



Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

Shri Vaishnav Institute of Science

Choice Based Credit System (CBCS) in the light of NEP-2020

B.Sc. Chemistry

SEMESTER- (2026-2029)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME					L	T	P	CREDITS
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BSCHC101	MAJOR	Fundamentals of Inorganic Chemistry	60	20	20	30	20	4	0	2	6

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P - Practical; C - Credit;

*Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

COURSE OBJECTIVES:

The subject aims to provide the student with:

1. To understand the periodic law and significance of atomic no and electronic configuration as the basis for periodic classification and to include the importance of different types and theories of chemical bonding.
2. To understand different properties and reactions of the compounds of s- and p- block elements and to acquire required knowledge about coordination compounds and different theories of complexes.
3. To understand and analyze traditional Indian chemical knowledge systems and relate them to modern chemical principles and sustainable practices.
4. To acquaint the students with practical knowledge of the concepts of inorganic chemistry.

Course Alignment with UNSDG:

The Course aims to fulfill the United Nations Sustainable Development Goals, **SDG 4 (Quality Education)**.


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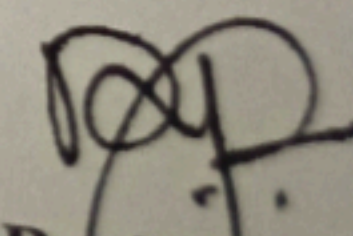
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Course outcomes: After completion of the course:

CO-1	Students will understand traditional Indian chemical knowledge systems and relate them to modern chemical principles and sustainable practices.
CO-2	Students will gain the basic knowledge of periodic law and significance of atomic no and electronic configuration as the basis for periodic classification and able to classify elements into s, p, d and f blocks.
CO-3	They learn the importance of different types of chemical bonding in terms of the attainment of a stable electronic structure.
CO-4	They will be able to understand the properties of s- and p- block elements and their compounds and the fundamental concepts in coordination chemistry.
CO-5	They can predict potential applications of inorganic chemistry and practical utility to become good chemists.

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Teaching Pedagogy:

T1	Classroom teaching (white board), Power Point Presentations, Interactive lectures, Inquiry-based teaching
T2	ABL activities, Assignments, Flip Class/ Seminars, Quizzes, Oral Viva-voce examination

Experiential Learning: Project Based Learning(PBL) and Case Studies

Modules	Name	Experiment/ABL/PBL	Bloom Taxonomy
Module 1	Preparation of Natural Dyes and Pigments using Traditional Indian Methods	PBL	Apply, Create
Module 1	Case Study on Ancient Indian Rasashala and Alchemical Practices	Case study	All Levels
Module 2	Visualization of Atomic Orbitals using Models/Software	PBL	Understand, Apply
Module 2	Assignment on Quantum Numbers	PBL	Apply, Analysis

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	and Electronic Configuration of Elements		
Module 3	Preparation and Interpretation of Molecular Orbital Diagrams of Diatomic Molecules	PBL	Appky, Analysis
Module 4	Case Study on Industrial Applications of Interhalogen Compounds	Case Study	All Levels
Module 4	Project on Extraction and Uses of Ancient Metals (Gold, Silver, Copper, Iron)	PBL	Apply, Evaluate
Module 5	Project on Industrial and Biological Applications of Coordination Complexes	PBL	Apply, Create, Evaluate

Assessment Tools

AT1-1	Quiz
AT1-2	Activity Based Learning
AT1-3	Midterm Exams
AT1-4	Flip Class

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AT1-5	Seminar Presentation
AT1-6	Assignments
AT1-7	Poster
AT1-8	Oral Viva-voce examination

Prerequisites: Solid foundation in basic inorganic chemistry (periodic table, chemical bonding, hybridization, etc.)

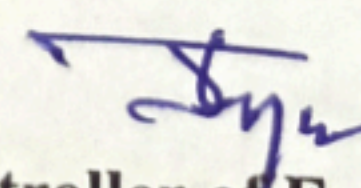
Module	Descriptors/Topics	Hours	Assessment tools
I	Introduction of Bhartiya Knowledge System: Chemistry in Ancient Indian - History and Development. Ancient Indian Alchemical Lab 'Rasashala' and its instruments- Dola Yantra, Swedani Yantra, Patana Yantra, Adhaspatan Yantra, Kosthi Yantra, Tiryak Patan Yantra, Dhup Yantra, Damru Yantra- their working and uses. Ancient Indian Chemist- their contribution and books- Rishi Kanad, Aacharya Nagarjuna, Vagbhatta, Govindacharya, Yashodhar, Ramchandra, Somadeva, Gopalbhatta, etc. Indian Chemist of 19th century- Aacharya Prafulla Chandra Ray- His	12	Quiz Mid-term Exam Assignment Presentation


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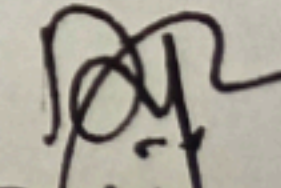
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	Contribution and work for Indian Chemistry. General Introduction of Ancient Indian Chemical Techniques- Metallurgy, Dyes, Pigments, Cosmetics-their production and uses. Chemistry of Ancient Metals- Gold, Silver, Copper, Iron, Tin, Lead and Mercury- their extraction and uses.		
II	Atomic structure and Periodic properties of elements: Kanada's concept of atom and molecule formation, Bohr's theory, its limitations and atomic spectrum of hydrogen atom. Wave mechanics: de Broglie equation, Heisenberg's uncertainty principle, and its significance. Schrödinger's wave equation, significance of ψ and ψ^2 . Quantum numbers and their significance. Normalized and orthogonal wave functions. Radial and angular distribution curves. Shapes of s, p, and d orbitals. Pauli's Exclusion Principle, Hund's rule of maximum spin multiplicity, Aufbau principle and its limitations. Brief discussion of the following properties of the elements and the	12	Mid-Term Quiz Assignment


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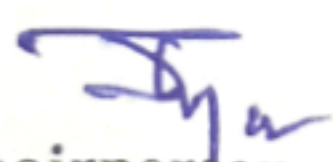
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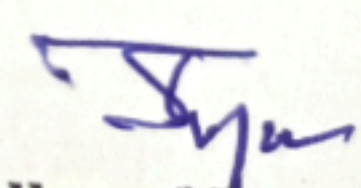
	trends shown: (a) Effective nuclear charge, shielding or screening effect, Slater rules, variation of effective nuclear charge in periodic table. (b) Atomic and ionic radii, Ionization enthalpy, Electron gain enthalpy, and Electronegativity.		
III	Chemical bonding: Ionic bond: General characteristics, radius ratio rule and its limitations. Born-Landé equation for calculation of lattice energy. Covalent character in ionic compounds, polarizing power and polarizability. Fajan's rules and consequences of polarization. Covalent bond: Valence Bond theory and its limitations. Types of hybridization with examples. Valence shell electron pair repulsion (VSEPR) theory, shapes of some inorganic molecules based on VSEPR (H ₂ O, NH ₃ , PCl ₅ , SF ₄ , SF ₆ , ClF ₃ , ICl ₄ ⁻). Molecular orbital theory. Linear Combination of Atomic Orbitals (LCAO), Molecular orbital diagrams of diatomic and simple polyatomic molecules H ₂ , Li ₂ , Be ₂ , B ₂ , C ₂ , N ₂ , O ₂ , F ₂ , CO, NO, HF, CN.	12	Mid-Term Quiz Assignment Oral Viva-voce examination


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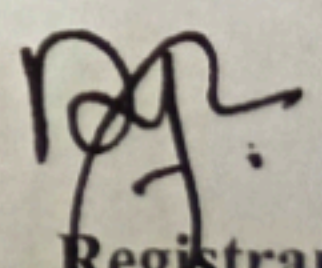
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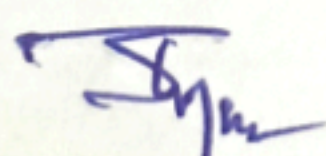
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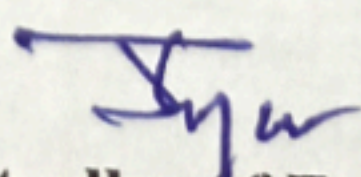
IV	Chemistry of s and p block elements: General properties of s-block and p-block elements, physical and chemical properties of s- and p-block elements, diagonal relationships, solvation and hydration tendency of s-block elements, Comparative properties of s and p block elements. Catenation. Hydrides and their classification ionic, covalent, and interstitial. Study of the following compounds with emphasis on structure, bonding, preparation, properties and uses: Borohydrides (diborane), carboranes, silanes, oxides and oxoacids of nitrogen, phosphorus, and chlorine. Interhalogen compounds. Pseudohalogens.	12	Quiz Assignment Mid-Term Presentations
V	Coordination compounds Werner's coordination theory and its experimental verification, IUPAC nomenclature of coordination compounds, isomerism in coordination compounds. A brief idea about chelate effect and labile and inert complexes. Valence bond theory and its application to complexes of coordination numbers 4 and 6, Examples of inner and	12	Quiz Assignment Mid-Term


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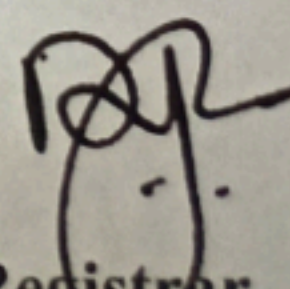
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	outer orbital complexes. AI Applications in inorganic chemistry		
	Total Hours	60	

Additional Resources

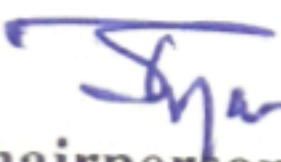
A. Value addition to course content/ Skill enhancement content:

Preview: Industrial Inorganic Chemistry | SWAYAM

B. Remedial classes for slow learners: As per the AUMP SOP for slow and fast learners.

Suggested Readings:

Reference Books	1. Huheey, J.E.; Keiter, E.A.; Keiter; R. L.; Medhi, O.K., Inorganic Chemistry- Principles of Structure and Reactivity, Pearson Education. 2. Lee, J.D. Concise Inorganic Chemistry, ELBS. 3. Atkins, P.W.; Overton, T.L.; Rourke, J.P.; Weller, M.T.; Armstrong, F.A., Shriver and Atkins Inorganic Chemistry, 5th Edition, Oxford University Press. 4. Cotton, F.A.; Wilkinson, G., Advanced Inorganic Chemistry Wiley-VCH. 5. Sodhi, G.S., Principles of Inorganic Chemistry, Viva books.
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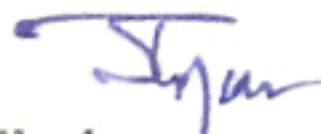
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	6. Garg, R., Singh, R., Inorganic Chemistry, McGraw Hill Education.
Suggested e- resources (Websites/e-books)	<u>Preview: Chemistry Of Main Group Elements SWAYAM</u> <u>Preview: Basics in Inorganic Chemistry SWAYAM</u>

List of Experiments:

1. Preparation of Standard solutions.
2. Standardization of solutions.
3. Calibration of Pipette.
4. An analysis of a mixture of Na_2CO_3 and NaOH using two indicators and a standard HCl solution.
5. To estimate the amount of Ferrous iron in the whole of the given solution using a standard solution of Potassium Dichromate. (Redox Titrations)
6. Preparation of CIS-POTASSIUM DIOXALATE DIAQUA CHROMATE (III)
 $\text{K}[(\text{C}_2\text{O}_4)_2(\text{H}_2\text{O})_2] \cdot 2\text{H}_2\text{O}$.
7. Quantitative analysis of binary mixture of inorganic compound (ESTIMATION OF BARIUM).
8. Inorganic mixture analysis


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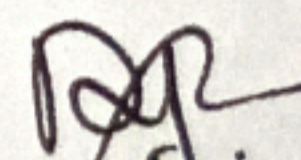
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Mixture Analysis for 2 Cations and 2 Anions with typical combinations.

Course Articulation Matrix (Mapping of COs with POs)

Course Outcomes	Correlation with POs												Correlation with PSOs		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	2	2	1	2	-	3	3	2	1	2	-	-	2	1	3
CO2	3	2	2	1	1	2	-	-	2	1	-	-	3	2	1
CO3	3	3	2	1	1	2	-	-	2	1	-	-	3	2	1
CO4	3	3	2	2	1	3	1	-	2	1	-	-	3	3	2
CO5	3	3	3	2	2	2	2	1	3	2	-	-	3	3	3


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Ability Enhancement Course for Undergraduate Program

SEMESTER-I (2026-30)

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ENGAEC101	AEC	Strategic Communication	Max	60	20	20	0	0	2	0	0	2
			Min	24	16		0	0				

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COURSE OBJECTIVES:

The student will have ability to:

1. To develop effective professional communication and business writing skills for corporate and digital workplaces.
2. To enhance interpersonal, leadership, presentation, and teamwork skills for professional growth and employability.
3. To cultivate ethical values, emotional intelligence, critical thinking, and workplace readiness aligned with industry requirements.

COURSE ALIGNMENT WITH UNSDG:

The Course aims to fulfill the United Nations Sustainable Development Goals, **SDG 4 (Quality Education)** and **SDG 9 (Industry, Innovation and Infrastructure)**.

COURSE OUTCOMES:

After completion of the course, the student will be able to:

- CO1** Demonstrate effective verbal, written, and digital communication skills in professional environments.
CO2 Apply interpersonal, leadership, presentation, and teamwork skills in workplace and collaborative settings.
CO3 Analyze workplace situations using ethical values, emotional intelligence, and problem-solving abilities for career readiness.

TEACHING PEDAGOGY:

- T1** Classroom teaching (white board), Power Point Presentations, Interactive lectures, Inquiry-based teaching
T2 ABL activities, Assignments, Flip Class/ Seminars, Quizzes, Oral Viva-voce examination

ASSESSMENT TOOLS:

- ATL1** Quiz
ATL2 Activity Based Learning
ATL3 Midterm Exams
ATL4 Group Discussions & Role Plays
ATL5 Case Study Analysis
ATL6 Assignments
ATL7 Practical Activities

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Choice Based Credit System (CBCS) in the light of NEP-2020

Ability Enhancement Course for Undergraduate Program

SEMESTER-I (2026-30)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME						L	T	P	CREDITS
			Marks	THEORY			PRACTICAL					
				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
ENGAEC101	AEC	Strategic Communication	Max	60	20	20	0	0	2	0	0	2
			Min	24	16		0	0				

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit; *Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

ATL8 Mock Interviews / Viva Voce

ATL9 Industrial Visit Report

PREREQUISITES:

Basic understanding of English language and communication skills.

SYLLABUS:

Module	Descriptors/Topics	Hours	Assessment Tools
I	Communication Fundamentals Communication process Verbal, non-verbal, and cross-cultural communication Professional etiquette and corporate behavior Communication barriers and strategies for effective communication Different types of Channels of Communication Activity: Elevator Pitch Activity where students introduce themselves professionally in 60 seconds	6	ATL1, ATL2, ATL6
II	Developing Effective Listening and Speaking Skills Hearing versus Listening, Listening Process (hearing, understanding, remembering, evaluating and responding), Note-taking, Barriers to Listening, and Strategies for Effective Listening. Tools and techniques of Effective Speaking at Various Level, Types of listening Art of Conversation, Dialogue and debate, Telephonic Skills Activity: Think, Pair, Share, Structured Debates, Role-Playing and Collaborative Storytelling	6	ATL1, ATL2, ATL3, ATL6, ATL7, ATL8

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Choice Based Credit System (CBCS) in the light of NEP-2020

Ability Enhancement Course for Undergraduate Program

SEMESTER-I (2026-30)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME						L	T	P	CREDITS
			Marks	THEORY			PRACTICAL					
				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
ENGAEC101	AEC	Strategic Communication	Max	60	20	20	0	0	2	0	0	2
			Min	24	16		0	0				

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit; ***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

III	Developing Reading and Technical Writing Skills Concept, Strategies and Techniques (skimming, scanning, SQ3R technique) for Effective Reading and Comprehension, Process of Reading, Active Vs Passive Reading, Types of Reading Tips for Effective Business Letter Writing, Notice, E-mail Writing, Precis Writing, Email and Blog Writing, Movie and Film Review · Activity: Article and Report Writing and Story Writing and Film Review Sessions	6	ATL2, ATL5, ATL7, ATL8,
	Job Preparation and Digital Communication and Industry Readiness Sensitization to Building Portfolio, Job/Cover Letter and Resume, Interview Skills Digital Media Tools and Apps for Enhancing Communication Skills Activity: Role Plays, Mock Interviews, Resume Preparation, Usage of different AI tools		
	Value Science, Ethics, and Emotional Intelligence Human values and professional ethics Ethics Vs Morality Emotional intelligence in corporate life Workplace diversity and inclusion Stress management and work-life balance Corporate social responsibility and ethical decision-making Crisis Management and Conflict Management and Time management Skills, Negotiation, and Persuasion. Interpersonal effectiveness and Service Orientation		

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Ability Enhancement Course for Undergraduate Program

SEMESTER-I (2026-30)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME						L	T	P	CREDITS
			Marks	THEORY			PRACTICAL					
				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
ENGAEC101	AEC	Strategic Communication	Max	60	20	20	0	0	2	0	0	2
			Min	24	16		0	0				

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit; *Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

	Activity: CSR Campaign Design Activity where groups create a social responsibility initiative for a company		
	Total Hours	30	

ADDITIONAL RESOURCES

A. Value addition to course content/ Skill enhancement content:

Corporate Etiquette, Professional Communication and Workplace Communication

B. Remedial classes for slow learners:

Additional practice sessions for speaking and writing activities

SUGGESTED READINGS:

Textbooks

1. Lesikar, Raymond V., and Marie E. Flatley. Business Communication: Connecting in a Digital World. McGraw Hill Education, 2015.
2. Rizvi, M. Ashraf. Effective Technical Communication. McGraw Hill Education, 2017.
3. Raman, Meenakshi, and Sangeeta Sharma. Technical Communication: Principles and Practice. Oxford University Press, 2015.
4. Goleman, Daniel. Emotional Intelligence: Why It Can Matter More Than IQ. Bloomsbury Publishing, 2005.
5. Ghosh, Meeta. Business Communication Skills. Pearson Education, 2012.

Suggested e- resources (Websites/e- books)

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Choice Based Credit System (CBCS) in the light of NEP-2020

Ability Enhancement Course for Undergraduate Program

SEMESTER-I (2026-30)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME						L	T	P	CREDITS
			Marks	THEORY			PRACTICAL					
				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
ENGAEC101	AEC	Strategic Communication	Max	60	20	20	0	0	2	0	0	2
			Min	24	16		0	0				

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit; ***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

1 https://nptel.ac.in/courses/109107121?utm_source

LIST OF PRACTICAL

	Title	CO Mapping
1.	Role Play on Workplace Communication	CO1
2.	Active Listening and Business Conversation Exercise	CO2
3.	Business Email Drafting Practice	CO1,CO2
4.	Resume and Cover Letter Preparation	CO2
5.	LinkedIn Profile Development	CO2, CO4
6.	Report Writing and Executive Summary Preparation	CO2
7.	Group Discussion and Team Communication Activity	CO2
8.	PowerPoint Presentation and Public Speaking	CO2
9.	Mock Interview and HR Interaction	CO2, CO3
10.	Case Study Analysis on Workplace Ethics	CO3
11.	Emotional Intelligence and Stress Management Reflection	CO3
12.	Virtual Meeting and Digital Collaboration Tool Practice	CO4

COURSE ARTICULATION MATRIX (MAPPING OF COs WITH POs)

Course Outcome s	Correlation with POs												Correlation with PSOs		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO1	1	2	-	-	2	1	-	1	2	3	-	2	2	1	1
CO2	-	2	1	-	2	1	-	1	3	3	2	2	2	2	1
CO3	-	3	2	1	1	2	1	3	2	2	2	3	1	2	2

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Ability Enhancement Course for Undergraduate Program

SEMESTER-I (2026-30)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME						L	T	P	CREDITS
			Marks	THEORY			PRACTICAL					
				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
ENGAEC101	AEC	Strategic Communication	Max	60	20	20	0	0	2	0	0	2
			Min	24	16		0	0				

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit; ***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

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Choice Based Credit System (CBCS) in the light of NEP-2020

B.Sc. Physics

SEMESTER-I

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME						L	T	P	CREDITS
			Marks	THEORY			PRACTICAL					
				END SEM University	Two Term Exam	Teachers Assessment*	END SEM University	Teachers Assessment*				
BSPHM101	Minor-I	Fundamentals of Ray Optics	Max	60	20	20	30	20	3	0	2	4
			Min	24	16		14	9				

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P - Practical; C - Credit;
*Teacher Assessment shall be based following components: Quiz/Assignment/Project/Participation in Class, given that no component shall exceed more than 10 marks.

COURSE OBJECTIVES:

After successful completion of the course, the student will have ability to:

1. Understand the fundamental concepts of waves and oscillations, including simple harmonic motion, wave equations, and energy associated with oscillatory systems.
2. Analyze damped and forced oscillations, resonance phenomena, and the significance of quality factor in oscillatory systems.
3. Explain the principles of geometrical optics, including thick lenses, optical systems, cardinal points, and image aberrations.
4. Understand the wave nature of light through Huygens' principle, wavefront concepts, superposition, and coherence of light waves.
5. Apply the principles of interference of light to analyze and explain interference phenomena and experimental arrangements such as Young's double-slit experiment and Fresnel biprism.
6. To develop experimental skills in optics and oscillations through the use of scientific instruments and techniques for the measurement and analysis of physical parameters.

COURSE ALIGNMENT WITH UNSDG:

The Course aims to fulfill the United Nations Sustainable Development Goals, **SDG 4 (Quality Education)**.

COURSE OUTCOMES:

After successful completion of the course, students will be able to:

1. Explain the fundamental concepts of waves, oscillations, and simple harmonic motion, and determine the physical parameters associated with oscillatory motion.
2. Analyze damped and forced oscillatory systems, and evaluate resonance characteristics and the quality factor of oscillators.
3. Apply the principles of geometrical optics to study image formation in optical systems and analyze various optical aberrations.



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Choice Based Credit System (CBCS) in the light of NEP-2020

B.Sc. Physics

SEMESTER-I

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME						L	T	P	CREDITS
			Marks	THEORY			PRACTICAL					
				END SEM University	Two Term Exam	Teachers Assessment*	END SEM University	Teachers Assessment*				
BSPHM101	Minor-I	Fundamentals of Ray Optics	Max	60	20	20	30	20	3	0	2	4
			Min	24	16		14	9				

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P - Practical; C - Credit;

*Teacher Assessment shall be based following components: Quiz/Assignment/Project/Participation in Class, given that no component shall exceed more than 10 marks.

- Interpret the wave nature of light through Huygens' principle, wavefront analysis, superposition, and coherence phenomena.
- Analyze and explain interference phenomena and apply the principles of interference to optical experiments such as Young's double-slit experiment and Fresnel biprism.
- Perform optics and oscillation experiments, analyze experimental data, estimate measurement uncertainties, and interpret results to determine physical parameters using appropriate laboratory instruments and methodologies.

TEACHING PEDAGOGY:

T1	Classroom teaching (white board), Power Point Presentations, Interactive lectures, Inquiry-based teaching
T2	ABL activities, Assignments, Flip Class/ Seminars, Quizzes, Oral Viva-voce examination

ASSESSMENT TOOLS:

ATL1	Quiz
ATL2	Activity Based Learning
ATL3	Midterm Exams
ATL4	Flip Class
ATL5	Seminar Presentation
ATL6	Assignments
ATL7	Poster
ATL8	Oral Viva-voce examination
ATL9	Industrial Visit Report

Signature



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Choice Based Credit System (CBCS) in the light of NEP-2020

B.Sc. Physics

SEMESTER-I

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME						L	T	P	CREDITS
			Marks	THEORY			PRACTICAL					
				END SEM University	Two Term Exam	Teachers Assessment*	END SEM University	Teachers Assessment*				
BSPHM101	Minor-1	Fundamentals of Ray Optics	Max	60	20	20	30	20	3	0	2	4
			Min	24	16		14	9				

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P - Practical; C - Credit;

*Teacher Assessment shall be based following components: Quiz/Assignment/Project/Participation in Class, given that no component shall exceed more than 10 marks.

PREREQUISITES:

Fundamental knowledge of waves & oscillations and Optics

Module	Descriptors/Topics	Hours	Assessment Tools
I	Oscillations (Simple Harmonic Motion) :Definition and types of waves (mechanical and electromagnetic), Transverse and longitudinal waves, Wave equation and its solution, Principle of superposition, Periodic motion and oscillations, Simple Harmonic Motion (SHM), Equation of SHM and its solutions, Velocity, acceleration, and phase relations, Energy in SHM (kinetic and potential energy).	08	ATL1 ATL2 ATL3 ATL6 ATL8
II	Damped and Forced Oscillations: Damped oscillations: Types (underdamped, critically damped, overdamped), Damping coefficient and decay constant, Forced oscillations, Resonance, Sharpness of resonance and Quality factor (Q)	08	ATL1 ATL2 ATL3 ATL6 ATL8
III	Fundamentals of Light and Ray Optics: Nature of light: ray and wave concepts, Fermat's Principle, Optical path length, Thick Lenses and Optical Systems, Principal planes and effective focal length, Ray tracing in thick lenses. Cardinal and Nodal Points of an Optical System, Aberrations, Defects of images: Spherical aberration, Coma and astigmatism.	08	ATL1 ATL2 ATL3 ATL6 ATL8



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Choice Based Credit System (CBCS) in the light of NEP-2020

B.Sc. Physics

SEMESTER-I

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME						L	T	P	CREDITS
			Marks	THEORY			PRACTICAL					
				END SEM University	Two Term Exam	Teachers Assessment*	END SEM University	Teachers Assessment*				
BSPHM101	Minor-1	Fundamentals of Ray Optics	Max	60	20	20	30	20	3	0	2	4
			Min	24	16		14	9				

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P - Practical; C - Credit; *Teacher Assessment shall be based following components: Quiz/Assignment/Project/Participation in Class, given that no component shall exceed more than 10 marks.

IV	Wave Nature of Light: Historical theories: Isaac Newton (corpuscular theory), Christiaan Huygens (wave theory), Huygens' Principle: Wavefronts: spherical, cylindrical, plane, Principle of superposition, Concept of Coherence: Temporal and Spatial Coherence, Concept of Coherence length and Coherence Time.	08	ATL1 ATL2 ATL3 ATL6 ATL8
V	Interference of Light -I: Introduction to Interference, Conditions for interference, Constructive and destructive interference and coherent sources. Experiments based on Division of Wavefront: Youngs Double slit experiment, Fresnel Biprism and its applications.	08	ATL1 ATL2 ATL3 ATL6 ATL8
Total Hours		40	

List of Experiments	1. Determination of radius of curvature of convex lens by Newton's ring experiment. 2. Determination of Frequency of A.C. mains by electrically maintained vibrating rod. 3. Determination of Resolving Power of Telescope. 4. Determination of wavelength of LASER using Diffraction Grating. 5. To determine the mass of cane sugar dissolved in water using half shade Polarimeter.
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B.Sc. Physics

SEMESTER-I

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME						L	T	P	CREDITS
			Marks	THEORY			PRACTICAL					
				END SEM University	Two Term Exam	Teachers Assessment*	END SEM University	Teachers Assessment*				
BSPHM101	Minor-I	Fundamentals of Ray Optics	Max	60	20	20	30	20	3	0	2	4
			Min	24	16		14	9				

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P - Practical; C - Credit;
*Teacher Assessment shall be based following components: Quiz/Assignment/Project/Participation in Class, given that no component shall exceed more than 10 marks.

ADDITIONAL RESOURCES

A. Value addition to course content/ Skill enhancement content:

<https://swayam.gov.in/explorer?searchText=waves%20and%20oscillations>
<https://swayam.gov.in/explorer?searchText=optics>
<https://swayam.gov.in/explorer?searchText=engineering%20physics>

B. Remedial classes for slow learners:

As per the AUMP SOP for slow and fast learners.

SUGGESTED READINGS:

Textbooks

1. N. K. Bajaj, *Waves and Oscillations*, Tata McGraw-Hill Education, New Delhi.
2. Brij Lal and N. Subrahmanyam, *A Textbook of Optics*, S. Chand & Co., New Delhi.

Reference Books

1. A. P. French, *Vibrations and Waves*, CBS Publishers & Distributors Pvt. Ltd., New Delhi, Reprint Edition (Indian Edition).
2. Fundamentals of Physics – by David Halliday, Robert Resnick, and Jearl Walker
3. Principles of Optics – by Max Born and Emil Wolf
4. Ajoy Ghatak, *Optics*, McGraw Hill Education (India) Private Limited, New Delhi, 6th Edition, 2017



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B.Sc. Physics

SEMESTER-I

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			Marks	THEORY			PRACTICAL					
				END SEM University	Two Term Exam	Teachers Assessment*	END SEM University	Teachers Assessment*				
BSPHM101	Minor-I	Fundamentals of Ray Optics	Max	60	20	20	30	20	3	0	2	4
			Min	24	16		14	9				

Legends: L - Lecture; T - Tutorial/Teacher Guided Session; P - Practical

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P - Practical; C - Credit;
 *Teacher Assessment shall be based following components: Quiz/Assignment/Project/Participation in Class, given that no component shall exceed more than 10 marks.

Suggested resources (Websites/e-books)

1. NPTEL Course Repository: https://onlinecourses.nptel.ac.in/noc26_cs85/preview
2. OpenStax University Physics, Volume 1 (Oscillations and Waves)
<https://openstax.org/details/books/university-physics-volume-1>
3. OpenStax University Physics, Volume 3 (Optics)
<https://openstax.org/details/books/university-physics-volume-3>
4. MIT OpenCourseWare - Physics: <https://ocw.mit.edu>

COURSE ARTICULATION MATRIX (MAPPING OF COs WITH POs)

Course Outcomes	Correlation with POs										Correlation with PSOs		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PS O1	PS O2	PS O3
CO1	3	3	2	1	2	2	-	1	2	1	3	2	1
CO2	3	3	2	2	2	2	-	1	2	1	3	2	2
CO3	3	3	3	2	2	2	-	1	2	1	3	2	2
CO4	3	3	3	2	2	2	-	1	2	1	3	2	2
CO5	3	3	3	2	2	2	-	1	2	1	3	2	2
CO6	2	3	3	2	2	2	2	2	2	2	2	3	3



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Choice Based Credit System (CBCS) in the light of NEP-2020

Department of Life Science/Biotechnology

B.Sc. (Minor - Biotechnology)

Semester I (2026-2029)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME						L	T	P	CREDITS
			Marks	THEORY			PRACTICAL					
				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BSBTM101	Minor	Basics of Biomolecules and Metabolism	Max	60	20	20	30	20	3	0	1	4
			Min	24	16		14	9				

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit; *Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

T1 Classroom teaching (white board), Power Point Presentations, Interactive lectures, Inquiry-based teaching

T2 ABL activities, Assignments, Flip Class/ Seminars, Quizzes, Oral Viva-voce examination

Experiential learning: Project Based Learning (PBL) and Case Studies

Module	Name	Experiment/ABL/PBL	Bloom's Taxonomy
I	Analysis Identification and qualitative analysis of carbohydrates, proteins, and lipids.	Experiment	Remembering, Understanding
II	Problem-based learning on biomolecules in diagnostics, therapeutics, and biotechnology	PBL	Understanding, Applying, Analyzing

ASSESSMENT TOOLS:

ATL1 Quiz

ATL2 Activity Based Learning

ATL3 Midterm Exams

ATL4 Flip Class

ATL5 Seminar Presentation

ATL6 Assignments

ATL7 Poster

ATL8 Oral Viva-voce examination

ATL9 Industrial Visit Report


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Choice Based Credit System (CBCS) in the light of NEP-2020

Department of Life Science/Biotechnology

B.Sc. (Minor - Biotechnology)

Semester I (2026-2029)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME						L	T	P	CREDITS
			Marks	THEORY			PRACTICAL					
				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BSBTM101	Minor	Basics of Biomolecules and Metabolism	Max	60	20	20	30	20	3	0	1	4
			Min	24	16		14	9				

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit; *Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

PREREQUISITES:

Basic understanding of Intermediate Biology

SYLLABUS:

Module	Descriptors/Topics	Hours	Assessment Tools
Unit - I	Chemical composition of living matter, Carbohydrates: classification of monosaccharides. Di, tri and polysaccharides, their functions in energy storage and cell structure; Lipids: Structure and functions – Classification, nomenclature and properties of fatty acids.	10	Quiz, Activity Based Learning Seminar Presentation Assignments Midterm Exams
Unit – II	Proteins: primary, secondary, tertiary and quaternary structure; Ramchandran plot and Protein folding. Nucleic acids: Structure and properties of DNA; Double helical model of DNA structure A, B and Z form of DNA.	10	Quiz, Seminar Presentation Assignments Midterm Exams
Unit – III	Vitamins and co-enzymes: Structure, regulation of biochemical reactions and function of water-soluble vitamins; Fat soluble Vitamins A, D, E and K. AI in Drug Discovery: Using AI for virtual screening and designing new molecules.	9	Activity Based Learning Seminar Assignments
Unit – IV	Glycolysis, citric acid cycle and energy generation; Pentose phosphate pathway and its regulation, Electron Transport Chain, Oxidative phosphorylation.	8	Quiz, Activity Based Learning Seminar Assignments


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Choice Based Credit System (CBCS) in the light of NEP-2020

Department of Life Science/Biotechnology

B.Sc. (Minor - Biotechnology)

Semester I (2026-2029)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME						L	T	P	CREDITS
			Marks	THEORY			PRACTICAL					
				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BSBTM101	Minor	Basics of Biomolecules and Metabolism	Max	60	20	20	30	20	3	0	1	4
			Min	24	16		14	9				

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit; *Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Unit – V	Lipid Metabolism: Fatty Acid Metabolism, Biosynthesis of saturated fatty acids, Protein Metabolism: Amino Acid Catabolism, Transamination and deamination reactions.	8	Activity Based Learning Seminar Assignments
Total Hours		45	

ADDITIONAL RESOURCES

A. Value addition to course content/ Skill enhancement content: <https://nptel.ac.in/courses/104103121>
<https://youtu.be/c-EBH0tuoI4?si=v0uvzrocBa9WPB3W>

B. Remedial classes for slow learners:

As per the SVVV SOP for slow and fast learners.

SUGGESTED READINGS:

Textbooks

1. Jain, J. L., Jain, S., & Jain, N. (n.d.). *Fundamentals of biochemistry*. S. Chand Publications.
2. Voet, D., Voet, J. G., & Pratt, C. W. (2018). *Voet's principles of biochemistry* (5th ed.). Wiley.
3. Nelson, D. L., & Cox, M. M. (2021). *Lehninger principles of biochemistry* (8th ed.). W. H. Freeman & Co.
4. Stryer, L., Berg, J. M., Tymoczko, J. L., & Gatto, G. J., Jr. (2019). *Biochemistry* (9th ed.). W. H. Freeman & Co.
5. Zubay, G. L., Parson, W. W., & Vance, D. E. (1995). *Principles of biochemistry*. William C. Brown Publishers.

Reference books:

1. Voet, D., Voet, J. G., & Pratt, C. W. (2018). *Voet's principles of biochemistry* (5th ed.). Wiley.
2. Nelson, D. L., & Cox, M. M. (2021). *Lehninger principles of biochemistry* (8th ed.). W. H. Freeman & Co.


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Choice Based Credit System (CBCS) in the light of NEP-2020

Department of Life Science/Biotechnology

B.Sc. (Minor - Biotechnology)

Semester I (2026-2029)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME						L	T	P	CREDITS
			Marks	THEORY			PRACTICAL					
				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BSBTM101	Minor	Basics of Biomolecules and Metabolism	Max	60	20	20	30	20	3	0	1	4
			Min	24	16		14	9				

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit; *Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Suggested e- resources (Websites/e- books)

<https://openstax.org/details/books/biology-2e>

<https://microbenotes.com/category/biochemistry/>

LIST OF PRACTICAL

	Title	CO Mapping
1.	Preparation of reagents	CO4
2.	Demonstration of pH meter	CO4
3.	Separation of leaf fragments by paper chromatography	CO4
4.	Qualitative estimation of Carbohydrate by Benedict Test	CO1, CO4
5.	Qualitative estimation of Carbohydrate by Fehling Test	CO1, CO4
6.	Qualitative estimation of Carbohydrate by Molish Test	CO1, CO2
7.	Qualitative estimation of Lipids by Iodine Test	CO2, CO4
8.	Qualitative estimation of Protein by Xanthoproteic test	CO2, CO4


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Choice Based Credit System (CBCS) in the light of NEP-2020

Department of Life Science/Biotechnology

B.Sc. (Minor - Biotechnology)

Semester I (2026-2029)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME						L	T	P	CREDITS
			Marks	THEORY			PRACTICAL					
				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BSBTM101	Minor	Basics of Biomolecules and Metabolism	Max	60	20	20	30	20	3	0	1	4
			Min	24	16		14	9				

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit; *Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

COURSE ARTICULATION MATRIX (MAPPING OF COs WITH POs)

Course Outcomes	Correlation with POs										Correlation with PSOs		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO2	PSO3
CO1	2	1	2	-	3	1	1	-	1	-	3	2	1
CO2	2	2	2	1	2	1	1	-	1	1	2	1	1
CO3	2	1	2	2	2	1	1	1	2	1	2	-	3
CO4	2	3	3	3	3	1	1						


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Choice Based Credit System (CBCS) in the light of NEP-2020

BCA (No Branch)

SEMESTER-I (2026-29)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME						L	T	P	CREDITS
			Marks	THEORY			PRACTICAL					
				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BCCA103M	Minor -2	PC Software	Max	60	20	20	30	20	3	0	2	4
			Min	24	16		13.5	9				

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit; *Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

COURSE OBJECTIVES:

The student will have ability to:

1. To provide the knowledge of using different software packages including word processor, electronic spreadsheet, presentation s/w
2. To develop an understanding of database management system.
3. To explain how to integrate the data stored in word processor, spreadsheet etc.
4. To develop presentation skills using these software.

COURSE ALIGNMENT WITH UNSDG:

The Course aims to fulfill the United Nations Sustainable Development Goals, **SDG 4 (Quality Education)** and **SDG 9 (Industry, Innovation and Infrastructure)**.

COURSE OUTCOMES:

After completion of the course, the student will be able to:

- CO1** To create word documents and to format them using various tools available
- CO2** To create tables and manipulate them, To use mail merge, labels
- CO3** Creating spreadsheet for storing and managing data using functions Format, print spreadsheet
- CO4** Create power point presentation for different purposes using objects, animation
- CO5** To store and manipulate data stored in databases.

TEACHING PEDAGOGY:

- T1** Classroom teaching (white board), Power Point Presentations, Interactive lectures, Inquiry-based teaching
- T2** ABL activities, Assignments, Flip Class/ Seminars, Quizzes, Oral Viva-voce examination

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Choice Based Credit System (CBCS) in the light of NEP-2020

BCA (No Branch)

SEMESTER-I (2026-29)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME						L	T	P	CREDITS
			Marks	THEORY			PRACTICAL					
				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BCCA103M	Minor -2	PC Software	Max	60	20	20	30	20	3	0	2	4
			Min	24	16		13.5	9				

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit; *Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

ASSESSMENT TOOLS:

ATL1	Quiz
ATL2	Activity Based Learning
ATL3	Midterm Exams
ATL4	Flip Class
ATL5	Seminar Presentation
ATL6	Assignments
ATL7	Poster
ATL8	Oral Viva-voce examination

PREREQUISITES:

Basic Computer Knowledge

SYLLABUS:

Module	Descriptors/Topics	Hours	Assessment Tools
I	Word Processor: Introduction, Word Processing, Advantages of word processing, Creating, Saving and editing a document: Selecting, Deleting, Replacing Text, Copying text to another file. Formatting Text and Paragraph: Using the Font Dialog Box, Paragraph Formatting using Bullets and Numbering in Paragraphs, Line spacing, Margins.	12	ATL3 ATL6
II	Creating and Formatting Tables: Changing Row height, inserting columns, merging cells Calculations in a Table, Sorting Text, Toolbar using word art, Mail merge: Definition, a Practical Example of mail merge, creating charts. Defining Tabs: Tabs Dialog Box, Enhancing a Document: Inserting page Breaks, Adding Border, Using Header and Footers in the Document.	12	ATL3 ATL6

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SEMESTER-I (2026-29)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME						L	T	P	CREDITS
			Marks	THEORY			PRACTICAL					
				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BCCA103M	Minor -2	PC Software	Max	60	20	20	30	20	3	0	2	4
			Min	24	16		13.5	9				

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit; *Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

III	Spreadsheet: Introduction, Definition. Screen parts of worksheet, Entering information: Numbers, Formula, Editing Data in a cell, Using a Range with SUM, Moving and copying data, Inserting and Deleting Row and Columns in the worksheet, Using the format cells Dialog box.	12	ATL3 ATL6
IV	Protecting a workbook with Password, Macro: Recording and Running a Macro, Linking workbook files Using Pivot table, Inserting Hyper links, Using chart wizard to create a chart, Naming ranges, classification of Functions.	12	ATL3 ATL6
V	Presentation : Introduction, Slide show, Formatting, Creating a Presentation, Inserting clip Arts, Adding Objects, Applying Transitions, Animation effects, formatting and checking text, Modifying Visual elements, Preparing a complete presentation, Case studies.	12	ATL3 ATL6
Total Hours		60	

ADDITIONAL RESOURCES

A. Value addition to course content/ Skill enhancement content:

<https://www.redhat.com/en/services/training/rh124-red-hat-system-administration-i>

B. Remedial classes for slow learners:

As per the AUMP SOP for slow and fast learners.

SUGGESTED READINGS:

Textbooks

1. Taxali R. K. "PC Software for Windows 98, Made Simple" TMH.
2. Saxena Sanjay, "MS Office 2000 "Vikas Publication House PVT LTD.
3. Busbby M. and Stultz R.A. "Microsoft Office 2000", BPB.
4. Jain S., Geetha M. and Kratika, "Microsoft Office-2007", BPB

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COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME						L	T	P	CREDITS
			Marks	THEORY			PRACTICAL					
				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BCCA103M	Minor -2	PC Software	Max	60	20	20	30	20	3	0	2	4
			Min	24	16		13.5	9				

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit; *Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Suggested e- resources (Websites/e- books)

1. Microsoft Office – Complete Reference – BPB Publication.

LIST OF PRACTICAL

	Title	CO Mapping
1.	To open and practice of OS – Folder related operations, My-Computer, window explorer, Control Panel,	CO4
2.	To create, save and editing of Text files using word processor.	CO4
3.	Formatting and printing of document (setting of margins, size, orientation, different breaks etc. Checking of spelling and use of thesaurus)	CO4
4.	Creating, inserting tables, header, footers, hyperlink, different objects in a document	CO4
5.	Use of Charts in Word Processor.	CO4
6.	Creating and manipulating spreadsheets. To create, save and editing of spreadsheets. Use of cell	CO4
7.	Creating a mail merged documents, labels references, sorting and filtering data in a spreadsheet, using formulae	CO4

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SEMESTER-I (2026-29)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME						L	T	P	CREDITS
			Marks	THEORY			PRACTICAL					
				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BCCA103M	Minor -2	PC Software	Max	60	20	20	30	20	3	0	2	4
			Min	24	16		13.5	9				

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit; *Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

8.	Formatting and printing of spreadsheets (setting of margins, size, orientation, different breaks etc. What if analysis, mail merging	CO4
9.	Creating header, footers, hyperlink, different objects in a spreadsheet	CO5
10.	Creation, editing and formatting presentation slides. Creating different types of graphs and printing	CO5

COURSE ARTICULATION MATRIX (MAPPING OF COs WITH POs)

Course Outcomes	Correlation with POs												Correlation with PSOs		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	1	3	-	-	-	-	-	3	-	1	2	-			
CO2	1	3	1	-	-	-	-	2	-	1	2	-			
CO3	2	3	2	1	-	-	-	1	-	-	2	-			
CO4	-	3	-	1	-	-	-	3	1	-	2	-			
CO5	3	2	2	1	3	-	-	-	-	1	2	1			

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Choice Based Credit System (CBCS) in the light of NEP-2020

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SEMESTER-I (2026-29)

SEMESTER-I (2026-29)												
COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME						L	T	P	CREDITS
			Marks	THEORY			PRACTICAL					
				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BSMAM101	Minor	Differential Calculus	Max	60	20	20	0	0	4	0	0	4
			Min	24	16		0	0				
Lecture: T - Tutorial/Teacher Guided Student Activity: P – Practical; C - Credit; *Teacher Assessment component shall												

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P - Practical; C - Credit; *Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

COURSE OBJECTIVES:

The student will have ability to:

1. Understand the concepts of derivatives and applications.
2. Learn series expansions and curve analysis.
3. Apply partial differentiation techniques.
4. Solve optimization problems involving multiple variables.

COURSE ALIGNMENT WITH UNSDG:

The Course aims to fulfill the United Nations Sustainable Development Goals, SDG 4 (Quality Education).

COURSE OUTCOMES:

After completion of the course, the student will be able to:

- | | |
|-----|---|
| CO1 | Understand the significance of derivatives and their applications. |
| CO2 | Construct Taylor's and Maclaurin's series expansions. |
| CO3 | Apply partial differentiation and curve tracing techniques. |
| CO4 | Solve optimization problems involving functions of several variables. |

TEACHING PEDAGOGY:

- | | |
|----|---|
| T1 | Classroom teaching (white board), Power Point Presentations, Interactive lectures, Inquiry-based teaching |
| T2 | ABL activities, Assignments, Flip Class/ Seminars, Quizzes, Oral Viva-voce examination |

ASSESSMENT TOOLS:

- | | |
|------|-------------------------|
| ATL1 | Quiz |
| ATL2 | Activity Based Learning |
| ATL3 | Midterm Exams |
| ATL4 | Seminar Presentation |
| ATL5 | Poster |


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SEMESTER-I (2026-29)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME						L	T	P	CREDITS
			Marks	THEORY			PRACTICAL					
				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BSMAM101	Minor	Differential Calculus	Max	60	20	20	0	0	4	0	0	4
			Min	24	16		0	0				

L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit; *Teacher Assessment

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P - Practical; C - Credit; *Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

ATL6	Assignments
ATL7	Oral Viva-voce examination

PREREQUISITES:

Knowledge of Higher Secondary Mathematics

SYLLABUS:

Module	Descriptors/Topics	Hours	Assessment Tools
I	Derivative and its geometrical and physical interpretation, Sign of derivatives and monotonic increasing and decreasing functions, Rolle's and Mean value theorems and simple applications.	10	ATL1 ATL3 ATL6
II	Successive differentiation, Leibnitz theorem, Maclaurin's and Taylor's series expansion, Asymptotes.	10	ATL1 ATL3 ATL6
III	Curvature, test for concavity and convexity, points of inflection, multiple points, tracing of curves in cartesian and polar coordinates.	10	ATL1 ATL3 ATL6
IV	Indeterminant form, L'Hospital's rule, Tangents and Normal, Partial differentiation, Euler's theorem, total derivatives.	10	ATL1 ATL3 ATL6
V	Functions of two and three variables, Maxima and minima of functions of two variables - Lagrange's Method of undetermined multiplier - Problems only. Implicit function in case of function of two variables (existence assumed) and derivative.	10	ATL1 ATL3 ATL6 ATL7
Total Hours		50	

ADDITIONAL RESOURCES

A.	Value addition to course content/ Skill enhancement content: https://www.youtube.com/@satishshukla2553330
B.	Remedial classes for slow learners:

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SEMESTER-I (2026-29)

SEMESTER-I (2026-29)												
COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME						L	T	P	CREDITS
			Marks	THEORY			PRACTICAL					
				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BSMAM101	Minor	Differential Calculus	Max	60	20	20	0	0	4	0	0	4
			Min	24	16		0	0				
L - Lecture; T - Tutorial/Teacher Guided Student Activity; P - Practical; C - Credit; *Teacher Assessment												

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P - Practical; C - Credit; *Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

As per the AUMP SOP for slow and fast learners.

SUGGESTED READINGS:

Textbooks

1. Gorakh Prasad, *Differential Calculus*, Pothishala Pvt. Ltd., Allahabad.
2. Shanti Narayan, *Differential Calculus*, S. Chand Publications.

Reference Books

1. Walter Rudin, *Principles of Mathematical Analysis*, McGraw-Hill Publications.
2. J. Edwards, *An Elementary Treatise on Differential Calculus*, Radha Publishing House.
3. David V. Widder, *Advanced Calculus*, Prentice Hall.
4. Courant and John, *Differential and Integral Calculus*, Wiley Eastern Ltd.
5. N. Piskunov, *Differential and Integral Calculus*, CBS Publishers & Distributors.
6. T. M. Apostol, *Mathematical Analysis*, Addison Wesley Publishing Company.
7. T. M. Apostol, *Calculus, Vol. I & II*, Wiley.

Suggested e- resources (Websites/e- books)

1. <https://www.youtube.com/@satishshukla2553330>
<https://sites.google.com/view/satishmathematics1978/home?authuser=0>
2. <https://youtube.com/@priva-mathematics1030?si=pZJZYTytr-l5pV7q>

COURSE ARTICULATION MATRIX (MAPPING OF COs WITH POs)

Course Outcomes	Correlation with POs												Correlation with PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	-	-	PSO1	PSO2	-
CO1	3	1	-	2	2	-	-	-	-	-	-	-	1	-	-
CO2	3	1	-	2	2	-	-	1	-	-	-	-	1	1	-
CO3	3	2	1	3	3	-	-	1	-	-	-	-	2	-	-
CO4	3	2	1	3	3	1	-	1	-	-	-	-	2	3	-

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Vishwavidyalaya, Indore

Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

Shri Vaishnav Institute of Science

Choice Based Credit System (CBCS) in the light of NEP-2020

B.Sc.

SEMESTER-I (2026-29)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME						L	T	P	CREDITS
			Marks	THEORY			PRACTICAL					
				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BSMAM101	Minor	Differential Calculus	Max	60	20	20	0	0	4	0	0	4
			Min	24	16		0	0				

L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit; *Teacher Assessment components: Quiz/Assignment/ Project/Participation in Class given that no component shall

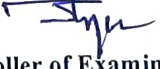
Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P - Practical; C - Credit; *Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.


Chairperson

Board of Studies,
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore


Chairperson

Faculty of Studies,
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore


Controller of Examination

Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore


Registrar

Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore