

Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

B.A. Honors Economics

BATCH2018-2021

SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM	University Exam	Two Term Exam	Teachers Assessment*	University Exam				
HU201	SOC. SC., ARTS & HUM	Foundation English II	60	20	20	0	20	3	0	2	4

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

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

Course Educational Objectives (CEOs): The students will be able to:

- Participate in seminars, group discussions, paper presentation and general personal interactions at the professional level.
- Have adequate mastery over communicative english, reading and writing skills, secondarily listening and speaking skills.

Course Outcomes (COs): The students should be able to:

- Improve their language skills, oral communication skills, group discussion skills, personal skills and confidence level.
- express his /her ideas and thoughts in speech or writing,
- Bridge the language gap vital to their success.
- Communicate effectively.

COURSE CONTENTS

UNIT I

Communication: Objectives of Communication, Formal and Informal Channels of Communication, Advantages and Disadvantages, Extrapersonal communication, Interpersonal communication, Intrapersonal communication, Principles of communication.

UNIT II

Developing Reading Skills: Reading Comprehension, Process, Active & Passive reading, Reading speed Strategies, Benefits of effective reading, SQ3R Reading technique.


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UNIT III

Vocabulary Building: Using Dictionaries and Thesaurus, Synonyms, Antonyms, Homophones, One Word Substitution, Affixation: Prefixes & Suffixes, Derivation from root words, Jargon, Scientific Jargon, Word Formation.

UNIT IV

Developing Writing Skills: Planning, Drafting and Editing, Developing Logical Paragraphs, Report Writing: Importance of Report, Characteristics of Good Report, Types of Report, Various Structures of a Report.

UNIT V

Professional Skills: Negotiation Skills, Telephonic Skills, Interview Skills: Team building Skills and Time management

Practical:

- Listening
- Linguistics and Phonetics
- Telephonic Conversation
- Mock Interviews
- Group discussions
- Extempore
- Debate
- Role Plays

Suggested Readings

- Ashraf Rizvi.(2005).*Effective Technical Communication*. New Delhi:Tata Mc Graw Hill
- Prasad, H. M.(2001) *How to Prepare for Group Discussion and Interview*. New Delhi: Tata McGraw-Hill.
- Pease, Allan. (1998).*Body Language*. Delhi: Sudha Publications.
- Morgan, Dana (1998).*10 Minute Guide to Job Interviews*. New York: Macmillan.





Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

B. Sc. Physics Hons

II Sem

Subject Code	Category	Subject Name	Teaching and Evaluation Scheme								
			Theory			Practical		Th	T	P	CREDITS
			End Sem University Exam	Two Term Exam	Teachers Assessment*	End Sem University Exam	Teachers Assessment*				
BSPH 202	DC	Waves and Optics	60	20	20	30	20	3	1	0	4

Course Objectives	<ol style="list-style-type: none">To develop the comprehensive understanding of laws of physics related to Waves and Optics and ability to apply them for laying the foundation for research and development.To work ethically as member as well as leader in a diverse team.
Course Ourcomes	<ol style="list-style-type: none">Student will be able to understand and solve the problems related to Waves and Optics.Student will be able to determine physical parameter experimentally with optimal usage of resources and complete the assignments in time.

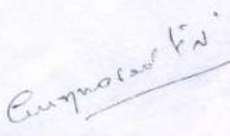
Abbreviation		Teacher Assessment (Theory) shall be based on following components: Quiz / Assignment/ Project / Participation in class (Given that no component shall be exceed 10 Marks).
Th	Theory	
T	Tutorial	
P	Practical	Teacher Assessment (Practical) shall be based on following components: Viva / File / Participation in Lab work (Given that no component shall be exceed 50% of Marks).


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Indore



Dr. UTTAM SHARMA
Professor & Head
Department of Physics
Shri Vaishnav Institute of Science


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BSPH 202: Waves and Optics

UNIT I: Waves

Wave motion, One dimensional wave equation and solution, speed of transverse waves in a uniform stretched string, speed of longitudinal waves in a fluid and gases, speed of longitudinal waves in a solid, variation in velocity and pressure in a plane progressive wave, Energy, Energy density of a progressive wave and intensity of a wave; waves on liquid surface, gravity waves and ripples, phase velocity and group velocity.

UNIT II: Interference of light

Condition of constructive and destructive interference, necessary condition of interference, Interference of light by division of wave front: Fresnel's Bi-Prism, shape of biprism fringes, Interference by division of amplitude, interference in thin films, path difference, phase difference due to reflection from denser medium: Stokes law, localised fringes, Newton's rings and applications. Haidinger fringes (Fringes of equal inclination), Michelson interferometer and its application.

UNIT III: Diffraction


Fraunhofer's diffraction at a single slit, double slit, plane transmission grating, n-slit diffraction, formation of spectra by the grating, determination of wavelength of light by with a grating, resolving power of an optical instruments, Rayleigh criterion of resolution of images. Resolving power of plane transmission grating.

UNIT IV: Polarisation

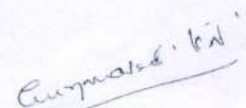
Polarization of light, production of plane polarized light by reflection; Brewster law, Production of plane polarized light by double refraction: double refraction in uniaxial crystal, Huygens explanation of double refraction, calcite crystal, Nicol prism, quarter and half wave plates, circularly and elliptically polarized light, analysis of polarized light, rotation of plane of polarization, polarimeter, Laurent's half shade device.


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UNIT V: Laser

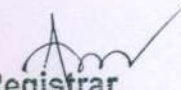
Stimulated and Spontaneous Emission, Einstein's A & B Coefficients, Population Inversion, Pumping, Techniques of Pumping, Two three and four level lasers. Optical Resonator, Properties and Applications of Laser, Ruby Laser, Nd:YAG Laser, He-Ne Laser, CO₂ Lasers.

References


1. Fundamentals of Optics: F.A. Jenkins and H. E. White, 1976, McGraw-Hill.
2. Principles of Optics: B. K. Mathur, 1995, Gopal Printing. . University Physics: F.W. Sears, M.W. Zemansky and H.D. Young, 13/e, 1986.
3. Optics: A. K. Ghatak, McGraw Hill Publications. . Principles of Optics: Max Born and Wolf. Pregmon Press. . Optics and Atomic Physics, D. P. Khandelwal. Himalaya Publication.
4. Lasers: Theory and Applications: K. Thyagrajan and A. K. Ghatak.

List of experiment


1. To determine the refractive index of the material of the prism using Na light.
2. To determine the dispersive power of the material of the prism.
3. Measurement of radius of curvature R of convex lens by Newton's ring experiment.
4. Measurement of resolving power of telescope.
5. Measurement of wavelength of Na light source using diffraction grating.
6. To determine the mass of cane sugar dissolved in water using half shade polarimeter.
7. Heating efficiency of electrical Kettle with varying voltages.
8. Measurement of resolving power of prism.
9. Measurement of resolving power of grating.
10. Measurement of frequency of AC mains by electrically maintained vibrating rod.


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Shri Vaishnav Vidyapeeth Vishwavidyalaya

Bachelor of Science (PCM, LS, BT)

SEMESTER II

COURSE CODE	CATEGORY	COURSE NAME	L	T	P	CREDITS	TEACHING & EVALUATION SCHEME				
							THEORY			PRACTICAL	
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
BSCH203	DC	Physical Chemistry II	3	1	4	6	60	20	20	30	20

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:

1. To develop the understanding of fundamentals of Thermodynamics & its applications.
2. To give basic knowledge of Chemical equilibrium and Solution.

Course Outcomes:

After completion of the course the students are expected to be able to demonstrate following knowledge, skills and attitude. The students demonstrate capability of understanding :

1. Theoretical understanding of fundamentals of Thermodynamics & its applications.
2. Become aware of fundamentals of Chemical equilibrium and Solution.

Syllabus:

UNIT I

Chemical Thermodynamics- I :

Intensive and extensive variables; state and path functions; isolated, closed and open systems. First law: Concept of heat, Q, work, W, internal energy, U, and statement of first law; enthalpy, H, relation between heat capacities, calculations of Q, W, ΔU and ΔH for reversible, irreversible and free expansion of gases (ideal and van der Waals) under isothermal and adiabatic conditions. Thermochemistry: Heats of reactions: standard states; enthalpy of formation and enthalpy of combustion and its applications; effect of temperature (Kirchhoff's equations) and pressure on enthalpy of reactions. Second Law: Concept of entropy; thermodynamic scale of temperature, statement of the second law of thermodynamics. Calculation of entropy change for reversible and irreversible processes.



Shri Vaishnav Vidyapeeth Vishwavidyalaya

Bachelor of Science (PCM, LS, BT)

SEMESTER II

UNIT II

Chemical Thermodynamics- II :

Third Law: Statement of third law, concept of residual entropy, calculation of absolute entropy of molecules. Free Energy Functions: Gibbs and Helmholtz energy; variation of S, G, A with T, V, P; Free energy change and spontaneity. Relation between Joule- Thomson coefficient and other thermodynamic parameters; inversion temperature; Gibbs-Helmholtz equation; Maxwell relations; thermodynamic equation of state. Systems of Variable Composition: Partial molar quantities, dependence of thermodynamic parameters on composition; Gibbs Duhem equation, chemical potential of ideal mixtures, change in thermodynamic functions in mixing of ideal gases.

UNIT III

Thermodynamic Equilibrium:

Criteria of thermodynamic equilibrium, degree of advancement of reaction, chemical equilibria in ideal gases. Thermodynamic derivation of relation between Gibbs free energy of reaction and reaction quotient. Equilibrium constants and their quantitative dependence on temperature, pressure and concentration (Le Chatelier Principle, Quantitatively)). Free energy of mixing and spontaneity. equilibrium between ideal gases and a pure condensed phase.

UNIT IV

Solutions and Colligative Properties-I:

Ideal solution-Thermodynamics of Ideal solutions; Raoult's Law- derivation of Raoult's Law; NonIdeal or real solutions; activity and activity coefficient; colligative properties: (i) relative lowering of vapour pressure- determination of molecular weight; osmotic pressure- osmosis, measurement of osmotic pressure, Law of osmotic pressure and determination of molecular weight.

UNIT V

Solutions and Colligative Properties-II:

Elevation in boiling point: Thermodynamic derivation of relation between molecular weight and elevation in boiling point, determination of molecular weight.

Depression of freezing point: Thermodynamic derivation of relation between molecular weight and depression of freezing point, determination of molecular weight.

Abnormal molar mass- Degree of dissociation and degree of association; Van't Hoff factor (i).



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SEMESTER II

Reference Books:

1. Atkins, P. W. & Paula, J. de Atkin's Physical Chemistry 8th Ed., Oxford University Press (2006).
2. Ball, D. W. Physical Chemistry Thomson Press, India (2007).
3. Castellan, G. W. Physical Chemistry 4th Ed. Narosa (2004).
4. Mortimer, R. G. Physical Chemistry 3rd Ed. Elsevier: NOIDA, UP (2009).



Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

Name of the Program: B. Sc. (Plain)

SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM	MST	Q/A	END SEM	Q/A				
BSMA 204	DC	Vector Algebra	60	20	20	-	-	3	1	-	4

Course Objective

To introduce the students with the Fundamentals of the Vector Algebra

Course Outcomes

After the successful completion of this course students will be able to

- 1. understand and apply the basics of the various operations in the Vector Algebra.*
- 2. demonstrate the basic concepts of the Geometry with Vectors.*
- 3. apply the techniques of vector and scalar triple product.*
- 4. solve the problem Related to geometry with Cartesian co-ordinates.*
- 5. solve the problems of the Volume of tetrahedron, work done, momentum.*

Course Content:

UNIT – I

Addition of vector, Multiplication of vectors, Vectors and scalars, Algebra of vectors, Laws of addition, Relation between two compositions, Vector Equation, Linear combinations, Expression of linear combination, Linearly independent and dependent vectors.

UNIT – II

Collinear and coplanar vectors: Origin of reference, position vectors, Section formula, Application to geometry, Condition for co linearity of three points, Parametric equation of plane, Condition for co planarity of four vectors, Proof of some well known Classical theorems.



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UNIT – III

Scalar and vector product of two or three vectors: Scalar product, Orthogonal bases, Application to Cartesian geometry, Distance between points whose rectangular Cartesian co-ordinates, Direction cosine of a line, Angle between two lines, Normal from of vector equation of a plain, Vector product or Cross product, Some properties of vector product, Interpretation of vector product as vector area, Scalar Triple product, Distribution law, Some properties of Scalar triple product, Vector triple product.

UNIT – IV

Simple Application problem to geometry: Equation of planes parallel to given vectors and passing through given points, Coplanarity of two lines, Shortest distance between two lines, Normal form of lines, Shortest distance, Change of Axes, Scalar Triple products, Two Useful Decompositions, Reciprocal System of Vectors, Solution of vector equations

UNIT – V

Tetrahedron & Application problem to Mechanics: Volume of Tetrahedron, Work done and Momentum.

Texts:

1. Vector Analysis – Louis Brand.
2. Vector Analysis – Barry Spain.
3. Vector & Tensor Analysis – Spiegel (Schaum).
4. Elementary Vector Analysis – C. E. Weatherburn (Vol. I & II).



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			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM	MST	Q/A	END SEM	Q/A				
BSMA 205	DC	Differential Calculus	60	20	20	-	-	3	1	-	4

Course Objective

To introduce the students with the Fundamentals of the Differential Calculus.

Course Outcomes

After the successful completion of this course students will be able to

- 1. understand and apply the basics of the Rational Numbers & Sequences.*
- 2. solve the problems of the Limit, Continuity and differentiation.*
- 3. apply the techniques to find the various partial differentiations.*
- 4. find maxima and minima of a function.*
- 5. know the solution of the problems of the function of the several variables.*

Course Content:

UNIT – I

Rational Numbers & Sequence: Geometrical representation. Irrational number, Real number represented as point on a line Linear Continuum. Acquaintance with Basic properties of real number (No deduction or proof is included), Definition of bounds of a sequence and monotone sequence, Limit of a sequence. Statements of limit theorems, Concept of convergence and divergence of monotone sequences - applications of the theorems, in particular, definition of ϵ . Statement of Cauchy's general principle of convergence and its application.

UNIT – II

Infinite series of constant terms &. Real-valued functions defined on an interval:



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Convergence and Divergence (definitions), Cauchy's principle as applied to infinite series (application only). Series of positive terms: Statements of Comparison test, D'Alembert's Ratio test, Cauchy's nth root test and Raabe's test – Applications. Alternating series, Statement of Leibnitz test and its applications, Limit of a function (Cauchy's definition). Algebra of limits. Continuity of a function at a point and in an interval, Acquaintance (no proof) with the important properties of continuous functions on closed intervals, Statement of existence of inverse function of a strictly monotone function and its continuity.

UNIT – III

Derivative & Successive derivative:

Derivative its geometrical and physical interpretation. Sign of derivative – Monotonic increasing and decreasing functions. Relation between continuity and derivability.

Differential – application in finding approximation, Leibnitz's Theorem and its application, Application of the principle of Maxima and Minima for a function of single variable in geometrical, physical and other problems.

UNIT – IV

Applications of Differential Calculus:

Tangents and Normal's, Pedal equation and Pedal of a curve, Rectilinear Asymptotes (Cartesian only), Definition and examples of singular points (viz. Node, Cusp, Isolated point), Statement of Rolle's Theorem and its geometrical interpretation. Mean Value, Theorems of Lagrange and Cauchy. Statements of Taylor's and Maclaurin's Theorems with Lagrange's and Cauchy's form of remainders. Taylor's and Maclaurin's Infinite series for functions like e^x , $\sin x$, $\cos x$, $(1+x)^n$, $\log(1+x)$ [with restrictions wherever necessary].

UNIT – V

Indeterminate Forms & Functions of two and three variables: L'Hospital's Rule: Statement and problems only, their geometrical representations, Limit and Continuity (definitions only) for functions of two variables, Partial Derivatives: Knowledge and use of Chain Rule, Exact differentials (emphasis on solving problems only). Functions of two variables, Successive partial derivatives: Statement of Schwarz's theorem on commutative property of mixed derivatives. Euler's theorem on homogeneous function of two and three variables. Maxima and minima of functions of not more than three variables – Lagrange's Method of undetermined multiplier – Problems only. Implicit function in case of function of two variables (existence assumed) and derivative.



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Texts:

1. Basic Real & Abstract Analysis – Randolph J. P. (Academic Press).
2. A First Course in Real Analysis – M. H. Protter & G. B. Morrey (Springer Verlag, NBHM).
3. A Course of Analysis – Phillips.
4. Problems in Mathematical Analysis – B. P. Demidovich (Mir).
5. Problems in Mathematical Analysis – Berman (Mir).
6. Differential & Integral Calculus (Vol. I & II) – Courant & John.
7. Calculus of One Variable – Maron (CBS Publication).
8. Introduction to Real Analysis – Bartle & Sherbert (John Wiley & Sons.)
9. Mathematical Analysis – Parzynski.
10. Introduction to Real Variable Theory – Saxena & Shah (Prentice Hall Publication).
11. Real Analysis – Ravi Prakash & Siri Wasan (Tata McGraw Hill).
12. Mathematical Analysis – Shantinakaran (S. Chand & Co.).
13. Theory & Applications of Infinite Series – Dr. K. Knopp.
14. Advanced Calculus – David Widder (Prentice Hall).
15. Charles Chapman Pugh: Real mathematical analysis; Springer; New York; 2002
16. Sterling K. Berberian: A First Course in Real Analysis; Springer; New York; 1994
17. Steven G. Krantz: Real Analysis and Foundations; Chapman and Hall/CRC; 2004
18. Stephen Abbott: Understanding Analysis; Springer; New York, 2002



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- 19 T. M. Apostol: Mathematical Analysis, Addison-Wesley Publishing Co. 1957
- 20 W. Ruddin: Principles of Mathematical Analysis, McGraw-Hill, New York, 1976
- 21 J. F. Randolph: Basic Real and Abstract Analysis, Academic Press; New York, 1968
- 22 Robert G Bartle, Donald R Sherbert: Introduction to real analysis; John Wiley Singapore; 1994
- 23 Differential & Integral Calculus (Vols. I & II) – Courant & John.
- 24 Differential & Integral Calculus (Vol. I) – N. Piskunov (CBS Publishers & Distributors)
- 25 Differential Calculus – Shantinakaran.
- 26 An elementary treatise on the Differential Calculus – J. Edwards (Radha Publishing House).
- 27 Advanced Calculus – David V. Widder (Prentice Hall)