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 202	DC	**Algebra II (Groups & Rings)**	60	20	20	-	-	4	1	-	5

Course Objective

To introduce the students with the Fundamentals of the Group and Ring theorems in Algebra.

Course Outcomes

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

1. *understand and apply the basics of the Group theorems.*
2. *know the fundamentals of the Ring and Field theorems.*
3. *apply the concepts of the homomorphisms and isomorphism theorems for rings.*
4. *know the techniques of the Domain of the Algebra.*
5. *understand the principles of the Polynomial rings.*

Course Content:

Unit I:.
somorphism theorems; group actions; orbit-stabiliser theorem; conjugacy; Sylow's theorem
Unit II:.
Simple group, direct product; structure of finite abelian groups (statement only),.
Unit III:.
Deffinition of rings and fields; ideals and quotient ring; ring homomorphisms and isomorphism theorems for rings;
Unit IV:
Prime and maximal ideals; integral domains; characteristic; field of fractions; Euclidean domains; unique factorisation domains; principle ideal domains;
Unit V:
Polynomial rings.

Reference Books :

1. M. Artin: Algebra.
2. S. D. Dummit and M. R. Foote: Abstract Algebra.
3. I. N. Herstein: Topics in Algebra.

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4. C. R. Rao: Linear Statistical Inference and Its Applications.
5. A. Ramachandra Rao and P. Bhimasankaram: Linear Algebra.
6. K. Ho_man and R. Kunze: Linear Algebra.
7. F. E. Hohn: Elementary Matrix Algebra.
8. P. R. Halmos: Finite Dimensional Vector Spaces.
9. R. B. Ash: Abstract Algebra: The Basic Graduate Year. Free download from http://www.math.uiuc.edu/ r-ash/Algebra.html.

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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 203	DC	**Analysis II**	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 Integral Calculus.*
2. *know the fundamentals of the Beta and the Gamma function.*
3. *apply the concepts of the Convergence of the Series.*
4. *know the techniques of the Domain of the Algebra.*
5. ***understand the principles of the Approximation Theorem.***

Course Content:

Unit I:.
Riemann integration. Fundamental theorem of Calculus. Computation of definite integrals. Improper integrals,
Unit II:.
Beta & Gamma functions.
Unit III:.
Sequences and series of functions. Point wise and uniform convergence. Term-by-term differentiation and integration.
Unit IV:
Power series
Unit V:
Weierstrass approximation theorem.

Reference Books :

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1. W. Rudin: Principles of Mathematical Analysis.
2. Tom Apostol: Mathematical Analysis.
3. Tom Apostol: Calculus I and II.
4. Terence Tao : Analysis I.
5. W. Rudin: Real and Complex Analysis.

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U.G. PROGRAM B. Sc. Physics (Hons.)

SEM-II-Paper-I

Waves, Acoustics and Optics

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*				
BSPH 202	DC	Waves ,Acoustics and Optics	60	20	20	30	20	3	1	4	6

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 Objectives:-

1. To develop the comprehensive understanding of laws of physics related to Waves, Acoustics 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 Outcomes:-

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

BSPH 202: Waves, Acoustics and Optics

Unit-I:

Waves in Media : Speed of transverse waves on a uniform string, speed of longitudinal waves in a fluid, energy density and energy transmission in waves, typical measurements. Waves over liquid surface : gravity waves and ripples Group velocity and phase velocity, their measurements
Superposition of waves: Linear homogeneous equation and the superposition principle, non linear superposition and consequences.
Standing waves: Standing waves as normal modes of bounded systems, examples. Harmonics and the quality of sound; Chaldni's figures and vibrations of a drum . Production and detection of ultrasonic and instrasonic waves and applications.

Unit-II:

Noise and Music ; The human ear and its responses ; limits of human audibility, intensity and loudness, bel and decibel, the musical scale, temperament and musical instrument.
Reflection, refraction and diffraction of sound. Acoustic impedance of a medium, percentage reflection and refraction at a boundary, impedance matching for transducers, diffraction of sound, principle of a sonar system ranging.

Unit-III:

Applied acoustics: Transducers and their characteristics, recording and reproduction of sounds, various systems, Measurements of frequency, waveform, intensity and velocity. The acoustics of halls, reverberation period, Sabine's formula.
Fermat's Principle of extremum path, the aplantic points of a sphere and other applications. General theory of image formation: cardinal points of an optical system, general relationship, lens and lens combinations, Lagrange equation of magnification, telescopic combinations, telephoto lenses and eyepieces.

UNIT IV:

Introduction to Interference, Fresnel's Bi-prism, Interference in Thin films, Newton's rings experiment, Michelson's interferometer and its application, Introduction to Diffraction and its Types, Diffraction at single slit, double slit and diffraction grating

Unit V:

Rayleigh criterion, resolving power of grating, Concept of polarized light, Brewster's laws, Double refraction, Nicol prism, quarter and half wave plate, circularly & elliptically polarized light.

References:

1. Optics by Ajoy Ghatak, McGraw-Hill International Editions.
2. *A text book on Optics by Subrahmanyam.*
3. *Optics by Brijlal and Avadhanulu*, South Asian Publication.
4. *Concept of Physics* by H.C. Verma, Bharati Bhavan Publishers.

List of Experiments (Any Eight)

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 "λ" 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 A.C. mains by electrically maintained vibrating rod.

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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		Th	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
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°, 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^{o}, 2^{o} and 3^{o} 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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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*				
HU201	**II**	**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:

- Participation 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.

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UNIT II

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

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.

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