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 402	DC	**Analysis - III**	60	20	20	-	-	4	1	-	5

Course Objective

To introduce the students with the Mathematical Analysis.

Course Outcomes

After the successful completion of this course students will be able to understand and apply the basics of the Differential and the Integral Calculus of the function of the several variables.

Course Content:

Unit I:
Functions of several variables. Continuity. Partial derivatives. Differentiability.
Unit II:
Taylor's theorem. Multiple integrals. Repeated integrals.
Unit III:
The Jacobian theorem. Line, surface and volume integrals. Green's Theorem.
Unit IV:
Statements of Inverse and Implicit Function Theorems.
Unit V:
Maxima and minima. Lagrange multiplier.

Reference Books :

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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Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

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

1. M.P. do Carmo: Differential Geometry of Curves and Surfaces.
2. J. A. Thorpe: Eelementary Topics in Differential Geometry.
3. Spivak: Calculus on manifolds.

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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 403	DC	**Geometry - I**	60	20	20	-	-	4	1	-	5

Course Objective

To introduce the students with the Two and the Three Dimensional Geometry.

Course Outcomes

After the successful completion of this course students will be able to understand and apply the basics of the Geometry.

Course Content:

Unit I:
Geometry: Quick review of two-dimensional coordinate geometry, specially conics and system of circle. Rectangular Cartesian co-ordinates, cylindrical, polar and spherical polar co-ordinates in 3-dimensions.

Unit II:
Projection of a vector on a co-ordinate axis. Inclination of a vector with an axis. Direction cosines of a vector. Distance between two points. Division of a directed line segment in a given ratio. Planes: Equation of a plane, signed distance of a point from a plane. Equation of a plane passing through the intersection of two planes. Angle between two intersecting planes. Bi- sectors of angles between two intersecting planes. Parallelism and perpendicularity of two planes.

Unit III:
Lines in space: Equations of a line. Rays or half lines. Direction cosines of a ray. Angle between two rays. Distance of a point from a line. Condition of coplanarity of two lines. Skew-lines. Shortest distance.

Unit IV:
Curves in two and three dimensions. Parametrized curves, re-parametrization. Regular and singular points.

Unit V:
Curvature and torsion for space curves. Existence theorem for space curves. Serret-Frenet formula for space curves.

Reference Books :

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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 404	DC	**Computer Programming and Data Structures**	60	20	20	-	-	3	1	-	4

Course Objective

To introduce the students with the Computer Programming and data Structures.

Course Outcomes

After the successful completion of this course students will be able to understand and apply the basics of the Computer Programming and data Structures.

Course Content:

Unit I :
Introduction to programming in the C language: arrays, pointers, functions,
Unit II:
Recursive programming and linked lists, file handling;
Unit III:
Notion of algorithms and their complexity, order notation; lists, stacks, queues and trees;
Unit IV:
Searching and sorting algorithms; string algorithms; object-oriented programming
Unit V:
Introduction to C++.

Reference Books :

1. Brian Kernighan and Dennis Ritchie: The C Programming Language.
2. Ellis Horowitz and Sartaj Sahani: Fundamentals of Data Structures.

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BBAI501 HUMAN VALUES AND PROFESSIONAL ETHICS

SUBJECT CODE	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
		THEORY			PRACTICAL		L	T	P	CREDITS
		END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BBAI501	Human Values and Professional Ethics	60	20	20	-	-	4	-	-	4

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

Course Objectives

The objective of the course is to disseminate the theory and practice of moral code of conduct and familiarize the students with the concepts of "right" and "good" in individual, social and professional context

Course Outcomes

1. Help the learners to determine what action or life is best to do or live.
2. Right conduct and good life.
3. To equip students with understanding of the ethical philosophies, principles, models that directly and indirectly affect business.

COURSE CONTENT

Unit I: Human Value

1. Definition, Essence, Features and Sources
2. Sources and Classification
3. Hierarchy of Values
4. Values Across Culture

Unit II: Morality

1. Definition, Moral Behaviour and Systems
2. Characteristics of Moral Standards
3. Values Vs Ethics Vs Morality
4. Impression Formation and Management

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Unit III: Leadership in Indian Ethical Perspective.

1. Leadership, Characteristics
2. Leadership in Business (Styles), Types of Leadership (Scriptural, Political, Business and Charismatic)
3. Leadership Behaviour, Leadership Transformation in terms of Shastras (Upanihads, Smritis and Manu-smriti).

Unit IV: Human Behavior – Indian Thoughts

1. Business Ethics its meaning and definition
2. Types, Objectives, Sources, Relevance in Business organisations.
3. Theories of Ethics, Codes of Ethics

Unit V: Globalization and Ethics

1. Sources of Indian Ethos & its impact on human behavior
2. Corporate Citizenship and Social Responsibility – Concept (in Business),
3. Work Ethics and factors affecting work Ethics.

Suggested Readings

1. Beteille, Andre (1991). ***Society and Politics in India***. Athlone Press:New Jersey.
2. Chakraborty, S. K. (1999). ***Values and Ethics for Organizations***. oxford university press
3. Fernando, A.C. (2009). ***Business Ethics - An Indian Perspective*** .India: Pearson Education: India
4. Fleddermann, Charles D. (2012). ***Engineering Ethics***. New Jersey: Pearson Education / Prentice Hall.
5. Boatright, John R (2012). ***Ethics and the Conduct of Business.***Pearson. Education: New Delhi.
6. Crane, Andrew and Matten, Dirk (2015). ***Business Ethics***. Oxford University Press Inc:New York.
7. Murthy, C.S.V. (2016). Business ***Ethics – Text and Cases***. Himalaya Publishing House Pvt. Ltd:Mumbai
8. Naagrajan, R.R (2016). ***Professional Ethics and Human Values***. New Age International Publications:New Delhi.

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

SEM-IV-P-I

Electrostatics & Magneto statics

SUBJECT CODE	Category	SUBJECT NAME	TEACHING &EVALUATION SCHEME								
			THEORY			PRACTICAL		Th	T	P	CREDITS
			End Sem Uni-versity Exam	Two Term Exam	Teachers Ass-sessment *	End Sem Uni-versi-ty Exam	Teachers Ass-sessment*				
BSPH402	DC	Electrostatics & Magneto statics	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 MidSem 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,Electrostatics,Magnetostatics 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 toElectrostatics.
2. Student will be able to understand and solve the problem related toMagnetostatics
3. Student will be able to determine physical parameter experimentally with optimal usage of resources and complete the assignments in time.

BSPH 402-Electrostatics &Magnetostatics

Unit-1

Electric Circuits AC Circuits: - Complex Reactance and Impedance. Series LCR Circuit: Resonance, Power Dissipation and Quality Factor. and Band Width. Parallel LCR Circuit.Network theorems: - Ideal Constant-voltage and Constant-current Sources. Network Theorems: Thevenin theorem, Norton theorem, Superposition theorem, Reciprocity theorem, and Maximum Power Transfer theorem

Unit-2

Electrostatics Coulombs law in vacuum expressed in vector forms, calculations of electric field E for simple distributions of charge at rest, dipole and quadruple fields. Relation between electric field & electric potential ($E = -\nabla V$), torque on a dipole in a uniform electric field and its energy, flux of the electric field, Gauss's law and its application.. Dielectrics, parallel plate capacitor with a dielectric, dielectric constant, polarization and polarization vector P, relation between displacement vector D, E and P. Molecular interpretation ofClaussius-Mossotti equation

Unit-3

Magnetostatics Force on a moving charge, Lorentz force equation and definition of B, force on a straight conductor carrying current in a uniform magnetic field, torque on a current loop, magnetic dipole moment, angular momentum and gyro magnetic ratio, Biot and Savart's law, Electromagnetic induction, Faraday's Laws, Electromotive force, Integral and differential forms of Faraday's laws, Self and mutual inductance, Transformers, Energy in a static magnetic field, Maxwell's displacement current, Derivations of Maxwell's equations, Electromagnetic field energy density. Poynting vector,

Unit-4

Current Electricity: Steady current, current density J, non-steady currents and continuity equation, Kirchoff's laws and analysis of multi loop circuits, growth and decay of current in LR and CR circuits, decay constants, LCR circuits. AC circuits, complex numbers and their applications in solving AC circuits problems, complex impedance and reactance, series and parallel resonance. Q-factor, power consumed by an A.C. circuit, power factor, Y and Δ networks and transmission of electric power.

Unit-5

Dielectric Properties of Matter Dielectrics:- Electric Field in Matter. Dielectric Constant.Parallel Plate Capacitor with a Dielectric.Polarization, Polarization Charges and Polarization Vector.Electric Susceptibility.Gauss's law in Dielectrics.Displacement vector D. Relations between the three Electric Vectors. Capacitors filled with Dielectrics.

References:

1. Introduction to Electrodynamics: David J. Griffiths, 4th Edition, Printice Hall.
2. Classical Electrodynamics: Jhon David Jackson, Jhon Wiley & Sons.
3. Electrodynamics: Emi Cossor&Bassin Lorraine, Asahi Shimbunsha Publishing Ltd.
4. From Neuron to Brain: Kuffler and Nicholas, Sinauer Associates, Inc Pub. Sunderland, Masschuetts (Reference for topics of Bioelectricity) Department of Higher Education, Government of Mad

List of Experiments:

1. Hall probe method for measurement of resistivity.
2. To Study Series Resonance CKT
3. Charging and discharging of Capacitor through resistance
4. Study of B-H Curve (Magneto statics)
5. To study Parallel Resonance
6. Measurement of Frequency of A.C. mains by electrically maintained vibrating rod.(Electromagnetic induction)
7. Growth and decay of current in LR
8. Determination of e/m using Thomson's method.
9. Verification of Thevenin theorem
10. Verification of Norton theorem
11. Verification of Superposition theorem
12. Verification of Maximum Power Transfer theorem.

Shri Vaishnav Vidyapeeth Vishwavidyalaya
Shri Vaishnav Institute of Science
B.Sc. (Honours)

Semester IV (B.Sc. Honours) Chemistry Syllabus for Physics & Maths Honours

SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		Th	T	P	CR EDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment *				
BSHCH 405	HONS	ADVANCE CONCEPT OF GENERAL CHEMISTRY - II	60	20	20	0	0	4	0	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 exceed more than 10 marks.

Course Objective:

(i) To develop the understanding of fundamentals of Organic, Inorganic and Physical Chemistry.
(ii) To give knowledge of Chemistry.

Course Outcomes:

After completion of the course the students will be able to understand:
Fundamentals & applications of Organic, Inorganic and Physical Chemistry.

ADVANCE CONCEPT OF GENERAL CHEMISTRY - II

Unit I: Carbonyl Compounds:

Structure, reactivity and preparation; Nucleophilic additions, Nucleophilic addition-elimination reactions with ammonia derivatives with mechanism; Mechanisms of Aldol and Benzoin condensation, Knoevenagel condensation, Claisan-Schmidt, Perkin, Cannizzaro and Wittig reaction, Beckmann and Benzil-Benzilic acid rearrangements, haloform reaction and Baeyer Villiger oxidation, α-substitution reactions, oxidations and reductions (Clemmensen, Wolff-Kishner, LiAlH4, NaBH4, MPV, PDC and PGC); Addition reactions of unsaturated carbonyl compounds: Michael addition. Active methylene compounds: Keto-enol tautomerism. Preparation and synthetic applications of diethyl malonate and ethyl acetoacetate:

Unit II: Carbohydrates

Occurrence, classification and their biological importance Monosaccharides: Constitution and absolute configuration of glucose and fructose, epimers and anomers, mutarotation, determination of ring size of glucose and fructose,] Haworth projections and conformational structures; Interconversions of aldoses and ketoses; Killiani-Fischer synthesis and Ruff degradation; Disaccharides – Structure elucidation of maltose, lactose and sucrose Polysaccharides – Elementary treatment of starch, cellulose and glycogen.

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Unit III : Chemical thermodynamics:

Intensive and extensive variables; state and path functions; isolated, closed and open systems; zeroth law of thermodynamics.

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, U and H for reversible, irreversible and free expansion of gases (ideal and van der Waals) under isothermal and adiabatic conditions.

Second Law: Concept of entropy; thermodynamic scale of temperature, statement of the second law of thermodynamics; molecular and statistical interpretation of entropy. Calculation of entropy change for reversible and irreversible processes.

Unit IV: Electrochemistry

Quantitative aspects of Faraday's laws of electrolysis, rules of oxidation/reduction of ions based on half-wave potentials, applications of electrolysis in metallurgy and industry. Chemical cells, reversible and irreversible cells with examples. Electromotive force of a cell and its measurement, Nernst equation; Standard electrode (reduction) potential and its application to
different kinds of half-cells. Qualitative discussion of potentiometric titrations (acid-base, redox, precipitation).

Unit V: Coordination Chemistry

Werner's theory, valence bond theory (inner and outer orbital complexes), Electro neutrality principle and back bonding. Crystal field theory. Octahedral vs. tetrahedral coordination, tetragonal distortions from octahedral geometry Jahn-Teller theorem, square planar geometry. Qualitative aspect of Ligand field and MO Theory. IUPAC nomenclature of coordination compounds, isomerism in coordination
compounds. Stereochemistry of complexes with 4 and 6 coordination numbers. Chelation.

Books:

1. Atkins, P. W. & Paula, J. de *Atkin's Physical Chemistry* 8th Ed., Oxford University Press.
2. Castellan, G. W. *Physical Chemistry* 4th Ed. Narosa (2004).
3. Engel, T. & Reid, P. *Thermodynamics, Statistical Thermodynamics, & Kinetics* Pearson Education, Inc: New Delhi (2007).
4. McQuarrie, D. A. & Simon, J. D. *Molecular Thermodynamics* Viva Books
5. Morrison, R. T. & Boyd, R. N. *Organic Chemistry*, Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).
6. Finar, I. L. *Organic Chemistry* (*Volume 1*), Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).

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