SCHOOL OF STUDIES IN CHEMISTRY
JIWAJI UNIVERSITY, GWALIOR

Module for B.Sc. Hons. –First semester (NEP-2020)

Session: 2025-26

	Semester I
Major	Major C-1(6 Credits) Fundamental of Inorganic Chemistry
Minor	Minor M-1(4 Credits) Basic Calculus and Vector Calculus / Elementary Botany
Multidisciplinary course	MD-1 (3 Credits)Basic of Tourism Management
Ability Enhancement course	AEC-1 (2 Credits) हिंदी भाषा और संस्कृति आधार पाठ्यक्रम
Skill Enhancement course	SEC-1 (3 Credits) Vermicomposting
Project Work	PW-1 (2 Credits)
	Total Credits -20

अवलोकनार्थ एवं स्वीकृतार्थ प्रस्तुत है।

सहा० कुलसचिव

अकादमी

Chem/76
15-9-2025

विभागाध्यक्ष,

रसायन अध्ययनशाला

Professor & Head
School of Studies in Chemistry
Jiwaji University
Gwalior - 474 011

19-9-2025

CBCS Annual Pattern
B.Sc. Ist year
CHEMISTRY– Major-I
Syllabus of Theory Paper

Part A Introduction			
Program-Certificate	**Class- B.Sc**	**Year- First**	**Session: 2025-2026**
Subject: Chemistry			

1	**Course Code**	**C1**
2	**Course Title**	**Fundamentals of I[illegible]ganic Chemistry**
3	**Course Type (Core Course/Elective/Generic Elective/Vocational/.....)**	**Major 1**
4	**Pre-requisite (if any)**	**To study this course the students must have the subject Chemistry in12th Course or equivalent**
5	**Course Learning outcomes (CLO)**	By the end of this course students will be able to the following aspects of Chemistry: 1. Introduction of Bharatiya Knowledge System Including its Significance 2. Explain various theories and principles applied to reveal atomic structure. 3. Significance of quantum numbers. 4. Explain the concept of periodic properties of elements with S and P Block elements. 5. Explain theories related to chemical bonding. 6. Explain the MO theory, Acid-base concept, pH, and buffer.
6	**Credit Value**	**04**
7	**Total Marks**	Max. Marks: 30+70 / Min. Passing Marks:35

Part B- Content of the Course

Total No. of Lectures-Tutorials-Practical (in hours per week):
L-T-P:

Unit	Topics	No. of Lectures
Unit 1	**Introduction of Bharatiya Knowledge System Including its Significance** Introduction and significance of BKS, BKS's structure, historical background of BKS, A few noteworthy features of BKS. General Introduction of Chemical Techniques in Ancient India Religion, Taboos, Spirituals, Tantra Mantra, Amchi Medicine System, and Vaidya (traditional healthcare system) Land, water, and soil conservation and management practices; agriculture; animal husbandry; forests; sacred groves; water mills; and sacred water bodies ***Keywords/Tags**: BKS, Ancient India Chemistry, Animal Husbandry, Vaidya, Myths.*	12

	Activities: 1. Collection of Medicinal plants and their uses from near by area (Herbarium Preparation) 2. Field study of BKS in nearby area 3. Prepare the Project and Modals related to Ancient Indian Chemistry	
Unit 2	**Atomic Structure:** (i) Kanada's concept of atom and molecule formation (di-atom, tri-atom), concept of atom in Buddhism and Jainism, Review of Bohr's theory and its limitations. Atomic spectrum of Hydrogen. Dual nature of particles and waves, de Broglie's equation, Heisenberg's Uncertainty principle and its significance. (ii) Quantum numbers and their significance. Rules for filling electrons in various orbitals, Pauli's Exclusion Principle, Hund's rule of maximum multiplicity, Aufbau principle and its limitations, Variation of orbital energy with atomic number. (iii) Electronic configurations of the atoms. Stability of half-filled and completely filled orbitals, concept of exchange energy. Relative energies of atomic orbitals, Anomalous electronic configurations. ***Keywords/Tags*** *: Hydrogen spectrum, Hund's rule, Aufbau principle, configurations*	**12**
Unit 3	**Elementary idea of the following properties of the elements with reference to s & p-block elements in periodic table.** • Effective nuclear number (EAN), shielding or screening effect, Slater rules, variation of effective nuclear charge in periodic table. • Atomic radii (van der Waals) • Ionic and crystal radii. • Covalent radii (octahedral and tetrahedral) Detailed discussion of the following properties of the elements, with reference to s & p-blocks. • Ionization energy- Successive ionization energy and factors affecting ionization energy. Applications of ionization energy. • Electron Affinity- Definition, factors effecting electron affinity, periodicity • Electronegativity- Pauling's/ Mulliken's electronegativity scales. Variation of electronegativity with bond order, partial charge, hybridization. ***Keywords/Tags*** *: EAN, Atomic radii, Ionic Radii, Crystal Radii, Ionization Energy.*	**12**
Unit 4	**Chemical Bonding** i. Ionic Bonding: General characteristics of ionic bonding. Ionic bonding &Energy: lattice & solvation energies and their importance in the context of stability and solubility of ionic compounds. Statement of Born-Landé equation for calculation of lattice energy,	**12**

	Madelung constant, Born-Haber cycle and its applications. Covalent character in ionic compounds, polarizing power and polarizability. Fajan's rules. ii. Covalent bonding: Lewis structure, Valence Bond theory (Heitler-London approach). Hybridization- Concept, types (SP, SP^2, SP^3, dSP^2,d^2SP^3)with suitable examples of inorganic and organic molecules Ionic character in covalent compounds- dipole moment and percentage ionic character. *Valence shell electron pair repulsion theory (VSEPR) theory:* Assumptions, need of theory, application of theory to explain geometries or shapes of some inorganic molecules and ions on the basis of VSEPR and hybridization with suitable examples of linear, trigonal planar, square planar, tetrahedral, trigonal bipyramidal and octahedral arrangements such as: NH_3, H_2O, SF_4, ClF_3, PCl_5, SF_6, ClF_5, XeF_4. **Bond parameters:** Definition and factors affecting - bond orders, bond lengths, bond angles. ***Keywords/Tags*** *:Ionic Bonding, Covalent Bonding, Hybridization, VSEPR Theory, LCAO, Bond Parameters*	
Unit 5	**Molecular orbital (MO) concept of bonding** The approximations of the theory, Linear combination of atomic orbitals (LCAO) (elementary pictorial approach) Rules for the LCAO method, bonding and anti bonding MOs. Characteristics for s-s, s-p and p-p combinations of atomic orbitals, nonbonding combination of orbitals. MO diagrams of homonuclear diatomic molecules: H_2, Li_2, Be_2, B_2, C_2, N_2, O_2, F_2, and their ions. Molecular orbitals of heteronuclear diatomic molecules: CO, NO, CN, HF. **Acid-Base concept** Arrhenius concept, Bronsted-Lowry's concept, conjugates acids and bases, relative strength of acids, Lewis concept, pH, buffer solutions. Acid-base neutralisation curves, Handerson equation. Strength of organic acids and bases: Comparative study with emphasis on factors affecting pKa values ***Keywords/Tags*** *: MO Diagrams, Acid-Base Concept, Bronsted-Lowry's Concept, Conjugate Acids And Bases, pH, Buffer Solution.*	**12**
	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	

Part C-Learning Resources

Text Books, Reference Books, Other resources

Text Books:

1. Lee, J.D., Concise Inorganic Chemistry, ELBS, 1991.
2. Khera, H.C., Gurtu, J.N., Singh, J., Chemistry For B.Sc. Ist Year, Pragati prakashan.
3. Bariyar, A. & Goyal, S., B.Sc. Chemistry Combined. **(In** Hindi) Krishna Educational Publishers Year: 2019.
4. Puri, B.R., Pathania, M.S., Sharma, L.R., Principles of Physical Chemistry Vishal Publishing Company 2020
5. Gurtu, J.N., Gurtu A., Advanced Physical Chemistry, Pragati Publications, Meerut, ISBN: 9789386633347, 9386633345; Edition: IV, 2017
6. Day, M.C. and Selbin, J. Theoretical Inorganic Chemistry, ACS Publications 1962.
7. Bahl, A. and Bahl, B.S. Advanced Organic Chemistry, S. Chand, 2010
8. Kalsi, P.S., Stereochemistry Conformation and Mechanism, New Age International, 2005
9. Finar, I.L., Organic Chemistry (Volume I and II), E.L.B.S.
10. Morrison, R.T. and Boyd, R.N., Organic Chemistry, Pearson, 2010
11. Clayden, J., Greaves, N., Warren, S., Wothers, P., Organic Chemistry, Oxford University Press, 2nd edition, 2012
12. Atkins Physical Chemistry, 10th ed., Oxford University Press, 2014
13.

Reference Books:

1. Prakash, S., Founders of Sciences in Ancient India, published by The Research Institute of Ancient Scientific Studies, New Delhi. 1965 (OCoLC)594302452.
2. Acharya Prafulla Chandra Ray - A Collection of Writings, Volume IIIA : A History of Hindu Chemistry (Volume-I), Editor : Prof. Anil Bhattacharyya, Publisher : University of Calcutta. . Online information: https://www.caluniv.ac.in/news/APCR%20Publication/acharya-prafulla.html
3. Chemistry in India, in Traditions & Practices of India, Textbook for Class XI, Module 2, Central Board of Secondary Education.
4. Subbarayappa, B.V.,Chemistry and Chemical Techniques in India, Centre for Studies in Civilizations, 2004, ISBN 818758601X.
5. Huheey, J.E., Keiter, E.A., Keiter, R.L. &Medhi, O.K., Inorganic Chemistry:Principles of Structure and Reactivity, Pearson Education India, 2006.
6. Douglas, B.E., McDaniel, D.H. & Alexander, J.J., Concepts and Models in

InorganicChemistry, John Wiley & Sons, 1994.
7. Graham Solomon, T.W., Frail, C.B. and Dunidar, S.A. Organic Chemistry, John Wiley & Sons, 12th edition, 2016
8. McMurry, J.E. Fundamentals of Organic Chemistry, 7th ed. Cengage Learning India edition, 2013
9. Sykes, P., A Guidebook to Mechanisms in Organic Chemistry, Orient Longman, New Delhi (1988) 10. Barrow, G.M. Physical Chemistry, Tata McGraw-Hill (2007)

Suggested equivalent online courses:

- MOOC: https://alison.com/course/fundamentals-of-chemistry
- NPTEL: https://nptel.ac.in/courses/104/106/104106119/ ; https://nptel.ac.in/courses/104/101/104101121/

Web sources

https://www.sydney.edu.au/science/chemistry/~george/1108/ShapesOfMolecules.pdf

https://artsandculture.google.com/exhibit/rasashala-ancient-indian-alchemical-lab-national-council-of-science-museums/KwJCaP1RF0v-KQ?hl=en

http://sanskrit.uohyd.ac.in/events-new/Ancient-Indian-chemistry.pdf

https://insa.nic.in/writereaddata/UpLoadedFiles/IJHS/Vol01_1_1_PRav.pdf

https://asi.nic.in/Ancient_India/Ancient_India_Volume_9/article_8.pdf

https://vvm.org.in/study_material/ENG%20-%20Indian%20Contributions%20to%20Science.pdf

https://www.pgurus.com/chemistry-in-ancient-india/

https://en.wikipedia.org/wiki/History_of_chemistry

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 : University Exam Section: 70 Time :	**Section(A)** : Very Short Questions **Section (B)** : Short Questions **Section (C)** : Long Questions	70

Total Marks: 100

Any remarks/ suggestions:

CBCS Annual Pattern
B.Sc. Ist year
CHEMISTRY– Major-I
Syllabus of Practical Paper

Part A Introduction			
Program: Certificate	Class: B.Sc	Year: First	Session:2025-26
Subject: Chemistry			

1	Course Code	C1	
2	Course Title	Qualitative & Quantitative Chemical analysis	
3	Course Type (Core Course/Elective/Generic Elective/Vocational/.....)	Major-I	
4	Pre-requisite (if any)	To study this course the students must have the subject Chemistry in12th Course or equivalent.	
5	Course Learning outcomes (CLO)	By the end of this course students will be able to the following aspects of Laboratory in chemical analysis: • Identification of simple inorganic mixture • Determination of ionic product, common ion and solubility product • Detection of Extra Elements and functional groups in organic compounds • Measurement of pH of different solutions of acids and alkalies using pH-meter • Measurement of the pH of buffer solutions • Preparation of buffer solutions	
6	Credit Value	2 (Practical)	
7	Total Marks	Max. Marks: 30+70	Min. Passing Marks:35

Part B- Content of the Course
Total No. of Lectures-Tutorials-Practical (in hours per week): 4 L-T-P: 60-0-30

Unit	Topics	No. of Lectures
1	**Qualitative inorganic analysis** **20 Marks** Identification of simple inorganic mixture (5 radicals) with two/three acidic and two/three basic radicals (including typical combinations). Special emphasis on learning theoretical concepts of strong, moderate and weak electrolytes, ionic product, common ion effect. Solubility and solubility product.	12
2	**Qualitative organic analysis** **7+8 Marks** 1. Detection of hetero-elements (N, S, Cl, Br, I) in organic compounds by the Zinc Dust 2. Functional group tests for alcohol, aldehyde, carboxylic acid, carbohydrate, phenols, nitro, amine and amide.	9
3	**Quantitative analysis of acid, alkali and buffer solutions** **15 Marks** **Ionic Equilibria** 1. Measurement of pH of different solutions of acids and alkalies using pH-meter (may use aerated drinks, fruit juices, shampoos and soaps) Note-use dilute solutions of soaps and shampoos to prevent damage to the glass electrode. 2. Measurement of the pH of buffer solutions and comparison of the values with theoretical values. 3. Preparation of buffer solutions and determination of their pH and buffer capacity: (i) Sodium acetate-acetic acid (ii) Ammonium chloride-ammonium hydroxide	9
Note	**Students should visit any chemical industry or Research Institute to learn or observe the process and preparations practically and submit the report of that industrial visit also**	

Keywords/Tags: Inorganic Mixture Analysis, Ionic Product, Common ion, Solubility Product, Qualitative Organic Analysis, Ionic Equilibria, P^H, Buffer Solutions

Part C-Learning Resources

Text Books, Reference Books, Other resources

Text Books:

1. Goswami A.K., Mehta, A., Khanam Rehana, O.R.S., UGC Practical Chemistry VOL. I, Pragati Prakashan, 2015

2. Goyal, S., B.Sc. Chemistry Practical, Krishna Publication, 2017.
3. Vogel, A.I., A Textbook of Quantitative Inorganic Analysis, ELBS.
4. Svehla, G., Vogel's Qualitative Inorganic Analysis, Pearson Education, 2012.
5. Mendham, J., Vogel's Quantitative Chemical Analysis, Pearson, 2009.
6. Vogel, A.I., Tatchell, A.R., Furnis, B.S., Hannaford, A.J. & Smith, P.W.G., Textbook of Practical Organic Chemistry, Prentice-Hall, 5th edition, 1996.
7. Mann, F.G.,& Saunders, B.C., Practical Organic Chemistry, Pearson Education (2009).
8. Khosla, B. D., Garg, V. C.,& Gulati, A., Senior Practical Physical Chemistry, R.Chand & Co.: New Delhi (2011).
9. Mohd A A, Ramesh K P, Anuradha S, Bassa S, Advanced Laboratory Techniques in Chemistry, 2024, Scientific International Publishing house, Tamilnadu

References:

10. Mann, F.G. & Saunders, B.C., Practical Organic Chemistry Orient-Longman, 1960.
11. Furniss, B.S., Hannaford, A.J., Smith, P.W.G., Tatchell, A.R., Practical Organic Chemistry, 5th Ed., Pearson (2012)
12. Ahluwalia, V.K., &Aggarwal, R., Comprehensive Practical Organic Chemistry: Preparation and Quantitative Analysis, University Press (2000).
13. Prof. Robert H. Hill Jr., David C. Finster, Laboratory Safety for Chemistry Students, 2nd Edition Wiley ISBN: 978-1-119-02766-9 May 2016
14. Prudent Practices in the Laboratory: Handling and Management of Chemical Hazards, Updated Version, ISBN 978-0-309-13864-2 | DOI 10.17226/12654, The National Academies Press, Washington D.C.
15. Mohd A A, Ramesh K P, Anuradha S, Bassa S, Advanced Laboratory Techniques in Chemistry, 2024, Scientific International Publishing house, Tamilnadu

Suggestive digital platforms web links: https://nptel.ac.in/courses/104/105/104105102/

Suggested equivalent online courses:

1. https://www.youtube.com/watch?v=EhyemWlluXQ
2. http://amrita.olabs.edu.in/?sub=73&brch=7&sim=31&cnt=1
3. http://amrita.olabs.edu.in/?sub=73&brch=7&sim=180&cnt=1
4. http://www.rbmcollege.ac.in/sites/default/files/files/reading%20material/inorganic-qualitative-analysis.pdf
5. https://courses.lumenlearning.com/boundless-chemistry/chapter/qualitative-chemical-analysis/
6. https://chem.libretexts.org/Bookshelves/Analytical_Chemistry/Supplemental_Modules_(Analytical_Chemistry)/Qualitative_Analysis
7. https://courses.lumenlearning.com/boundless-chemistry/chapter/buffer-solutions/
8. https://bio.libretexts.org/Bookshelves/Biotechnology/Lab_Manual%3A_Introduction_to_Biotechnology/01%3A_Techniques/1.07%3A_pH_and_Buffers
9. https://chem.libretexts.org/Ancillary_Materials/Laboratory_Experiments/Wet_Lab_Experiments/General_Chemistry_Labs/Online_Chemistry_Lab_Manual/Chem_12_Experiments/05%3A_pH_Measurement_and_Its_Applications_(Experiment)
10. https://www.mt.com/mt_ext_files/Editorial/Generic/1/Guides_to_Electrochemical_Analysis_0x000248ff00025c9a00093c4a_files/guideph.pdf
11. https://web.cortland.edu/sternfeld/ph.pdf
12. http://webhost.bridgew.edu/e2king/CHEM142/Lab/7_Buffers%20and%20Properties.pdf

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

Any remarks/ suggestions:

Part A: Introduction				
Program: Certificate Course		**Class:** B.Sc./B.A.	**Year:** I	**Session:** 2025-2026
Subject: Mathematics				
1	**Course Code**			
2	**Course Title**	**Basic Calculus and Vector Calculus**		
3	**Course Type**	**Minor – 1**		
4	**Pre-requisite (if any)**	To study this course, a student must have had the subject Mathematics in class 12th.		
5	**Course Learning Outcomes (CLO)**	The course will enable the students to: 1. Understand the differentiation and integration by Vedic approach. 2. Sketch curves in a plane using its Mathematical properties in the different coordinate systems of reference. 3. Usingthe derivatives in Optimization, Social sciences, Physics and Life sciences etc. 4. Learn to differentiate vector-valued functions with respect to scalar variables. 5. Develop a strong understanding of the gradient, divergence, and curl as key operators in vector calculus. 6. Develop an intuitive understanding of how the concepts of vector calculus relate to real-world physical phenomena.		
6	**Credit Value**	Theory: 4		
7	**Total Marks**	Max. Marks: 30 + 70	Min. Passing Marks: 35	

Part B: Content of the Course		
Total No. of Lectures (in hours per week): 2 hours per week **Total Lectures:** 60 hours		
Module	Topics	No. of Lectures
I	**Indian Knowledge System:** 1.1 Contribution of Indian Mathematicians in Calculus 1.1.1 Aryabhata 1.1.2 Madhava 1.1.3 Jyeshthadeva 1.2 Vedic Calculus 1.2.1 Differentiation using DhvajaGhataSūtra 1.2.2 Successive Differentiation using Urdhva–TriyagbhyamSūtra 1.2.3 Derivative of the division of two polynomials using Urdhva–TriyagbhyamSūtra 1.2.4 Integration by using EkādhikenaPūrveṇaSūtra 1.2.5 Integration based on partial fraction using ParāvartyaYojayetSūtra 1.2.6 Integration of the product of two functions using Urdhva–TriyagbhyamSūtra 1.3 Vedic Approach to Areas under Curves	10

Name of BOS: Mathematics
Date: .....

Signature of the Chairman (BOS):
Name: Dr. Anil Rajput

II	**Differential Calculus:** 2.1 Successive differentiation 2.1.1 Leibnitz theorem 2.1.2 Maclaurin's series expansion 2.1.3 Taylor's series expansion 2.2Basic Concepts of Partial Derivative of two and three variables 2.3 Asymptotes 2.3.1 Asymptotes of algebraic curves 2.3.2 Condition for Existence of Asymptotes 2.3.3 Parallel Asymptotes 2.3.4 Asymptotes of polar curves 2.4 Curvature 2.4.1 Formula for radius of Curvature 2.4.2 Curvature at origin 2.4.3 Centre of Curvature	15
III	**Integral Calculus:** 3.1 Integration of transcendental functions 3.2 Reduction formulae 3.3 Definite Integral 3.4 Double and Triple Integral	15
IV	**Vector Calculus:** 4.1 Vector differentiation 4.1.1 Rules of differentiation 4.1.2 Derivatives of Triple Products 4.2 Gradient, Divergence and Curl 4.3 Directional derivatives 4.4 Vector Identities 4.5 Vector Integration	15
Case Study	**Industrial Applications:** 1. Applications of Calculus to solve the problems related to Industries, Business and Economics. 2. Applications of Vector Calculus to solve the problems related to Industries and real world.	05
Keywords/Tags: Vedic Calculus,Successive differentiation, Partial Differentiation, Asymptotes, Curvature, Definite Integral,Double and Triple Integral,Vector differentiation, Vector integration.		

Part C: Learning Resources

Text Books, Reference Books, Other Resources

Suggested Readings:

Text Books:

1. Gorakh Prasad: Differential Calculus, Pothishala Private Ltd., Allahabad, 2016.
2. Gorakh Prasad: Integral Calculus, Pothishala Private Ltd., Allahabad, 2015.
3. N. Saran and S. N. Nigam: Introduction to Vector Analysis, Pothishala Pvt. Ltd. Allahabad, 1990.

Name of BOS: Mathematics
Date: .....

Signature of the Chairman (BOS):
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4. Marvin L. Bittinger, David J. Ellenbogen, Scott J. Surgent: Calculus and its Applications, Pearson, 2011.
5. Absos Ali Shaikh and Sanjib Kumar Jana: Vector Analysis with Applications, Narosa Publishing House, 2009.
6. Gerard G. Emch, R. Sridharan and M. D. Srinivas: Contributions to the History of Indian Mathematics. Hindustan Book Agency, Vol. 3, 2005.
7. Bharati KrsnaTirthaji Maharaja, "Vedic Mathematics", Motilal Banarasidas Publisher, Delhi, 1994.
8. Sneha Amit Vaidya: The Contribution of Vedic Mathematics in Advance Calculus, https://shodhganga.inflibnet.ac.in/, 2019.
9. मध्य प्रदेश हिन्दी ग्रंथ अकादमी की पुस्तकें।

Reference Books:

1. N. Piskunov: Differential and Integral Calculus, CBS Publishers, 1996.
2. Murray R. Spiegel: Vector Analysis, Schaum Publishing Company, New York, 2017.
3. Bibhutibhusan Datta and Avadhesh Narayan Singh: History of Hindu Mathematics, Asia Publishing House, 1962.
4. Larry J Goldstein, David I Schneider, David C Lay, Nakhle H Asmar: Calculus and Its Applications, Pearson Education, 2012.

Suggested Digital Platforms Web links:

https://epgp.inflibnet.ac.in
https://freevideolectures.com/university/iit-roorkee
https://www.eshiksha.mp.gov.in/mpdhe

Suggested Equivalent online courses:

https://nptel.ac.in/courses/111106146/
https://nptel.ac.in/courses/122102004/L02
https://nptel.ac.in/courses/111/101/111101080/

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)		**Total Marks: 30**
External Assessment: University Exam Section Time: 03.00 Hours	**Section (A) :** Very Short Questions **Section (B) :** Short Questions **Section (C) :** Long Questions	**Total Marks: 70**

Name of BOS: Mathematics
Date: .....

Signature of the Chairman (BOS):
Name: Dr. Anil Rajput

Syllabus of Theory Paper

Part A Introduction			
Program: Certificate	**Class`:B.Sc.**	**Year: First**	**Session: 2025-26**
Subject: Botany			

1	**Course Code**	
2	**Course Title**	**Elementary Botany**
3	**Course Type**	**Minor paper I**
4	**Pre-requisite (if any)**	To Study this course, a student must have studied the subject Biology/Life Sciences/Agriculture in class 12th.
5	**Course Learning outcomes (CLO)**	On completion of this course students will be able to- • Explore Indian knowledge system about plants and contribution of Rishis • Gain the knowledge about external and internal structure of plant body • Understand various physiological processes of plants • Acquainted with Concept of gametophyte and Sporophyte
6	**Credit Value**	**3**
7	**Total Marks 100**	Max. Marks: 30+70 / Min. Passing Marks:35

Part B- Content of the Course

Total No. of Lectures- 45 hours Theory Tutorials-Practical- 15 hours (in hours per week): L-T-P:

Unit	Topics	No. of Lectures
I	**Plants in Bhartiya Gyan Parampara** 1.1 Botany definition, scope and importance 1.2 History and evolution of Botany in India 1.3 General Idea about Botanical concepts in Vedas 1.4 Contribution of Indian Rishis in Botany (Parashar, Charak,Shushrut) 1.5 Plants in Indian Traditional food and medicine **Activity-enlisting of plants in Charak and Shushrata*	9
II	**Plant Morphology-External Structure of Plants:** 1.1 Root: Structure, Types(tap root and adventitious root) and Modifications (For storage of food) 1.2 –**Stem:** Structure, Types(erect and weak) and Modifications (of Underground stem) 1.3 –**Leaf:** Structure, Types (Simple and compound) , venation and Modifications of leaf lamina 1.4 –**Flower:** Structure, types (hypogynous, perigynous, epigynous), placentation 1.5-**Fruits and seeds** **Activity- Field visit to study various types of flowers, fruits, seeds *etc,*	9
III	**Plant Anatomy – Internal Structure of Plants:** 1.1 Cell- structure and cell organelles 1.2 Tissues and types of tissues 1.3 General Anatomy of – 1.3.1-Roots 1.3.2 - Stem	9

	1.3.3 -Leaf * *Activity- Preparation of Charts and models*	
IV	**General idea of Plant Physiology**: 1.1 Plant water relations (Imbibition, Diffusion, Osmosis) 1.2 Absorption and transport of Water 1.3 Transport of Solutes 1.4Assimilation of Energy- Photosynthesis 1.5Release of Energy- Respiration **Activity – Quiz competition on Various Physiological aspects.*	**9**
V	**Plant reproduction, Growth and Propagation:** 1.1 Plant propagation and types of propagules 1.2 Plant reproduction (Sexual and Asexual) 1.3 Plant growth regulators 1.4 Concept of gametophyte and Sporophyte 1.5 Alternation of Generation **Field visit and trails of plant growth and propagation*	**9**

Keywords/Tags:*Morphology, Anatomy, Physiology, Propagation*

Part C-Learning Resources

Text Books, Reference Books, Other resources

Suggested Readin

- Bhojwani, S.S. and Bhatnagar, S.P. (2011). The Embryology of Angiosperms, Vikas Publishing House. Delhi. 5th edition.
- Dickison, W.C. (2000). Integrative Plant Anatomy. Harcourt Academic Press, USA.
- Evert, R.F. (2006) Esau's Plant Anatomy: Meristems, Cells, and Tissues of the Plant Body: Their Structure, Function and Development. John Wiley and Sons, Inc.
- Fahn, A. (1974). Plant Anatomy. Pergamon Press, USA.
- Hopkins, W.G. and Huner, A. (2008). Introduction to Plant Physiology. John Wiley and Sons. U.S.A. 4th edition.
- Mauseth, J.D. (1988). Plant Anatomy. The Benjammin/Cummings Publisher, USA.
- Sharma , P.V. (1981) **"CharakaSamhita"** (Translation) ChaukhambhaOrientalia, New Delhi.
- Sircar , N.N 1991Vraksayurveda of Parashra (A Treatise on plant science) Sri Satguru Publication
- Srikantha Murthy, K.R. (1991) **"Sushruta Samhita"** – Translated :ChaukhambhaOrientalia, New Delhi
- Taiz, L., Zeiger, E., MØller, I.M. and Murphy, A (2015). Plant Physiology and Development. Sinauer Associates Inc. USA. 6th edition.

"2. Suggestive digital platforms web links

1. https://archive.org/details/fundamentalsofbo0000unse_z7a4/page/58/mode/2up

Suggested equivalent online courses:

https://www.mooc.org , https://swayam.gov.in. , https://nptel.ac.in

Part D-Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks : 100

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

Internal Assessment : Continuous Comprehensive Evaluation (CCE):30	Class Test Assignment/Presentation	30 marks
External Assessment : University Exam Section: 70 Time : 03.00 Hours	**Section(A)** : Very Short Questions (50 Words Each) **Section (B) :**Short Questions (200 Words Each) **Section (C) :**Long Questions (500 Words Each)	70 marks

Any remarks/ suggestions:

सैद्धांतिक प्रश्न पत्र पाठ्यक्रम

भाग अ- परिचय			
कार्यक्रम: प्रमाणपत्र	कक्षा–बी.एससी.	वर्ष-प्रथम	सत्र: 2025-26
विषय:वनस्पति शास्त्र			
1	पाठ्य क्रम का कोड		
2	पाठ्यक्रम का शीर्षक	प्रारंभिक वनस्पति शास्त्र	
3	पाठ्यक्रम का प्रकार:(कोर)	विषय-प्रश्नपत्र I	
4	पूर्वापेक्षा(Prerequisite) (यदि कोई हो)	इस पाठ्य क्रम का अध्ययन करने के लिए विद्यार्थी को कक्षा 12वीं में जीव विज्ञान/ जीवन विज्ञान/ कृषि विषय का अध्ययन करना होगा।	
5	पाठ्यक्रम अध्ययन की परिलब्धियां (कोर्स लर्निंग आउटकम) (CLO)	इसकोर्सकोपूराकरनेपरविद्यार्थीसक्षमहोंगे- • पादप के बारे में भारतीय ज्ञान परंपरा और ऋषियों के योगदान की जानकारी प्राप्त करने में • पादप के शरीर की बाह्य और आंतरिक संरचना के बारे में ज्ञान प्राप्त करने में • पादप की विभिन्न शारीरिक प्रक्रियाओं को समझने में • गैमेटोफाइट और स्पोरोफाइट की अवधारणा से अवगत होंगे	
6	क्रेडिटमान	3	
7	कुलअंक 100	अधिकतमअंक: 100	न्यूनतमउत्तीर्णअंक: 35

भागब- पाठ्यक्रमकीविषयवस्तु

व्याख्यानकीकुलसंख्या 45 -ट्यूटोरियल- प्रायोगिक (प्रतिसप्ताहघंटेमें): L-T-P:

इकाई	विषय	व्याख्यान की संख्या
I	**भारतीय ज्ञान प्रणालियों में पौधे-** 1.1 वनस्पति शास्त्र की परिभाषा, क्षेत्र और महत्व 1.2 भारत में वनस्पति विज्ञान का इतिहास और विकास 1.3 वेदों में वनस्पति विज्ञान की अवधारणा से संबंधित सामान्य जानकारी 1.4 वनस्पति विज्ञान में भारतीय ऋषियों का योगदान (पराशर, चरक, सुश्रुत) 1.5 भारतीयपारंपरिकभोजनऔरचिकित्सामेंपौधे *गतिविधि- चरक और शुश्रुतसंहिता में वर्णित पौधों की सूची बनाना	9
II	**पौधों की आकारिकी-पौधों की बाह्य संरचना** 1.1 जड़: संरचना, प्रकार (मूसला जड़ और अपस्थानिक जड़) और	9

	रूपान्तरण (भोजन के भंडारण के लिए) 1.2 तना: संरचना, प्रकार (उर्ध्व और दुर्बल) और रूपान्तरण (भूमिगत तने के) 1.3 पत्ती: संरचना, प्रकार (सरल और संयुक्त), शिरा विन्यास और पत्र फलक के रूपान्तरण 1.4 फूल: संरचना, प्रकार (हाइपोगायनस, पेरिगायनस, एपिगायनस), प्लेसेंटेशन (बीजांडन्यास) 1 .5 फल और बीज *गतिविधि- विभिन्न प्रकार के फूलों, फलों, बीजों आदि का अध्ययन करने के लिए क्षेत्रीयभ्रमण	
	पौधों की आंतरिकी– पौधों की आंतरिक संरचना 1.1 कोशिका-संरचना और कोशिकांग 1.2 ऊतक और ऊतकों के प्रकार 1.3 सामान्य शारीरिक रचना – 1.3.1- जड़ 1.3.2 - तना 1.3.3 -पत्ती * ग़तिविधि- चार्ट और मॉडल निर्माण	9
IV	**पादप कार्यिकी का सामान्य परिचय :** 1.1 पौधों के जल संबंध (अंतःचूषण, विसरण, परासरण) 1.1 जल का अवशोषण और परिवहन 1.2 विलेय का परिवहन 1.3 ऊर्जा का स्वांगीकरण- प्रकाश संश्लेषण 1.4 ऊर्जा का विमोचन- श्वसन * ग़तिविधि - पादपकार्य की से सम्बंधित प्रश्न मंच	9
V	**पादप प्रजनन, वृद्धि और प्रसार** 1.1 पादप प्रसार और प्रसारकों के प्रकार 1.2 पादप प्रजनन (लैंगिक और अलैंगिक) 1.3 पादप वृद्धि नियामक 1.4 युग्मकोद्भिद और बीजाणुभिद की अवधारणा 1.5 पीढ़ी एकांतरण * गतिविधि -क्षेत्र भ्रमण/ पादप प्रसारण एवं पादप वृद्धि के प्रयोग	9
सार बिंदु (की वर्ड)/ टैग: *आकारिकी, आंतरिकी, पादपकार्यिकी, प्रसार*		

भाग स- अनुशंसित अध्ययन संसाधन

पाठ्य पुस्तकें, संदर्भ पुस्तकें, अन्य संसाधन

अनुशंसित सहायक पुस्तकें /ग्रन्थ/अन्य पाठ्य संसाधन/ पाठ्य सामग्री:

Suggested Readings:

- .Bhojwani, S.S. and Bhatnagar, S.P. (2011). The Embryology of Angiosperms, Vikas Publishing House. Delhi. 5th edition.
- Dickison, W.C. (2000). Integrative Plant Anatomy. Harcourt Academic Press, USA.
- Evert, R.F. (2006) Esau's Plant Anatomy: Meristems, Cells, and Tissues of the Plant Body: Their Structure, Function and Development. John Wiley and Sons, Inc.
- Fahn, A. (1974). Plant Anatomy. Pergamon Press, USA.
- Gangulee,H.C., Das, A.K., Dutta R.C.(1991) College Botany Vol -I New Central Book Agency, Kolkata
- Hopkins, W.G. and Huner, A. (2008). Introduction to Plant Physiology. John Wiley and Sons. U.S.A. 4th edition.
- Mauseth, J.D. (1988). Plant Anatomy. The Benjammin/Cummings Publisher, USA.
- .Mishra,P.K. (2016) Botany in Vedas , Write and print Publications,New Delhi
- Sharma , P.V. (1981) **"CharakaSamhita"** (Translation) ChaukhambhaOrientalia, New Delhi.
- Sircar, N. N. (1991) Vrakshayurveda of Parashar, (A Treatise on Plant Science) Sri Satgura Publication, New Delhi
- Srikantha Murthy, K.R. (1991) **"Sushruta Samhita"** – Translated .ChaukhambhaOrientalia, New Delhi
- Taiz, L., Zeiger, E., MØller, I.M. and Murphy, A (2015). Plant Physiology and Development. Sinauer Associates Inc. USA. 6th edition.
- चौधरी, रामदास**"विज्ञान का क्रमिक विकास"** *प्रकाशक:*राष्ट्रीय पुस्तक न्यास, दिल्लीISBN: 978-81-237-6138
- मित्तल, दीपाली. 2009 **"वनस्पति विज्ञान एवं भारतीय ज्योतिष शास्त्र"** –*प्रकाशक:*वेदऋषि
- मेवाड़ी, देवेन्द्र 2008- **"विज्ञान बेला में"** *प्रकाशक:*राष्ट्रीय पुस्तक न्यास, दिल्ली/*SBN:* 978-81-237-8164-8
- शर्मा, शशि 2001 **"विज्ञान और मनुष्य"** *प्रकाशक:*आधुनिक प्रकाशन/*SBN:* 81-902378-0-2

"2. Suggestive digital platforms web links

1. https://archive.org/details/fundamentalsofbo0000unse_z7a4/page/58/mode/2up

अनुशंसित समकक्ष ऑनलाइन पाठ्यक्रम: SWAYAM and MOOCS कोर्स

https://www.mooc.org
https://swayam.gov.in
https://nptel.ac.in

भाग द-अनुशंसित मूल्यांकन विधियां:

अनुशंसित सतत मूल्यांकन विधियां:

अधिकतम अंक: 100 सतत व्यापक मूल्यांकन (CCE) अंक : 30 विश्वविद्यालयीन परीक्षा (UE) अंक: 70

आंतरिक मूल्यांकन: **सततव्यापकमूल्यांकन(CCE):**	क्लासटेस्ट/ असाइनमेंट/ प्रस्तुतीकरण	**कुलअंक :30**
आकलन : **विश्वविद्यालयीन परीक्षा:** समय- 03.00 घंटे	**अनुभाग (अ): अति लघु उत्तरी प्रश्न (प्रत्येक 50 शब्द)** **अनुभाग (ब): लघु उत्तरी प्रश्न (प्रत्येक 200शब्द)** **अनुभाग (स): दीर्घ उत्तरी प्रश्न (प्रत्येक 500 शब्द)**	**कुलअंक :70**
कोईटिप्पणी/सुझाव:		

Syllabus of Practical Paper

Part A Introduction			
Program: Certificate	**Class`: B.Sc.**	**Year: I**	**Session: 2025-26**

Subject: Botany			
1	Course Code		
2	Course Title	**Elementary Botany**	
3	Course Type (Core Course/Elective/Generic Elective/Vocational/.....)	**Minor Paper-I**	
4	Pre-requisite (if any)	To Study this course, a student must have studied the subject Biology/Life Sciences/Agriculture in class 12th.	
5	Course Learning outcomes (CLO)	On completion of this course students will be able to- • Gain the knowledge about external and internal structure of plant body • Understand various physiological processes of plants • Apply the knowledge of propagation	
6	Credit Value	**01**	
7	Total Marks	Max. Marks: 100	Min. Passing Marks:35

Part B- Content of the Course

Total No. of Lectures-Tutorials-Practical (in hours per week):
L-T-P:

Unit	Topics	No. of Lectures
	1. To study important Indian plants mentioned in Vedas like Amla, Tulsi, Peepal, Bargad etc. 2. Modifications: Root (Fusiform, Napiform, Conical, Tuberous For storage of food), Stem(Rhizome, Corm, Tuber, Bulb of Underground stem) 3. Leaf: Types (Simple and compound) , venation and Modifications of leaf lamina 4. Study of different types of tissues (parenchyma, collenchyma, sclerenchyma, types of vascular bundles. 5. To study temporary and permanent slides of transverse section of monocot stem maize (*Zea maize*) 6. To study temporary and permanent slides of transverse section of dicot stem of sunflower (*Helianthus*) 7. Demonstration of potato Osmoscope 8. Demonstration of Wilmotts bubbler 9. Study of cutting, budding, air layering	
	Remark: • Above practicals could be designed according to locally available plant materials. • Online available resources, charts models, photographs of Indian Rishis can also be used. Field visits could be arranged based on the availability of the plant material.	

Keywords/Tags: Modifications, Tissues, Osmoscope, Propagation

Part C-Learning Resources

Text Books, Reference Books, Other resources

- बेंद्र .,अशोक एवं कुमार,अँशोक 1991 "**प्रयोगत्मक वनस्पतिविज्ञान 2-रस्तोगि प्रकाशन,** मेरठ
- पांडे,वी.पी.,1992 **वनस्पति विज्ञान** एस चांद प्रकाशन, दिल्ली
- प्रो .चौधरी,रामदास**"विज्ञानकाक्रमिकविकास"** *प्रकाशक:*राष्ट्रीयपुस्तकन्यास, दिल्ली *ISBN:* 978-81-237-6138-1
- मित्तल,दीपाली. 2009 **"वनस्पति विज्ञान एवं भारतीय ज्योतिष शास्त्र"** – *प्रकाशक* .वेदऋषि
- मेवाड़ी, देवेन्द्र 2008 - **"विज्ञानबेलामें"** *प्रकाशक:*राष्ट्रीय पुस्तक न्यास, दिल्ली*ISBN:* 978-81-237-8164-8
- शर्मा, शशि**"विज्ञानऔरमनुष्य"** *प्रकाशक:*आधुनिकप्रकाशन*ISBN:* 81-902378-0-2
- सिंह, वी. 2001 आवृत बीजी वनस्पति विज्ञान, रस्तोगी प्रकाशन , मेरठ

Suggestive digital platforms web links:

https://www.mooc.org
https://swayam.gov.in
https://nptel.ac.in

Suggested equivalent online courses:

https://www.mooc.org
https://swayam.gov.in
https://nptel.ac.in

Part D- Scheme of the practical exam (External assessment)

Suggested Exercise:

1. Lab exercise onexternal morphology	15
2. Lab exercise onanatomy	15
3.Lab exercise on physiology	10
4.Lab exercise on plant propagation/ Indian plants in Vedas	10
5.. Spotting (Spots 1 to 5)	20
6. Viva voce	10
7. Record and Sessional	10
8. Attendance	10
TOTAL=	100

Any remarks/ suggestions: Nil

प्रायोगिक प्रश्न पत्र पाठ्यक्रम

भागअ- परिचय			
कार्यक्रम: प्रमाणपत्र	कक्षा–बी एस सी	वर्ष:	सत्र: 2025-26
विषय:वनस्पति शास्त्र			

1	पाठ्यक्रम का कोड	
2	पाठ्यक्रम का शीर्षक	**प्रारंभिक वनस्पति शास्त्र**
3	पाठ्यक्रम का प्रकार:(कोर)	**गौण विषय-प्रश्नपत्र I**
4	पूर्वापेक्षा(Prerequisite) (यदि कोई हो)	इस पाठ्यक्रम का अध्ययन करने के लिए छात्र को कक्षा 12वीं में जीव विज्ञान/ जीवन विज्ञान/कृषि विषय का अध्ययन करना होगा।
5	पाठ्य क्रम अध्ययन की परिलब्धियां (कोर्स लर्निंग आउटकम) (CLO)	**इस कोर्स को पूरा करने पर छात्र सक्षम होंगे-** • **पौधे के शरीर की बाहरी और आंतरिक संरचना को समझना** • **पौधों की शारीरिक प्रक्रियाओं का विश्लेषण करना** • **प्रवर्धन के ज्ञान को लागू करना**
6	क्रेडिटमान	**01**
7	कुल अंक 100	अधिकतम अंक: 100 / न्यूनतम उत्तीर्ण अंक: 35

भाग ब- पाठ्यक्रम की विषय वस्तु

व्याख्यान की कुल संख्या-ट्यूटोरियल- प्रायोगिक– 15 घंटे (प्रति सप्ताह घंटे में): L-T-P:

इकाई	विषय	व्याख्यान की संख्या
	1. वेदों में वर्णित महत्वपूर्ण भारतीय पौधों जैसे आंवला, तुलसी, पीपल, बरगद आदि का अध्ययन करना 2. रूपान्तरण : जड़ (फ्यूसीफॉर्म, नेपीफॉर्म, शंक्वाकार, कंदीय, भोजन के भंडारण के लिए), तना (प्रकंद, कॉर्म, कंद, भूमिगत तने का) 3. पत्ती: प्रकार (सरल और मिश्रित), शिरा विन्यास और **पत्रफलक के रूपान्तरण** 4. विभिन्न प्रकार के ऊतकों का अध्ययन (पैरेनकाइमा, कोलेनकाइमा, स्क्लेरेनकाइमा, संवहनी बंडलों के प्रकार) 5. एक बीजपत्री तने मक्का (ज़ीयामैज़) के अनुप्रस्थ काट की अस्थायी और स्थायी स्लाइड का अध्ययन करना 6. सूरजमुखी (हेलिएंथस) के द्विबीजपत्री तने के अनुप्रस्थ काट की अस्थायी और स्थायी स्लाइड का अध्ययन करना 7. आलू ऑस्मोस्कोप का प्रदर्शन 8. विल्मोट्स बबलर का प्रदर्शन	

	9. कलम लगाना, कलिका लगाना , गूटी लगाना काअध्ययन	

टीप :

- उपर्युक्त प्रयोग स्थानीय रूप से उपलब्ध पादप सामग्री के अनुसार डिज़ाइन किए जा सकते हैं।
- ऑनलाइन उपलब्ध संसाधन, चार्ट मॉडल का भी उपयोग किया जा सकता है।
- पादप सामग्री की उपलब्धता के आधार पर क्षेत्र भ्रमण की व्यवस्था की जा सकती है।

सार बिंदु (की वर्ड)/टैग: आकारिकी, ऊतक,ऑस्मोस्कोप,**प्रसार**

भाग स- अनुशंसित अध्ययन संसाधन

पाठ्य पुस्तकें, संदर्भ पुस्तकें, अन्य संसाधन

अनुशंसित सहायक पुस्तकें /ग्रन्थ/अन्य पाठ्य संसाधन/ पाठ्य सामग्री:

- बेंद्र,अशोक एवं कुमार,अँशोक 1991 **"प्रयोगत्मक वनस्पति विज्ञान 2-रस्तोगि प्रकाशन,** मेरठ
- पांडे,बी.पी.,1992 **वनस्पति विज्ञान** एस चांद प्रकाशन, दिल्ली
- प्रो .चौधरी,रामदास**"विज्ञान का क्रमिक विकास"** *प्रकाशक:*राष्ट्रीय पुस्तक न्यास, दिल्ली */SBN:* 978-81-237-6138-1
- मित्तल,दीपाली. 2009 **"वनस्पति विज्ञान एवं भारतीय ज्योतिष शास्त्र"** – *प्रकाशक* .वेदऋषि
- मेवाड़ी, देवेन्द्र 2008 - **"विज्ञान बेला में"** *प्रकाशक:* राष्ट्रीय पुस्तक न्यास, दिल्ली*/SBN:* 978-81-237-8164-8
- शर्मा, शशि**"विज्ञान और मनुष्य"** *प्रकाशक* .आधुनिक प्रकाशन*/SBN:* 81-902378-0-2
- सिंह, वी. 2001 आवृत बीजी वनस्पति विज्ञान, रस्तोगी प्रकाशन , मेरठ

अनुशंसित डिजिटल प्लेटफॉर्म वेब लिंक

https://www.mooc.org
https://swayam.gov.in
https://nptel.ac.in

अनुशंसित समकक्ष ऑनलाइन पाठ्यक्रम: SWAYAM AND NPTEL

https://www.mooc.org
https://swayam.gov.in
https://nptel.ac.in

भाग द -अनुशंसित प्रायोगिक परीक्षा योजना (बाह्य मूल्यांकन)

अनुशंसित प्रयोग सूची :

1. **पौधों की बाह्य संरचना** पर आधारित प्रयोगशाला कार्य	15
2. पौधों की आंतरिक संरचना पर आधारित प्रयोगशाला कार्य (मुख्य प्रश्न एवं लघु प्रश्न)	15
3.पादप कार्यिकी पर आधारित प्रयोगशाला कार्य	10
4.पादप प्रसार पर आधारित प्रयोगशाला कार्य/ वेदों में भारतीय पौधे	10

5.. स्पॉटिंग (स्पॉट 1 - 5)	20
6. मौखिक प्रश्नोत्तर	10
7. रिकॉर्ड एवं सत्रीय कार्य	10
8. उपस्थिति	10
कुल अंक =	100
टीप :	

Part A Introduction

Program: Certificate	Class: Bachelor of Tourism Management	Year: I	Session: 2025-26

Subject: Tourism Management

1	**Course Code**		
2	**Course Title**	**Basics of Tourism Management**	
3	**Course Type (Core Course/ Elective/Generic Elective / Vocational/.....)**	**Vocational**	
4	**Pre-requisite (if any)**	Open for All	
5	**Course Learning Outcome (CLO)**	Students will be able to ➢ Understand tourism as a social, cultural, and economic phenomenon. ➢ Identify how traditional Indian practices shaped early forms of tourism. ➢ Evaluate India's cultural assets and their significance in tourism. ➢ Develop marketing strategies that incorporate cultural and spiritual value propositions. ➢ Understand how Indian philosophical ideas shape consumer experience and destination identity. ➢ Analyze policy frameworks through the lens of Indian traditional governance. ➢ Apply practical knowledge in itinerary planning and service coordination. ➢ Recognize the importance of customer service and professionalism in tourism operations.	
6	**Credit Value**	3	
7	**Total Marks**	**Max Marks:** 100	**Min Passing Marks:**

Part B – Content of the Course

Total No. of Lectures – 45 (in 03 hours per week):

L-T-P:

Unit	Topics	No. of Lectures
I	**Unit Name: Introduction to Tourism** • Concept and scope of tourism: Definitions, types, and classifications. • Historical evolution of tourism in India and globally Overview and relevance in modern disciplines • Traditional Indian concepts of travel (e.g., *Tirtha Yatra*, *Desh Darshan*). • Role of ancient texts (like *Ramayana*, *Mahabharata*, *Jataka Tales*) in promoting pilgrimage and cultural travel	09
II	**Unit Name: Heritage and Culture in Indian Tourism** • Types of heritage: Tangible and intangible. • UNESCO World Heritage Sites in India • Indian art forms, architecture (e.g.,Vastu Shastra), performing arts, and crafts. • Festivals, rituals, and spiritual tourism. • Role of traditional knowledge in destination branding.	09
III	**Unit Name: Tourism Marketing** • Principles of tourism marketing and destination promotion. • Storytelling and branding using mythology and folk narratives. • Role of dharmic values (Satya, Ahimsa, Seva) in ethical tourism practices. • Spiritual branding and market positioning of Indian destinations	09
IV	**Unit Name: Tourism Operation** • Components of the tourism industry: Transport, accommodation, attractions, intermediaries • Travel Agency and Tour Operations o Functions of a travel agency. o Tour operator functions and types of tours (inbound, outbound, domestic) • Guiding and Escorting Services o Roles and responsibilities of tour guides and escorts. o Pre-tour and post-tour duties. o Tourist safety, code of conduct, and soft skills	09
V	**Unit Name: Future growth and development of Indian tourism** • National and state tourism policies • Entrepreneurship in tourism: Start-ups, digital platforms, local ventures. • Indigenous models of self-reliance (*Swadeshi*, *Gram Swaraj*, *Atmanirbhar Bharat*)	09

Part C- Learning Resources

	MANAGEMENT TOURISM AND TRAVEL MANAGEMENT - Course (swayam2.ac.in) Course Name: **TS-1: Foundation Course in Tourism** TS-1: Foundation Course In Tourism - Course (swayam2.ac.in)

Suggested Reading

Reference Books

- The Business of Tourism, Holloway, J. C., Pitman Publishing, London, 1994
- Tourism Principles and Practices, Kumar S., Mishra S. & Mohan J., Oxford Higher Education, 2012.
- Understanding Tourism, Medlik S., Butterworth Hinemann, Oxford, 1997
- Tourism and Development, Sharpley R, The Sage Course Companion, 2015.
- Successful Tourism Management, Seth P.N. Sterling Publication Pvt Ltd., Delhi, 1997.
- Tourism Development – Principles and Practices, Bhatia A.K., Sterling Publishers Pvt Ltd, New Delhi, 2003.
- Tourism Development & Management, D.Souza M. , Mangal deep Publication, Jaipur, 2003.
- Cultural heritage of India, Bhattacharyya, H., Ramakrishna Mission Inst of Culture, 2002.
- Tour Operation and Management, Biwal, A. & Roday, S., Oxford University press, 2009.

Online resources

- http://Tourism.gov.in
- Unit-1,INTRODUCTION TO TOURISM.pdf (ihmnotes.in)
- egvankosh.ac.in/bitstream/123456789/79883/1/Unit-6.pdf

Part D-Assessment and Evaluation		
Suggested Continuous Evaluation Methods: Maximum Marks: 100 Continuous Comprehensive Evaluation (CCE): marks University Exam (UE) marks		
Internal Assessment: Continuous Comprehensive Evaluation (CCE)	Class Test Assignment/Presentation	
External Assessment: University Exam Section: 70 Time: 02.00 Hours	**Section(A)**: Three Very Short Questions (50 Words Each) **Section (B):** Four Short Questions (200 Words Each) **Section (C):** Two Long Questions (500 Words Each)	Total

आधार पाठ्यक्रम – प्रथम प्रश्न पत्र – हिन्दी भाषा और संस्कृति

(भाग – अ) परिचय

	कार्यक्रम : यूजी लेवल प्रमाण पत्र	कक्षा : बी.ए./बी.कॉम /बी.एस.सी./बी.एच.एससी./बी.सी.ए/बी.बी.ए. (प्रथम वर्ष)	वर्ष 2025–26
	विषय :–	आधार पाठ्यक्रम	
	पाठ्यक्रम कोड	XI-FCEAIT	
	पाठ्यक्रम का शीर्षक : पाठ्यकम का प्रकार	हिन्दी भाषा और संस्कृति/ आधार पाठ्यक्रम/	
	पाठ्यक्रम अपेक्षित	कक्षा 12 वी उत्तीर्ण किसी भी विषय समूह से प्रमाण पत्र किया हो पात्र है ।	
	पाठ्यक्रम अध्ययन की उपलब्धि (लर्निंग आउटकम) CLO	1 – भारतीय ज्ञान परम्परा से विद्यार्थियों को अवगत एवं लाभान्वित करवाना । 2 – इस पाठ्यक्रम के अध्ययन से विद्यार्थी हिन्दी के प्रसिद्ध रचनाकारों एवं उनकी रचनाओं से परिचित हो सकेंगे। 3 – पठित रचनाओं के माध्यम से विद्यार्थी देश की संस्कृति चेतना,संस्कार एवं राष्ट्रीय भावना से परिचित हो सकेंगें 4 – व्याकरण एवं भाषा ज्ञान का बोध । 5 – सामान्य शब्दावली और विशेष शब्दावली के अध्ययन द्वारा भाषा एवं संस्कृति बोध का विकास करना । 6 – विशेष शब्दावली (बीज शब्द / की वर्ड) से परिचित करवाते हुए बोध के स्तर को विकसित करना । 7 – प्रतियोगी परीक्षाओं हेतु तैयार करना ।	
	क्रेडिट	02 क्रेडिट	
	कुल अंक	50 अंक	
	उत्तीर्ण अंक	17 अंक	

Asharya
01/04/25
Sl. [illegible]

अध्यक्ष
केन्द्रीय अध्ययन मण्डल
(हिन्दी भाषा)
उच्च शिक्षा विभाग म.प्र. शासन

(भाग–ब) कोर्स सामग्री

व्याख्यान की कुल संख्या : वर्ष में अधिकतम 30 घंटे

	इकाई	विषय	व्याख्यान की संख्या
	इकाई –1	1. भारतीय ज्ञान परम्परा : एक परिचय 2. भारतीय ज्ञान परम्परा और हिन्दी भाषा 3. आदि शंकराचार्य : जीवन व दर्शन	6 घंटे
	इकाई –2	1. मैथिलीशरण गुप्त : परिचय पाठ : मातृभूमि (कविता) 2. सूर्यकांत त्रिपाठी 'निराला' : परिचय पाठ : भारत वंदना (कविता) 3. प्रेमचन्द : परिचय पाठ : शतरंज के खिलाड़ी (कहानी)	6 घंटे
	इकाई –03	1. वैचारिक – भारतीय भाषाओं में राम 2. आचार्य रामचन्द्र शुक्ल : परिचय पाठ : उत्साह (भावमूलक निबन्ध) 3. रामधारी सिंह दिनकर : परिचय पाठ : भारत एक है (संस्कृति) लेख 4. शरद जोशी : परिचय पाठ :– अफसर (व्यंग्य)	6 घंटे
	इकाई –04	हिन्दी व्याकरण 1. शब्द रचना : उपसर्ग एवं प्रत्यय 2. शब्द प्रकार : तत्सम, तद्भव, देशज , विदेशी , संकर , नव निर्मित शब्द 3. पर्यायवाची , विलोमार्थी , अनेक शब्द के लिए एक शब्द	6 घंटे
	इकाई –05	हिन्दी व्याकरण 1. हिन्दी के प्रमुख विराम चिह्न 2. संक्षेपण 3. बीज शब्द – धर्म , अद्वैत, भाषा, अवधारणा	6 घंटे

01/04/25

अध्यक्ष
केन्द्रीय अध्ययन मण्डल
(हिन्दी भाषा)
उच्च शिक्षा विभाग म.प्र. शासन

	सार बिन्दु (की वर्ड) / टैग		
	सर्च करे :		
	मैथिलीशरण गुप्त :	मैथिलीशरण गुप्त की कविता– मातृभूमि	
	सूर्यकान्त त्रिपाठी निराला: भारत वंदना	सूर्यकान्त त्रिपाठी निराला: भारत वंदना	
	प्रेमचन्द	प्रेमचन्द – शतरंज के खिलाडी	
	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		

Asheeta
01/04/25
डॉ. पुष्पा 2115

अध्यक्ष
केन्द्रीय अध्ययन मण्डल
(हिन्दी भाषा)
उच्च शिक्षा विभाग म.प्र. शासन

(भाग – स)		
अनुशंसित अध्ययन संसाधन		
पाठ्य पुस्तकें , सन्दर्भ पुस्तकें , अन्य संसाधन		
1.	प्रेमचन्द – 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 बाडी रोड़, 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.	शुक्ल डॉ. स्मृति " भारतीय ज्ञान परम्परा के विविध संदर्भ " (प्रोसिडिंग) उच्च शिक्षा विभाग म.प्र. शासन भोपाल	
8.	प्राचीन भारतीय ज्ञान परम्परा लेखक – डॉ. अश्विन कुमार राठौर , प्रकाशक – श्री सॉईनाथ, प्रकाशन– नागपुर	
9.	हिन्दी ज्ञान कोश	
10.	इन्टरनेट सामग्री – टैग में उल्लेखित	

Ashutosh
01/04/25
अध्यक्ष
केन्द्रीय अध्ययन मण्डल
(हिन्दी भाषा)
उच्च शिक्षा विभाग म.प्र. शासन

Part – A Introduction			
Program – Certificate	Class- B.Sc./B.A./B.Com.	Year – I[st] year	Session 2025-26
Subject- Vermicomposting			

1.	Course Code	
2.	Course Title	Basics of Vermicomposting
3.	Course Type	Skill Enhancement Course (S.E.C.)
4.	Pre-requisite (if any)	Open for students of all streams.
5.	Course Learning outcomes (CLO)	After completion of course student will learn. 1. Understand technique of vermicomposting. 2. To get opportunities of employment. 3. Improve soil health. 4. Work on green waste management.
6.	Credit Value	**02**

Total Marks	**Minimum Passing Marks**
100	**35**

Part B – Content of the Course

Total numbers of Lectures = 30

Module	Topics	No. of Lectures
Unit I	Concept of Vermicomposting.	**10**
1.1	Introduction, Scope and significance of vermicomposting.	
1.2	History of vermicomposting ancient roots and modern methods.	
1.3	Identification and biology of common earthworm species responsible for fast composting.	
	Activities : 1) Survey of locally available species of earthworm during rainy season. 2) Local visit to study various types of vermicomposting units.	

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(Dr. Alka Bajpai

Unit II	Technique of Vermicomposting.	**10**
2.1	Preparation of composting pit/ bed.	
2.2	Inoculation of earth worm.	
2.3	Maintenance of composting unit.	
	Activities :	
	1) Set up a small or large vermicomposting unit at you residence or at institute.	
	2)Maintenance of vermicomposting unit.	
Unit III	Collection Methods	**10**
3.1	Collection packaging, storage and marketing of vermicompost.	
3.2	Collection of Vermiwash and its uses.	
3.3	Separation and conservation of earth worms. Further utilization and sale.	
	Activities :	
	1. Apply vermiwash on some plant species and observe its effect.	
	2. Prepare a business plan for vermicompost.	

Part – C

Suggested Readings

1. डिके, अरूण 2007 वर्मीकल्चर बायोटेक्नोलॉजी. एज्युकेशनल एण्ड क्राफ्ट, इन्दौर
2. Singh, Keshav 2014. A textbook of Vermicompost, Vermiwash and Biopesticide, Biotech Books.
3. तबस्सुम, शाहीन एवं कृष्णचंद्र (Eds.) 2014 केंचुआ खाद, श्री हरिभजन प्रकाशन
4. EIRI Board, 2008. The Handbook of organic farming and organic foods with vermicomposting. Neem Publishers, Engineers India Research Institute (EIRI)
5. Seethalekshamy, M. and Santhi, R. 2024. Vermitechnology. Saras Publication.
6. Peterm Devies 2014. Vermiculture and Vermicomposting. Peter Davies (Kindle Edition)
7. Badwork, V. 2025. Text book on Vermiculture and Vermicomposting . Bhumi Publication.

E-learning resources :

1) https://www.onlinebiologynotes.com/ vermicomposting

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2) https://www. nios.ac.in PDF
3) https://agri.horti.assam.gov.in. PDF
4) https://www.researchgate.net
5) https://pausabour.ac.in PDF
7) https://www.course.org/lecture/solid waste management PDF

Part –D

Maximum Marks	100
Annual Exam.	100
Minimum Passing Marks	35

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Part – A Introduction

Program – Certificate	Class- B.Sc./B.A./B.Com.	Year – I[st] year	Session 2025-26

Subject- Vermicomposting

1.	Course Code	
2.	Course Title	Basics of Vermicomposting
3.	Course Type	Skill Enhancement Course (S.E.C.)
4.	Pre-requisite (if any)	Open for students of all streams.
5.	Course Learning outcomes (CLO)	After completion of course student will able to set a vermicomposting unit and prepare small business plan.
6.	Credit Value	**01**
Total Marks		**Minimum Passing Marks**
100		**35**

Part B – Content of the Course

Total numbers of Lectures = 15

S.No.	Experiments	No. of Lectures
1.	Survey, identification and classification of various species of earth worms.	15
2.	Physicochemical analysis of vermicompost.	
3.	Analysis of vermiwash to get its nutritional value.	
4.	Study of pests and diseases of earthworm.	
5.	Methods of disease and pestcontrol in earthworms.	
6.	Study of effect of vermicompost and vermiwash on various plants.	
7.	Establishment of vermicomposting unit at your institute.	
8.	Establishment of small portable vermicompost unit at your home or agricultural land.	
9.	Field visit to any vermicomposting unit and prepare a report on it.	
10.	Prepare a small and large business plan on vermicomposting.	

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