



# Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
HU101	1	Foundation English I	60	20	20	0	20	3	0	2	4

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

- Develop the second language learners' ability to enhance and demonstrate LSRW Skills.
- Enable students to acquire English Language Skills to further their studies at advanced levels.
- prepare students to become more confident and active participants in all aspects of their undergraduate programs


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

- Enhance confidence in their ability to read, comprehend, organize, and retain written information.
- Write grammatically correct sentences for various forms of written communication to express oneself.

## COURSE CONTENTS:

### UNIT I

Communication: Nature, Meaning, Definition, Process, Functions and importance, Characteristics of Business Communication Verbal and Non Verbal Communication Barriers to Communication.

  
Chairperson  
Board of Studies  
Shri Vaishnav Vidyapeeth Vishwavidyalaya  
Indore

  
Joint Registrar  
Shri Vaishnav Vidyapeeth Vishwavidyalaya  
Indore



# Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

## UNIT II

Listening: Process, Types, Difference between Hearing and Listening, Benefits of Effective Listening Barriers to Effective Listening, Overcoming Listening Barriers, and How to Become an Effective Listener

## UNIT III

Basic Language Skills: Grammar and usage- Parts of Speech, Tenses, S-V Agreement, Preposition, Article, Types of Sentence, Direct - Indirect, Active - Passive voice, Phrases & Clauses.

## UNIT IV

Business Correspondence : Business Letters, Parts & Layouts of Business Letter, Resume and Job application , Application Calling/ Sending Quotations/ Orders/ Complaints. E-mail writing

## UNIT V

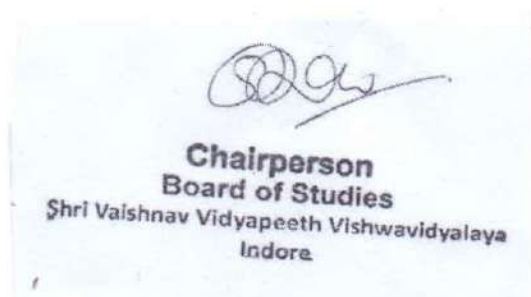
Précis Writing, Noting: The Purpose of Notes, Methods of Note-Taking, General Principles of Good Notes. Drafting: Notice, Agenda and Minutes. Advertisement: Importance, Types, Various Media of Advertising. Slogan Writing.

### Practical:

- Self Introduction
- Reading Skills and Listening Skills
- Linguistics and Phonetics
- Role play
- Oral Presentation – Preparation & Delivery using Audio – Visual Aids with stress on body language and voice modulations.

### Suggested Readings

- Ashraf Rizvi.(2005).*Effective Technical Communication*. New Delhi:Tata Mc Graw Hill
- A.J. Thomson and A.V. Martinet(1991).*A Practical English Grammar*( 4<sup>th</sup> ed). Newyork: Ox- ford IBH Pub.
- Kratz, Abby Robinson (1995). *Effective Listening Skills*. Toronto: ON: Irwin Professional Publishing.
- Adair, John (2003). *Effective Communication*. London: Pan Macmillan Ltd.





## Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

### Name of the Program: B. Sc. (Mathematics Honours)

SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM	MST	Q/A	END SEM	Q/A				
<b>BSMHMA 102</b>	DC	<b>Algebra-I (Basic Algebra)</b>	60	20	20	-	-	4	1	-	5

#### Course Objective

*To introduce the students with the Fundamentals of the Classical Algebra*

#### Course Outcomes

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

- 1. know the fundamental principles of the algebra of the complex numbers.*
- 2. apply the techniques to find the roots of an equation after knowing the relation between the roots and the coefficients.*
- 3. know the basic principles of the Modular Mathematics.*
- 4. understand and apply the basics of the Group Theory.*

#### Course Content:

##### UNIT – I

Relations, Partial Order Relation, Equivalence Relation and Partitions, Functions, Composition of functions, Invertible functions, Cardinality, Countable and Un-countable sets, A review of modular arithmetic.

##### UNIT – II

Descartes Rule of signs, Sturm's theorem and their applications. Multiple roots. Relation between roots and coefficients. Symmetric functions of roots. Quick review of algebra of complex numbers including De-Moivre's Theorem.

##### UNIT – III

Symmetries of a square, Dihedral groups, definition and examples of groups and elementary properties of groups.



## **Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore**

### **Name of the Program: B. Sc. (Mathematics Honours)**

#### **UNIT – IV**

Subgroup and its examples, Order of group and its elements, Cosets, Lagrange's Theorem, Euler's Theorem and Fermat's Theorem.

#### **UNIT – V**

Normal Subgroup, Quotient group, Cyclic group, Properties of Cyclic Groups.

#### **Reference Books:**

1. John B. Fraleigh, A First Course in Abstract Algebra, Narosa Publication.
2. Joseph A. Gallian, Contemporary Abstract Algebra, Cengage Learning.
3. M. Artin: Algebra, Pearson.
4. S. D. Dummit and M. R. Foote: Abstract Algebra, John Wiley.
5. I.N. Herstein: Topics in Algebra, Wiley.
6. N.S. Gopalkrishnan, University Algebra, John Wiley & Sons.
7. P.B. Bhattacharya, Basic Abstract Algebra, Cambridge University Press.
8. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers Delhi.



## Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

### Name of the Program: B. Sc. (Mathematics Honours)

SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM	MST	Q/A	END SEM	Q/A				
BSMHMA 103	DC	Analysis -I	60	20	20	-	-	4	1	-	5

#### Course Objective

*To introduce the students with the Fundamentals of the Mathematical Analysis*

#### Course Outcomes

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

- 1. understand and apply the basics of the Real Analysis.*
- 2. solve the fundamental problems of the convergence of a series.*
- 3. apply the fundamentals of Calculus.*

#### Course Content:

##### UNIT – I

Real numbers, Sequences, Bounded and Unbounded Sequences, Monotone sequences and their convergence, Limit Supremum, Limit Infimum and convergence criterion using them, Subsequences, Cauchy sequence and their convergence criterion.

##### UNIT – II

Series of non-negative terms, Infinite series and their convergence, Geometric series, p-series test, Comparison test, Ratio and root tests, Raabe's test, Logarithmic test, Bertrand test, Condensation test and Integral test, Absolute and conditional convergence, Alternating series and Leibnitz's theorem.

##### UNIT – III

Differentiation, Chain rule, Rolle's theorem, Mean value theorem, Higher order derivatives. Successive Differentiation, Leibnitz formula, Maclaurins and Taylors series expansion.

##### UNIT – IV

Reduction formulae and evaluation of Integrals by using Beta and Gamma functions.



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**UNIT – V**

Tangents and Normals, Curvature, Radius of curvature: Cartesian and polar curves.

**Reference Books :**

1. W. Rudin: Principles of Mathematical Analysis, Mac Graw Hill Education.
2. Tom Apostol: Mathematical Analysis, Pearson.
3. Tom Apostol: Calculus I and II, Pearson.
4. Terence Tao : Analysis I, Hindustan Book Agency.
5. W. Rudin: Real and Complex Analysis, Mac Graw Hill Education.
6. Gorakh Prasad, Differential Calculus, Pothishala pvt. Ltd. Allahabad.



# Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

Name of the Program: B. Sc. (Mathematics Honours)

B. Sc. Physics Hons

I 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 *				
BSPH102	DC	General Properties of Matter	60	20	20	30	20	3	1	0	4

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

<b>Abbreviation</b>		<b>Teacher Assessment (Theory) shall be based on following components: Quiz / Assignment/ Project / Participation in class (Given that no component shall be exceed 10 Marks).</b>
Th	Theory	
T	Tutorial	
P	Practical	<b>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).</b>



# **Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore**

## **Name of the Program: B. Sc. (Mathematics Honours)**

### **BSPH 102: General Properties of Matter**

#### **UNIT I: System of Many Particles**

System of particles and equation of motion, Centre of mass for a system of particles, motion of the centre of mass, law of conservation of linear momentum for a system of one, two, n particles, law of conservation of angular momentum for a single particle, system of n particles and examples, recoil velocity on firing a bullet from a gun, motion of a boat or propulsion of an aeroplane, jet propulsion, motion of rocket. Keplers law of Planetary motion.

#### **UNIT II: Rotational Dynamics**

Motion of rigid body, rotatory motion, equations of rotationary motion of a particle under a constant angular acceleration, angular momentum and concept of moment of inertia in rotational motion, Newtons law of motion in rotational motion, Moment of inertia and its examples, radius of gyration, rotatinal kinetic energy, relation between Torque and moment of inertia, Kinetic energy of rotation, Theorem of parallel axis, theorem of perpendicular axis.

#### **UNIT III: Elasticity**

Elasticity, Effect of temperature and impurities on elasticity of a substance; small deformation, Stress and Strain; Hook's law, elasticity constants for an isotropic solid, Young's modulus, Bulk Modulus, Modulus of rigidity, Poission's ratio, Relationship between the various elastic moduli. Bending of beam and bending moment, Cantilever, transverse oscilations of a cantilever, torsion of cylinder.

#### **UNIT IV: Oscillations**

SHM: Simple Harmonic Oscillations, Differential equation of SHM and its solution. Kinetic energy, potential energy, total energy and their time-average values. Damped oscillation. Forced oscillations: Transient and steady states; Resonance, sharpness of resonance; power dissipation and Quality Factor, motion of simple pendulum, motion of compound pendulum, motion of mass connected with spring, motion of torsional pendulum,

#### **UNIT V: Fluid Mechanics**

Ideal and Viscous fluid, Stream line and Turbulent flow, Reynold's number, Rotational and irrotatinal flow, Equation of continuity, Bernoulli's theorem and its application, Stokes law, viscous flow of fluids





## **Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore**

### **Name of the Program: B. Sc. (Mathematics Honours)**

Effect of pressure and temperature on the coefficient of viscosity, Poiseuille's formula, Intermolecular forces-cohesive and adhesive forces, Surface tension, Surface energy, Effect of temperature and impurities on the surface tension, Angle of contact; expression for pressure on a curved surface,

#### **REFERENCES**

1. Mathur, D.S. : Mechanics (S. Chand)
2. Mechanics, Berkeley Physics, vol.1, C.Kittel, W.Knight, et.al. 2007, Tata McGraw-Hill.
3. Berkley Physics Course vol. I (Mechanics)
4. Halliday and Resnic; Physics, vol. I
5. Keppler and Kolenkow; Classical Mechanics
6. Halliday and Resnick; Physics, vol. I
7. Klepper and Kolenkow; Classical Mechanics.

#### **List of experiments**

1. To verify laws of Perpendicular axes for moment of inertia.
2. To determine Acceleration due to gravity using compound pendulum.
3. To determine Coefficient of Viscosity of fluid using Stoke's law.
4. To determine Young's Modulus using Cantilever method.
5. To determine Surface Tension by Jaeger's method.
6. To determine Coefficient of Viscosity of fluid using Poiseuille's method.
7. To determine Modulus of rigidity by Torsional pendulum.
8. To determine Young's Modulus of long wire by Searl's method.
9. To determine Poisson's ratio of rubber tube.
10. To determine the force constant of the given spring and to verify that the force constant of a parallel combination of spring.



**Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore**  
**DEGREE PROGRAM B.Sc. (Maths / Physics Honours)**

**Semester-I (B.Sc. - Honours)**

SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		Th	T	P	CREDITS
			EN D SE M University Exam	T w o T e r m Ex a m	T e a c h e r s A s s e s s m e n t*	E N D S E M U n i v e r s i t y E x a m	T e a c h e r s A s s e s s m e n t*				
BSHCH105	HONS	Chemistry - I (Atomic Structure, Bonding, General Organic Chemistry)	60	20	20	30	20	3	1	2	5

**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:-**

- To give basic knowledge of Basic Chemistry.
- To understand and apply the knowledge of Atomic Structure and Bonding.

**Course Outcomes:-**

- After completion of this course the students are expected to be able to demonstrate following knowledge, skills and attitudes. The student will demonstrate capability of
- CO1. Theoretical understanding of various state of matter.
- CO2. **Became aware of the importance of Chemistry and its laws in the field of chemistry and dealing with its numerical approach.**

**UNIT 1: Inorganic Chemistry-1**

**Atomic Structure:** Review of: Bohr's theory and its limitations, dual behaviour of matter and radiation, de Broglie's relation, Heisenberg Uncertainty principle. Hydrogen atom spectra. Need of a new approach to Atomic structure.

What is Quantum mechanics? Time independent Schrodinger equation and meaning of various terms in it. Significance of  $\psi$  and  $\psi^2$ , quantum numbers, orbital angular momentum and quantum numbers  $m_l$  and  $m_s$ . Shapes of  $s$ ,  $p$  and  $d$  atomic orbitals, nodal planes. Discovery of spin, spin quantum number ( $s$ ) and magnetic spin quantum number ( $m_s$ ).

Rules for filling electrons in various orbitals, 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.



# Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

## DEGREE PROGRAM B.Sc. (Maths / Physics Honours)

### UNIT 2: Chemical Bonding and Molecular Structure

*Ionic Bonding:* General characteristics of ionic bonding. Energy considerations in ionic bonding, lattice energy and solvation energy and their importance in the context of stability and solubility of ionic compounds. Polarizing power and polarizability. Fajan's rules, ionic character in covalent compounds, bond moment, dipole moment and percentage ionic character.

*Covalent bonding:* VB Approach: 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.

### UNIT 3: Organic Chemistry-1

#### Fundamentals of Organic Chemistry

Physical Effects, Electronic Displacements: Inductive Effect, Electromeric Effect, Resonance and Hyperconjugation. Cleavage of Bonds: Homolysis and Heterolysis.

Structure, shape and reactivity of organic molecules: Nucleophiles and electrophiles. Reactive Intermediates: Carbocations, Carbanions and free radicals.

Strength of organic acids and bases: Comparative study with emphasis on factors affecting pK values. Aromaticity: Benzenoids and Hückel's rule.

### UNIT 4:

Conformations with respect to ethane, butane and cyclohexane. Interconversion of Wedge Formula, Newmann, Sawhorse and Fischer representations. Concept of chirality (upto two carbon atoms). Configuration: Geometrical and Optical isomerism; Enantiomerism, Diastereomerism and Meso compounds). Threo and erythro; D and L; *cis - trans* nomenclature; CIP Rules: R/ S (for upto 2 chiral carbon atoms) and E / Z Nomenclature (for upto two C=C systems).

### UNIT 5: Physical Chemistry-1

#### Kinetic Theory of Gases

Postulates of Kinetic Theory of Gases and derivation of the kinetic gas equation.

Deviation of real gases from ideal behaviour, compressibility factor, causes of deviation. van der Waals equation of state for real gases. Boyle temperature (derivation not required). Maxwell Boltzmann distribution laws of molecular velocities and molecular energies (graphic representation – derivation not required) and their importance.

Temperature dependence of these distributions. Most probable, average and root mean square velocities (no derivation). Collision cross section, collision number, collision frequency, collision diameter and mean free path of molecules. Viscosity of gases and effect of temperature and pressure on coefficient of viscosity (qualitative treatment only).

#### Liquids

Surface tension and its determination using stalagmometer. Viscosity of a liquid and determination of coefficient of viscosity using Ostwald viscometer. Effect of temperature on surface tension and coefficient of viscosity of a liquid (qualitative treatment only).