Shri VaishnavVidyapeethVishwavidyalaya, Indore

B.A. Honors Economics

BATCH2018-2021

SUBJECT CODE	Category	SUBJECT NAME	TEACHING &EVALUATION SCHEME								
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*	Th	T	P	CREDITS
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.(200**5**).*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					
			End Sem University Exam	Two Term Exam	Teachers Assessment*	End Sem University Exam	Teachers Assessment*	Th	T	P	CREDITS
BSPH 202	DC	Waves and Optics	60	20	20	30	20	3	1	0	4

Course Objectives	1. 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.
	2. To work ethically as member as well as leader in a diverse team.

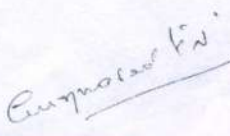| Course Ourcomes	1. Student will be able to understand and solve the problems related to Waves and Optics.
	2. Student will be able to determine physical parameter experimentally with optimal usage of resources and complete the assignments in time.

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	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).
P		Practical	

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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 presure in a plane progressive wave, Energy, Energy density of a progressive wave and intenisty 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 distructive 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, pathdifference , 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

Fraunhoffer'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.
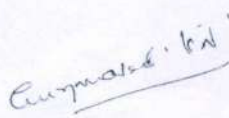
UNIT IV: Polarisation

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 eliptically polarized light, analysis of polarized light, rotation of plane of polarizaton, polarimeter, laurent'z half shade device.

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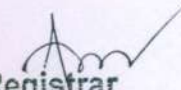
UNIT V: Laser

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, CO_2 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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B. Sc. Physics Hons
II Sem

Subject Code	Category	Subject Name	Teaching and Evaluation Scheme								
			Theory			Practical					
			End Sem University Exam	Two Term Exam	Teachers Assessment	End Sem University Exam	Teachers Assessment	Th	T	P	CREDITS
BSPHPH 203	DC	Laser and Optical Fibre	60	20	20	0	0	4	1	0	5

Course Objectives	1. To develop the comprehensive understanding of laws of physics related to Laser and Optical Fibre and ability to apply them for laying the foundation for research and development. 2. To work ethically as member as well as leader in a diverse team.
Course Ourcomes	1. Student will be able to understand and solve the problems related to Laser and Optical Fibre. 2. 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	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).
P	Practical	

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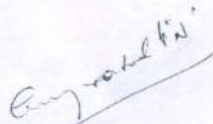# Shri Vaishnav VidhyapeethVishvavidhyalaya, Indore

BSPHPH203: Laser and Optical Fibre

UNIT I: Spontaneous and Stimulated Emission, Einstein Coefficients, Population Inversion, Pumping, Resonator, Properties of Laser: Intensity, Brightness, Monochromaticity, Coherence (Temporal and Spatial), Directionality, Ultra short duration Pulses, Polarisability. Applications of Laser based on above properties.

UNIT II: Classification of Lasers, 2, 3 and 4- Level Pumping Scheme, Pumping Techniques: Optical Pumping, Electrical Discharge Pumping, Chemical Pumping, Gas Dynamic Pumping, Injection Pumping. Various Laser Systems: Ruby Laser, He-Ne Laser, CO_2 Laser, Nd: YAG Laser Diode laser.

UNIT III: Functions of Resonator, Modes of Resonator, Types of resonator: Stable and Unstable resonator, Mode fillingand stability in various types of resonators (Plane–Plane, Plano–Concave, Concave–Concave, Plano–Convex, Convex–Convex Resonators), Ring resonator.

UNIT IV: Applications of Lasers: Lasers Cutting, Lasers Welding, Lasers Drilling, Lasers Surface treatments; Medical applications of laser, Laser in Communication, Doppler velocitymetery, Pollution detection & Remote Sensing, Defence applications of laser, Holography: Principal, Construction of Master Hologram and Reconstruction of Holograms.
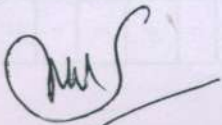
UNIT V: Introduction to Optical fibre, Acceptance Angle and Cone, Fractional refractive index change, Numerical Aperture, Modes of Propagation, Types of Optical fibre (SMF & MMF), V- Number, Pulse dispersion: Its types and effect on information carrying capacity, Graded Index Optical fibre, Attenuation and Losses in fibre and Applications of Optical fibre, Applications of fiber optics.

REFERENCES
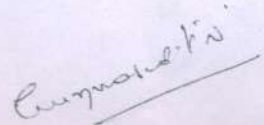
1. Introduction to Atomic and Molecular Spectroscopy by V.K.Jain
2. Optical Electronics, M. Yariv.
3. Laser Spectroscopy, Demtroder:
4. Non-Linear Spectroscopy, Letekhov :
5. Principles of Lasers, Svelto
6. Lasers and Non-linear Optics, B.B. Laud.

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SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL					
			End Sem University Exam	Two Term Exam	Teachers Assessment*	End Sem University Exam	Teachers Assessment*	L	T	P	CREDITS
BSCS203	COMPULSORY	Object Oriented Programming with C++	60	20	20			3	1	0	4

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical;   C - Credit;
Q/A – Quiz/Assignment/Attendance, MST - Mid Sem Test.
*Teacher Assessment shall be based on following components:
Quiz/Assignment/project/Participation in class (Given that no component shall be exceed 10 Marks)

Course Educational Objectives(CEOs):

- To familiarize the students with programming and to encourage them to develop their logic.
- To make students well versed with C++ language to solve problems efficiently.
- Using simple and well drawn illustrations develop their programming skills using modular programming.

Course Outcomes (COs): Student will be able to:
- Develop algorithms for problems.
- To understand the object Oriented paradigm
- Apply the programming concepts to solve the given problems.
- Write the programs using modular programming.
- Understand and write programs using various data structures very efficiently.
- Write the programs using pointers and to manage memory.
- To apply the knowledge of Object Oriented Methodology to write reusable code.
- Implement programs of file handling.

UNIT I
Object-Oriented Programming Concepts: Introduction, comparison between procedural programming paradigm and object-oriented programming paradigm, basic concepts of object-oriented programming — concepts of an object and a class, interface and implementation of a class, operations on objects, relationship among objects, abstraction, encapsulation, data hiding, inheritance, overloading, polymorphism, messaging.

UNIT II
Standard Input/output: Concept of streams, hierarchy of console stream classes, input/output using overloaded operators >> and << and member functions of i/o stream classes, formatting output, formatting using ios class functions and flags, formatting using manipulators.

UNIT III
Classes and Objects: Specifying a class, creating class objects, accessing class members, access specifiers, and static members, use of const keyword, friends of a class, empty classes, nested classes, local classes, abstract classes, container classes, bit fields and classes.

UNIT IV
Pointers and Dynamic Memory Management: Declaring and initializing pointers, accessing data through pointers, pointer arithmetic, memory allocation (static and dynamic), dynamic memory management using new and delete operators, pointer to an object, this pointer, pointer related problems - dangling/wild pointers, null pointer assignment, memory leak and allocation failures.

UNIT V
Constructors and Destructors: Need for constructors and destructors, copy constructor, dynamic constructors, explicit constructors, destructors, constructors and destructors with static members, Overloading operators, rules for overloading operators, overloading of various operators, type conversion - basic type to class type, class type to basic type, class type to another class type

Text Books

- Lafore R. "Object Oriented Programming in C++", Galgotia Pub.
- Lee "UML & C++ a practical guide to Object Oriented Development 2 ed, Pearson.
- Scheildt "C++ the complete reference 4ed, 2003.
- Hans Erit Eriksson, "UML 2 toolkit" Wiley.
- Balagurusawmy , "Object Orienter Programming with C++".

References

- B.G., Boach "Object Oriented Analysis & Design with Applications", Addision Wesly.
- S. Parate "C++ Programming". BPB. 8. Boggs "Mastering UML" BPB Publications.
- Mastering C++ by Venugopal TMH

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

Semester-II (B.Sc. - Honours)

SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*	Th	T	P	CREDITS
BSHCH205	HONS	Chemistry - II (Chemical Energetic, Equilibria & Functional Organic Chemistry)	60	20	20	30	20	3	1	2	5

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

Course Objectives:-

To give basic knowledge of state of matter.

To understand and apply the knowledge of equilibria.

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 equilibria and its laws in the field of chemistry and dealing with its numerical approach.

UNIT 1: Physical Chemistry

Chemical Energetic

Review of thermodynamics and the Laws of Thermodynamics.
Important principles and definitions of thermochemistry. Concept of standard state and standard enthalpies of formations, integral and differential enthalpies of solution and dilution. Calculation of bond energy, bond dissociation energy and resonance energy from thermochemical data. Variation of enthalpy of a reaction with temperature – Kirchhoff's equation.

UNIT 2: Chemical Equilibrium:

Free energy change in a chemical reaction. Thermodynamic derivation of the law of chemical equilibrium. Distinction between G and G^{o}, Le Chatelier's principle. Relationships between K_p, K_c and K_x for reactions involving ideal gases.

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UNIT 3:

Functional group approach for the following reactions (preparations & reactions) to be studied in context to their structure.

UNIT 4:

Preparation (Case benzene): from phenol, by decarboxylation, from acetylene, from benzene sulphonic acid.

Reactions: (Case benzene): Electrophilic substitution: nitration, halogenation and sulphonation. Friedel-Craft's reaction (alkylation and acylation) (upto 4 carbons on benzene). Side chain oxidation of alkyl benzenes (upto 4 carbons on benzene).

UNIT 5: Alcohols, Phenols and Ethers (Upto 5 Carbons)

Alcohols: *Preparation:* Preparation of 1°, 2° and 3° alcohols: using Grignard reagent, Ester hydrolysis, Reduction of aldehydes, ketones, carboxylic acid and esters.

Reactions: With sodium, HX (Lucas test), esterification, oxidation (with PCC, alk. $KMnO_4$, acidic dichromate, conc. HNO_3). Oppeneauer oxidation *Diols:* (Upto 6 Carbons) oxidation of diols. Pinacol-Pinacolone rearrangement.

Phenols: (Phenol case) *Preparation:* Cumene hydroperoxide method, from diazonium salts. *Reactions:* Electrophilic substitution: Nitration, halogenation and sulphonation. Reimer-Tiemann Reaction, Gattermann-Koch Reaction, Houben– Hoesch Condensation, Schotten – Baumann Reaction.

Ethers (aliphatic and aromatic): *Cleavage of ethers with HI.*

Reference Books:

1. Graham Solomon, T.W., Fryhle, C.B. & Dnyder, S.A. *Organic Chemistry,* John Wiley & Sons (2014).
2. McMurry, J.E. *Fundamentals of Organic Chemistry*, 7th Ed. Cengage Learning India Edition, 2013.
3. Sykes, P. *A Guidebook to Mechanism in Organic Chemistry,* Orient Longman, New Delhi (1988).
4. Finar, I.L. *Organic Chemistry* (Vol. I & II), E.L.B.S.
5. Morrison, R.T. & Boyd, R.N. *Organic Chemistry*, Pearson, 2010.

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

SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM	MST	Q/A	END SEM	Q/A				
BSHMA 204	Hons	MATHEMATICS – II (Vector Algebra & Differential Calculus)	60	20	20	-	-	4	-	-	4

Course Objective

To introduce the students with the Fundamentals of the Vector Algebra and Differential Calculus.

Course Outcomes

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

1. understand and apply the basics of the Vector Algebra.
2. know the fundamental principles of the algebra of the real numbers and sequences.
3. apply the techniques to test the convergence and the divergence of an infinite series.
4. know the basic principles of the Differential Calculus of single real variable.
5. understand and apply the basics of the Calculus of more than one real variable.

Course Content:

UNIT – I
Vector Algebra: Addition of Vectors. Multiplication of a Vector by a scalar. Collinear and Coplanar Vectors. Scalar and Vector products of two and three vectors. Simple applications to problems of Geometry. Vector equation of plane and straight line. Volume of Tetrahedron. Application to problems of Mechanics (Work done and Moment).

UNIT – II
Differential Calculus: Rational Numbers. 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). **Sequence:** Definition of bounds of a sequence and monotone sequence. Limit of a sequence. Statements of limit theorems.

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Concept of convergence and divergence of monotone sequences – applications of the theorems, in particular, definition of e. Statement of Cauchy's general principle of convergence and its application.

UNIT – III

Infinite series of constant terms: 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. **Real-valued functions defined on an interval :** Limit of a function (Cauchy's definition). Algebra of limits. Continuity of a function at a point and in an interval. Acquianance (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 – IV

Derivative: Its geometrical and physical interpretation. Sign of derivative – Monotonic increasing and decreasing functions. Relation between continuity and derivability. Differential – application in finding approximation. **Successive derivative:** 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. **Applications of Differential Calculus:** Tangents and Normals, Pedal equation and Pedal of a curve. Rectilinear Asymptotes (Cartesian only).

UNIT – V

Statement of Rolle's theorem and its geometrical interpretation. Mean Value Theorems of Lagrange and Cauchy. Statements of Taylors and Maclaurin's Theorems with Lagrange's and Cauchy's form of remainders. Taylor's and Maclaurin's Infinite series for functions like ex, sin x, cos x. $(1+x)^n$, log(1+x) [with restrictions wherever necessary]. **Indeterminate Forms:** L'Hospital's Rule : Statement and problems only. **Functions of two and three variables:** 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).

BOOKS:

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).
5. Basic Real & Abstract Analysis – Randolph J. P. (Academic Press).
6. A First Course in Real Analysis – M. H. Protter & G. B. Morrey (Springer Verlag, NBHM).
7. A Course of Analysis – Phillips.
8. Problems in Mathematical Analysis – B. P. Demidovich (Mir).
9. Problems in Mathematical Analysis – Berman (Mir).
10. Differential & Integral Calculus (Vol. I & II) – Courant & John.

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