	
V	**Microbial, Immunological Techniques and Vaccination:** Microbial Techniques: Principle, Working and applications of instruments-Laminar airflow, Autoclave, Hot air oven Immunological techniques: RIA, ELISA, ELISPOT, Western blotting, Principles of Precipitation, Agglutination, Immuno diffusion, Immunoelectophorosis. Vaccination: Vaccines and vaccination: Rubella, Varicella (Chickenpox), Polio, Diphtheria, Hepatitis vaccine.	12
	Suggested Activities Activity- I. Poster making on mechanism of types of ELISA II. Question on different types of vaccines. III. Video making of Lab microbial instrument.	

Note: One activity from every Unit is must for students.

Part–C:Learning Resources
Text Books, Reference Books, Other resources
Text books 1. Fundamentals of microbiology and immunology; A.K. Banerjee and Nirmalaya 2. Banerjee, New Central Book Agency, New Delhi 3. Modern concepts of microbiology; H.D. Kumar and Swati Kumar., Vikas Publishing 4. House Pvt Ltd., 2nd Edition. 5. Microbiology; M.J. Pelczar, E.C.S. Chan and N.R.Krieg, McGraw Hill Book company. 6. 1993, 5h edition. 7. A text book of microbiology; R.C.Dubey and D.K.Maheshwari,S Chand and Company Ltd 2004, 1" edition. 8. Microbiology; P.D. Sharma, Rastogi Publication, Meerut. 9. General Microbiology Vol I and II; C.B. Powar and H.F.Dagniwala , Himalaya 10. Microbiology Fundamental and Applications; S.S.Purohit, Agrobias, 7h Edition. 11. Immunology; K.R. Joshi, Agrobios, 5h edition.
Suggestive Digital Platform WebLinks: 1. https://epgp.inflibnet.ac.in 2. https://www.eshiksha.mp.gov.in/mpdhe
Suggested Equivalent Online Courses: 1 http:/www. freebookcentre, net >...free microbiology books download Ebooks online Textbooks 2 http://open.oregonstate.education>.General Microbiology- Open Textbook-Open Textbooks 3 http://www.freebookcentre.net>...Immune System and Immunology (PDF63P)\ldownload book

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

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Part A: Introduction		
Programme- B.Sc.(Biotechnology)	**Class: I Year**	**Semester: II** **Session: January - June 2026**
Subject: Biotechnology	**Theory / Practical : Practical**	
1.	**Course Code**	BSCBT – 202 (P)
2.	**Course Title**	Lab Work for Microbiology and Immunology (Practical)
3.	**Course Type**	Major- II (Core Course)
4.	**Pre-requisite (If any)**	To study this course, a student must have the subject Biology in XII class.
5.	**Course Objectives**	1. To develop fundamental laboratory skills in microbiology**,** including aseptic techniques, cultivation, isolation, and identification of microorganisms using standard microbiological procedures. 2. To provide hands-on experience in immunology-based experimental methods**,** such as antigen–antibody interactions, serological assays, and diagnostic immunological techniques. 3. To train students in the safe handling, observation, and characterization of pathogenic and non-pathogenic microbes**,** following biosafety guidelines and good laboratory practices (GLP). 4. To enable students to analyze, interpret, and document experimental data**,** integrating microbiological and immunological concepts to understand host–pathogen interactions and immune responses. 5. To cultivate scientific thinking, problem-solving ability, and research-oriented skills**,** preparing students for advanced studies and professional roles in clinical laboratories, biotechnology, healthcare, and research institutions
6.	**Course Outcomes (COs)**	On completion of this course, learners will be able to: CO1. Perform essential microbiological techniques—including aseptic handling, culturing, staining, and identification of microorganisms with accuracy and adherence to laboratory safety standards. CO2. Demonstrate the ability to conduct immunology- based assays such as agglutination, precipitation, and ELISA, and interpret antigen–antibody interactions for diagnostic or analytical purposes.

		CO3. Apply analytical and observational skills to evaluate microbial growth, immune responses, and experimental results, integrating microbiological and immunological concepts to understand host–pathogen dynamics.
7.	**Expected Job Role/Career Opportunities**	• Clinical Microbiologist • Biomedical Scientist • Immunologist • Research Scientist • Biosafety Officer
8.	**Credit Value**	**Practical** - 2 Credits
9.	**Total Marks**	**Max. Marks: 100** **Min. Passing Marks: 35**

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Part B:Content of the Practical Course	
Total No. of Lectures required: 30 hrs	
S.No.	**List of Experiments / Exercise/ Practicals:**
1.	Perform Aseptic technique, Cleaning of glassware's, preparation of Cotton Plugging and Sterilization.
2.	To Prepare Bacterial and Fungal media.
3.	To isolate microbes from Air, Water and Soil.
4.	To Study Dilution and plating by Pour Plate, Spread Plate methods.
5.	To Study microorganism by Staining method —Simple staining, Gram staining, Endospore staining, Fungal staining, Algal staining, Negative staining.
6.	To identify bacteria based on staining, Shape and Size.
7.	To enumerate microorganism—Total and Viable count.
8.	To isolate Antibiotic sensitivity of microbes by the use of antibiotic discs.
9.	To isolate and identify pathogenic bacteria from sewage and wastewater.
10.	To Determine growth curve and generation time of E.coli.
11.	To identify human blood groups.
12.	To enumerate total WBC of the given blood sample by hemocytometer.
13.	To enumerate differential Leukocyte of the given blood sample.
14.	To enumerate total RBC of the given blood sample by hemocytometer.
15.	To isolate and identify aquatic Fungi from Local water body.

Part C:Learning Resources

Text Books, Reference Books, Other resources

Text books

1. Laboratory Techniques in Modern Biology:N. Swarup,S.C.Pathak,S.Arora,Kalyani Publication,New Delhi.
2. Integrated Methodologies in Biology: Shashi Shrivastava,P.Banejee,ArunPrakashan,Gwalior.
3. Experiment in Microbiology Plant Pathology and Biotechnology: K.R.Anejaa, NewAge International, New Delhi,2007.
4. Laboratory Manual of Biotechnology; P.N.Swamy, Rastogi Publication, Meerut.
S. Practical Microbiology: R.C.Dubey, D.K.Maheshwari, S.Chand & Company, Delhi.
6. Manual of Experiments in Biotechnology: Leena Lakhani, Sheeba Khan, Kailash Pustak Sadan, Bhopal.

Suggestive Digital Platform WebLinks:

1. http://1ioguides.unhsc.edu>..ebooksMicrobiology Immunology & Biochemistry
2. http://bookauthoritv.ore;>.Microbiology eBook

Suggested Equivalent Online Courses:

- https://www.coursera.org/specializations/immunology
- https://www.edx.org/learn/microbiology
- https://onlinecourses.nptel.ac.in/noc21_bt36/preview
- https://www.ibiology.org/online-biology-courses/immunology-flipped-course/
- https://www.open.edu/openlearn/health-sports-psychology/infection-and-immunity

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Part D:Assessment and Evaluation (Practical)	
Scheme of Practical Examination:-	**Max. Marks :100**
Internal Assessment	
Class Interaction	
Quiz	
Seminar	
Assignments(Charts, Rural Service, Technology Dissemination/Excursion/Lab Visit/ Industrial Training	
External Assessment	**Max. Marks : 100**
Major Experiment	15
Minor Experiment-1	5+10
Minor Experiment-2	5+10
Spotting	15
Viva-Voce	10+10
Practical Record	10+10

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Part A : Introduction			
Programme: B.Sc. (Biotechnology)	**Class : I Year**	**Semester: II**	**Session: January - June 2026**
Subject: Chemistry		**Theory/ Practical: Theory**	
1.	**Course Code**	BSCBT – 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 Objectives**	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	**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. **Keywords/Tags:** Indus and Harappan Civilization, Later Pottery, Wootz Steel, Glass making, Paints, Perfumes **Activities:** 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 Chemistry 4. Educational Tour of Industries and Research Institutes	9
2	**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) **Keywords/Tags:** analgesic, antibiotics, anti depressant, antihypertensive, antipyretics, anticoagulants	9
3	**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 **Keywords/Tags:** Air pollution, Water pollution, Soil pollution, Noise pollution, e-waste pollution	9
4	**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. **Lipids/ fats-** triglyceride, phospholipids, cholesterol, mono saturated and poly saturated fatty acids, role of fats in cell membrane and hormone production	9

	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. **Minerals-** essential minerals- calcium, iron, sodium, potassium etc. mineral bioavailability and factors affecting absorption **Keywords/Tags:** Carbohydrates, Proteins, Lipids/ fats, Vitamins, Minerals	
5	**Chemistry of paper and textile** **Fiber Chemistry:** Classification of natural and synthetic fibers (cotton, wool, silk, polyester, nylon, acrylic), Chemical structure of fibers and their relation to properties Textile Wet Processing, introduction to dyes, identification of fibers and dyes **Paper making chemistry-** Pulping, Kraft process, Sulfite process, Bleaching, Additives and fillers **Keywords/Tags:** natural and synthetic fibers, Wet Processing, dyes, Pulping, Bleaching	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 chemistry	

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Part C-Learning Resources
Text Books, Reference Books, Other resources
Suggested Readings: 1. Traditional Systems of Medicine Hardcover -30 January 2006 by M.Z. Abdin (Author), Y.P. Abrol (Author), ISBN-10 8173197075, Publisher Narosa Publishing House 2. 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 Publishing 3. TEXTB0OK OF MEDICINAL CHEMISTRY 4ED VOL 1 (PB 2022) by ALAGARSAMY V. | 1 January 2022, Publisher: CBS Publishers & Distributors Pvt. Ltd 4. 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 publication 5. Pollution: Causes, Effects and Control, Roy M. Harrison, Royal Society of Chemistry, 2001 6. 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: 2020 7. Food: The Chemistry of its Components, By Tom Coultate, ISBN: 978-1-83916-814-7, Publication date: 11 Oct 2023, Royal Society of Chemistry 8. Chemical and Functional Properties of Food Components, 4th Edition, Edited By Hanna Staroszczyk, Zdzislaw E. Sikorski, December 19, 2024 9. Textile and Paper Chemistry and Technology, 1 January 1978 by Jett C. Arthur (Editor), Publisher American Chemical Society 10. 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: 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:** Continuous Comprehensive Evaluation (CCE): University Exam (UE): Time: 03.00 Hours		100 30 70
Internal Assessment: Continuous Comprehensive Evaluation (CCE):	Class Test	15
	Assignment/Presentation	15
	Total	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 (Biotechnology)	**Class : I Year**	**Semester: II** **Session: January - June 2026**
Subject: Chemistry		**Theory/Practical: Practical**
1.	**Course Code**	BSCBT – 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 Objectives**	• 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**	• 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,CCI_4, $CHCI_3$, benzene, xylene, toulene, ethyl alcohol]	**03**
5	**Solvent Extraction** 1.Separation and estimation of Mg(II) and Fe(III) **lon Exchange Method** 1. Separation and estimation of Mg(II) and Zn(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:l/www.columbia.edu/itc/barnard/biology/biobc2004/edit/experiments/Experiment1-Spec.pdf 16. http:l/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 V2.pdf 18. http:llgervind.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/~advanal/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 Documents IV Cycle/Criterion-I/2.3.2/ppt/Dr Ignatious ConductometricTitration.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.xation 27. http:llchemistry.du.ac.in/study material/4103-A/MSc Polarography.pdf 28. https://fac.ksu.edu.sa/sites/default/files/abbe experiment.pdf

29. https://web. mst.edu/~tbone/subjects/tbone/chem224/riproc.pdf
30. http:l/www.fbml.ff.vu.It/sites/default/files/7 4 en.pdf
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%20|V.pdf
33. https://vlab.amrita.edu/?sub=1&brch=195&sim=5458cnt=1

Suggested equivalent online courses:

1. https:/www.my-mooc.comlen/mooc/basic-analytical-chemistry/
2. https://www.my-mooc.com/en/mooc/principles-electronic-biosensors-purduex-nano535x/

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	Marks	External Assessment	Marks
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 10	Table work/ Experiments	10 50
	Total Marks:100		

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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**	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)**	On completion of this course, learners will be able to: CO1. Imbibe values which make them aware of national heritage and making them responsible citizens. CO2. Critically read texts to identify main ideas, infer meanings, and assess the author's purpose. CO3. Use grammar and vocabulary effectively for communication. CO4. Write appropriate correspondence and reports for various professional and social contexts. CO5. Prepare for various competitive exams by developing their English Language competence.	
7.	**Expected Job Role/career opportunities**	• 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

PART B: Content of the Course (Theory)		
Total No. of Lectures: 30 Hrs.		
Unit	**Topics**	**No. of Lectures**
I	**Understanding Indian Culture** 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) **Keywords**: Heritage, Diversity, Pluralism, Values, Patriotism, Spirituality, Humanism, Social Harmony, Tradition, Modernity. **Activity:** • 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	**Comprehension Skills** 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. **Keywords** - Inference, Main Idea, Theme, Tone, Purpose, Context Clues, Summary, Paraphrasing, Critical Reading **Activity:** • 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

III	**Basic Language Skills** **Grammar:** 1. Parts of Speech 2. Articles 3. Subject-Verb Agreement 4. Tenses and their application **Vocabulary:** 1. Synonyms, Antonyms, Homonyms, and Homophones 2. One-word substitutes 3. Word formation: Suffixes and Prefixes **Keywords-**Tense, Agreement, Clause, Phrase, Synonym, Antonym, Prefix, Suffix. **Activity:** • Grammar exercises (fill-in-the-blanks, error correction, sentence transformation). • Vocabulary-building games and quizzes.	08
IV	**Writing Skills** 1. The Writing Process: Pre-writing, Drafting, Revising, and Editing 2. Paragraph Writing: Structure, Topic Sentence, and Coherence. 3. Letter writing: Formal/Informal **Keywords:** Cohesion, Coherence, Topic Sentence, Drafting, Revising. Editing **Activity:** • 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	**Situational Conversation-Context, Audience, Purpose, Type, Register** 1. Meeting/Greeting - Introducing Self, Introducing people to one another 2. Apologies/Responses 3. Enquiring about a Course/ Requesting Information 4. Agreeing/Disagreeing (with a Proposal) **Keywords** - Register, Tone, Style, Audience, Purpose,-Context, Etiquette, Persuasion.	04

	Activity: • 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."	

Part C-Learning Resources
Text Books, Reference Books, Other resources
1. Tagore,R (1912). Gitanjali (Song Offerings). London: Macmillan. "Where the Mind is Without Fear" is Poem No. 35 in this collection. 2. Complete Works of Swami Vivekananda. Vol. 1. Advaita Ashrama (Publication Department of Ramakrishna Math, Belur Math, Kolkata). 3. Swami Tapasyananda, Sundarkandam of Srimad Valmiki Ramayana, Sri ram Krishna Math, Madras 4. Narayan, R.K. Malgudi Days. Indian Thought Publications; Ist edition (11 December 2019); ISBN-10: 9788185986173 5. Cultural Heritage of India by S. Radhakrishnan & Haridas Bhattacharyya (ed.) 6. A Course in English Grammar and Composition by Geetha Nagaraj 7. Functional English by Dr. P. Kiranmai Duit & Geetha Rajeevan (Foundation Books/Cambridge India) 8. Communicative English by E. Suresh Kumar, P. Srechari, and J. Savithri (Orient Black Swan) 9. Practical English Usage by Michael Swan (Oxford) 10. Modern English Grammar by N.Krishnaswany, Macmillion Publication 11. Developing Reading Skills: A Practical Guide to Reading Comprehension Exercises" by Francoise Grellet (Cambridge) 12. Writing Skills by Norman Coe, Robin Rycroft & Pauline Ernest (Cambridge)
Suggested Equivalent Online Course 1. NPTEL Course-"Communication Skills" (by IIT Kharagpur) https://nptel.ac.in/courses/109/106/109106175/ 2. Swayam Course - "English Language for Competitive https://onlinecourses.nptel.ac.in/noc23_hs51/preview Exargs" (by IIT Madras 3. British Council India - "Learn English: Speaking and Writing Skills" https://www.britishcouncil.in/english/courses-adults/learnonline 4. Coursera "Write Professional Emails in English" (by Georgia Tech) https://www.coursera.org/learn/professional-emails-english

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 **Class: I Year**		**Semester: II**	**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/MD-ID/SEC/VOC)**	VAC	
4.	**Pre-Requisite (if any)**	Class 12th Pass	
5.	**Course Objectives**	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)**	On completion of the course, learners will be able to: 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**	• 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

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	**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" **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 **Assignment:** Write a short essay (about 500 words) with pictures on any cultural heritage/festival/folk art of your village or town.	**06**
II	**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 **Activity:** "Public Policy Dialogue" – Organizing a Mock Constituent Assembly among students, where the fundamental values of India are presented and discussed. **Assignment 1:** Analyze any one fundamental right and its related duty from a Vedic/classical perspective. **Assignment 2:** Write an essay (400 words) on the role of youth in Indian democracy, from the perspective of "From Swaraj to Suraj".	**06**

III	**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 **Activity 1:** Knowledge-sharing session: Demonstration of traditional teaching methods (dialogue, memorization-based learning). **Activity 2:** Recreation of Shlokas and meaning- based discussion - Especially from Shikshavalli and Bhagavad Gita etc. **Assignment 1:** Explain the objectives of Indian education based on any Vedic hymn or Upanishadic statement. **Assignment 2:** Write a short essay on examples of Guru–Shishya tradition or life values observed in your school, village, or family.	**06**

IV	**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 **Activity 1:** Poster or slogan writing on "Simple Living, High Thinking" **Activity2:**Group presentation on Indian environmental traditions (yagya, tree worship, river, festivals, etc.) **Assignment 1:** Panchamahabhutas and Indian life perspective **Assignment 2:** Journey from 'Swadeshi' to 'Atmanirbhar Bharat' (Self-reliant India)	**06**
V	**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 **Activity 1:** Student presentation on policy alternatives (Indian Model vs Western Model) **Activity 2:**Essay writing on the theme *"India @ 2047"* **Assignment 1:** Global India and Possibilities of Cultural Leadership **Assignment 2:**Technology and Ethics: Exploring the Indian Model of Integration	**06**

Part – C: Learning Resources
Textbooks, Reference Books, Other Resources
Suggested Readings: 1. Katdre, Indumati – Bharatiya Shiksha: Sankalpana evam Swaroop/ Punarsrijan, Prakashan Seva trust, Ahmedabad 2. Kumar, Krishan – PrachinBharatiya Shiksha Paddhati, Shri Saraswati Sadan, Delhi 3. Saluja, Chand Kiran (2023) – Shiksha: BharatiyaPariprekshya Sanskrit Samvardhan Pratishthan, New Delhi 4. 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: 1. Swaroop, Devendra – Sanskriti: Ek Naam – Roop, Anek Pratiman Pratibha Prakashan, New Delhi 2. Swaroop, Devendra (Editor), (2010) – Rashtriya Shiksha Andolan ka Itihas (Hindi Sanskaran) Prabhat Pratisthan, New Delhi 3. Agrawal, Vasudev Sharan (Editor), (2023) – Rashtra, Dharma aur Sanskriti (Nibandh Sanchayan). Prabhat Prakashan, New Delhi
Reference Books: 1. Mishra, Rameshwar Pankaj (2024) – Advitiya samajshastra, Prabhat Prakashan, New Delhi 2. Pandey, Om Prakash (Editor) (2023) – Bharat Vaibhav, Rashtriya Pustak Nyas (NBT) , New Delhi 3. Subbarayappa, B.V. – Bhartiya Vigyan Parampara, Rashtriya Pustak Nyas (NBT) , New Delhi
Suggestive Digital Platform Web Links: ● https: //www.youtube.com/watch?v=VUOyldPx8h4 ● https://www.youtube.com/watch?v=1livkUGjeFA&list=PLfGFNx UDX0eholQwKZ2ekqaxY3PDtoDq-&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_a1TI5CC9RG8w PaNNDOk6VjSdhe0K3HE&index=6 ● https: //www.youtube.com/watch?v=9PLs_N6WbxE

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**	**सेमेस्टरः II**	**सत्र: जनवरी – जून 2026**
विषयः **Value Added Course (VAC)**		**Theory/ Practical: Theory**
1.	पाठ्यक्रम कोड	VAC – **201**
2.	पाठ्यक्रम शीर्षक	भारत बोध (Understanding India)
3.	पाठ्यक्रम प्रकार (कोर कोर्स/वोकेशनल) डीएसई/ माइनर /एमडी–आईडी/एसईसी/वीओसी)	VAC
4.	पूर्वापेक्षा (यदि कोई हो)	कक्षा 12 वी उतीर्ण
5.	पाठ्यक्रम का उद्देश्य	1. भारत के ऐतिहासिक, सांस्कृतिक और सवैधानिक स्वरूप की मूलभूत समझ विकसित करना। 2. भारत शिक्षा पद्धति, ज्ञान परंपरा और राष्ट्रीय मूल्यों के प्रति छात्रों में संवेदनशीलता उत्पन्न करना। 3. भारत की स्वतंत्रता संग्राम, लोकतांत्रिक विकास और वैश्विक भूमिका को समझने में सहायता करना। 4. संविधान में निहित दायित्वों एवं आधिकारों की जानकारी देकर छात्रों को जिम्मेदार नागरिक बनाना।
6.	पाठ्यक्रम अध्ययन की उपलब्धियां (कोर्स लर्निंग आउटकम)	इस कोर्स का अध्ययन करने के बाद विद्यार्थी में, 1. विद्यार्थी भारत की ऐतिहासिक,सांस्कृतिक और सामाजिक विविधता की मूलभूत समझ विकसित कर सकेंगे। 2. विद्यार्थी भारतीय ज्ञान परंपरा और राष्ट्रीय मूल्यों के प्रति संवेदनशीलता विकसित कर सेकेंगे। 3. विद्यार्थी भारत के स्वतंत्रता संग्राम, विकास यात्रा और वैश्विक भूमिका को समझ सकेंगे। 4. विद्यार्थी संविधान में निहित अधिकारों एवं कर्तव्यों का ज्ञान प्राप्त कर जिम्मेदार नागरिक बन सकेंगे।
7.	संभावित नौकरी भूमिकाएँ/ करियर अवसर	• सिविल सेवा अभ्यर्थी • सामाजिक कार्यकर्ता • पत्रकार / मीडिया प्रोफेशनल • काउंसलर / मोटिवेशनल ट्रेनर • कानून से जुड़े सहायक कार्य

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

भाग ब–पाठ्यक्रम सामग्री	
प्रति सप्ताह कक्षाओं की संख्याः 2 घंटे प्रति सप्ताह	
आवश्यक व्याख्यानों की कुल संख्या : थ्योरी (T) 30 घंटे	
ईकाई	विषय
I	**भारतीय इतिहास और सांस्कृतिक विरासत** ● 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 **गतिविधियां :** ● 'लोक से संवाद' कार्यक्रम–परिवार या समुदाय के किसी बुजुर्ग से पारंपरिक जीवन–मूल्य एवं ज्ञान पर चर्चा, और उसका लेखा–जोखा। **असाइनमेंट विषयः** ● अपने गाँव या नगर की किसी स्थानीय सांस्कृतिक धरोहर/पर्व/लोककलाओं का लघु लेख चित्रों सहित तैयार करें (500 शब्द)।
II	**भारतीय संविधान और नागरिक दायित्व** ● वैदिक राजधर्म और आधुनिक संविधान ● मूल अधिकार और कर्तव्य : धर्म–कर्तव्य – नैतिकता ● युवा नागरिक और लोकतांत्रिक भागीदारी ● शिक्षा का राष्ट्रनिमार्ण में योगदान **गतिविधियॉः** ● 'जननीति संवाद'–छात्रों के बीच मॉक संविधान सभा या युवा संसद का आयोजन, जिसमें भारत के मूल मूल्य प्रस्तुत करें। **असाइनमेंट विषयः** ● किसी एक मौलिक अधिकार और उससे जुडे कर्तव्य का वैदिक/शास्त्रीय दृष्टिकोण से विश्लेषण करें। ● भारतीय लोकतंत्र में युवाओं की भूमिका पर 'स्वराज से सुराज तक' दृष्टिकोण में निबंध (400 शब्द)

III	**भारतीय ज्ञान परंपरा और शिक्षा दृष्टिकोण** • भारतीय ज्ञान के स्त्रोत : वेद, उपनिषद, दर्शन, स्मृति, लोक साहित्य • गुरूकुल परंपराः शिष्य–केंद्रित शिक्षण, वाचिक परंपरा और स्मृति आधारित अधिगम • शिक्षा का उद्देश्य : आत्मोत्कर्ष एवं लोकसंग्रह • शिक्षक की भूमिका 'आचार्य देवो भवः'चरित्र निमार्ण, सामाजिक पुननिर्माण में योगदान **गतिविधियाँः** • ज्ञानवार्ता गोष्ठी–शास्त्रीय शिक्षा पर आधारित शिक्षण पद्धति (उदाहरणः संवाद, स्मृति आधारित अभ्यास) का डेमो प्रस्तुत करना। • श्लोक–गायन और उसका अर्थाथ संवाद–विशेष रूप से शिक्षावल्ली (तैतिरीयोपनिषद), गीता आदि से। **असाइनमेंट विषयः** • किसी वैदिक ऋचा या उपनिषद वाक्य के आधार पर भारतीय शिक्षा के उद्देशय का विवेचन करें। • अपने विद्यालय/ग्राम/परिवार में देखे गए गुरू–शिष्य परंपरा या जीवन–परमार्थ के उदाहरण पर लघु लेख।
IV	**भारत का जीवन – दर्शन और सतत भविष्य की अवधारणा** • भारतीय जीवन –दृष्टिः पुरुषार्थ चतुष्टय, आश्रम व्यवस्था और कर्तव्य आधारित नैतिकता • प्रकृति के साथ सामंजस्यः यज्ञ, पंचमहाभूत ऋतुचक्र और पर्यावरण संतुलन • भारतीय अर्थदर्शनः अर्थशास्त्र , स्वदेशी , श्रम–संस्कृति और लोक–उद्यम • सतत विकास और पर्यावरणीय न्याय की भारतीय अवधारणा **गतिविधियाँः** • 'सादा जीवन उच्च विचार' विषय पर पोस्टर या स्लोगन लेखन • भारतीय पर्यावरणीय परंपराओं (जैस यज्ञ, वृक्ष–पूजन, नदी महोत्सव आदि) पर समूह प्रस्तुति **असाइनमेंट विषयः** • पंचमहाभूत और भारतीय जीवन–दृष्टि • स्वदेशी से 'आत्मनिर्भर भारत' तक की यात्रा

V	**समकालील भारत और वैश्विक भूमिका** • स्वतंत्रता संग्राम में धार्मिक, सांस्कृतिक और बौद्धिक नेतृत्व की भूमिका • भारत का योगदानः अंतरिक्ष विज्ञान, योग, कूटनीति, शांति दर्शन • 'आत्मनिर्भर भारत' परंपरा और नवाचार का समन्वय • वैश्चिक परिप्रेक्ष्य में भारत 'सॉफ्ट पावर',बहुध्रुवीय विश्व में भूमिका **गतिविधियाँः** • छात्रों द्वारा नीति – विकल्प प्रस्तुत करना (Indian Model vs Western Model) • "भारत @ 2047" विषय पर निबंध **असाइनमेंट विषयः** • "ग्लोबल भारत और सांस्कृतिक नेतृत्व की संभावना" • "तकनीक और नैतिकता : भारतीय समन्वय की खोज"

भाग–सः अध्ययन संसाधन
पाठ्यपुस्तकें, संदर्भ पुस्तकें, अन्य संसाधन
अनुशंसित पाठ्यसामग्री 1. काटदरे, इंदुमति। भारतीय शिक्षा : संकल्पना एवं स्वरूप/ पुनरूत्थान प्रकाशन सेवा ट्रस्ट, अहमदाबाद। 2. कुमार, कृष्ण। प्राचीन भारतीय शिक्षा पद्धति। श्री सरस्वती सदन, दिल्ली। 3. सलूजा, चंद किरण (2023)। शिक्षाः भारतीय परिप्रेक्ष्य। संस्कृत संवर्धन प्रतिष्ठान, नई दिल्ली। 4. कपूर, कपिल एवं सिंह, अवधेश कुमार(संपादक)। (2005)। Indian Knowledge Systems (खंड 1–2)। इंडियन इंस्टिट्यूट ऑफ एडवांस्ड स्टडी, शिमला; डी.के. प्रिंटवर्ल्ड, नई दिल्ली।
पाठ्यपुस्तकें: 1. स्वरूप, देवेद्र। संस्कृति एकः 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।
संदर्भपुस्तकें: 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. सुब्बारायप्पा, बी.वी.। भारतीय विज्ञान परंपरा। राष्ट्रीय पुस्तक न्यास (एनबीटी), नई दिल्ली।

SHRI VAISHNAV INSTITUTE OF MANAGEMENT & SCIENCE, INDORE

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ISO 9001:2015 Certified

अनुशंसित डिजिटल प्लेटफॉर्म वेब लिंकः

- https: //www.youtube.com/watch?v=VUOyldPx8h4
- https://www.youtube.com/watch?v=1livkUGjeFA&list=PLfGFNx UDX0eholQwKZ2ekqaxY3PDtoDq-&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_a1TI5CC9RG8wPaNNDOk6 VjSdhe0K3HE&index=6
- https: //www.youtube.com/watch?v=9PLs_N6WbxE

भाग–दः आकलन एवं मूल्यांकन		
केवल बाह्य मूल्याकंन		कुल अंकः 100
बाह्य मूल्यांकन अंतिम सेमेस्टर परीक्षा समयः 03 घंटे	(अ) पांच लघु प्रश्न (ब) पांच दीर्घ उत्तरीय प्रश्न	कुल अंकः 100
अधिकतम अंक	100	
क्रेडिट मान	02	
न्यूनतम उर्त्तीण अंक	35	