



Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

ML-301 ENVIRONMENT AND ENERGY STUDIES

SUBJECT CODE	CATEGORY	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*				
ML-301	Compulsory	Environment and Energy Studies	60	20	20	0	0	4	0	0	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 Objectives :

1. Understand sources of information required for addressing environmental challenges.
2. Identify a suite of contemporary tools and techniques in environmental informatics.
3. Apply literacy, numeracy and critical thinking skills to environmental problem-solving.

Course Outcomes

1. Apply the principles of ecology and environmental issues that apply to air, land and water issues on a global scale.
2. Develop critical thinking and/or observation skills, and apply them to the analysis of a problem or question related to the environment.
3. Demonstrate ecology knowledge of a complex relationship between predators, prey, and the plant community.

Unit I: Environmental Pollution and Control Technologies - Environmental Pollution & Control: Classification of pollution, Air Pollution: Primary and secondary pollutants, Automobile and industrial pollution, Ambient air quality standards. Water pollution: Sources and types, Impacts of modern agriculture, degradation of soil. Noise Pollution: Sources and Health hazards, standards, Solid Waste management composition and characteristics of e - Waste and its management. Pollution control technologies: Wastewater Treatment methods: Primary, Secondary and Tertiary.

Unit II: Natural Resources - Classification of Resources: Living and Non - Living resources, water resources: use and over utilization of surface and ground water, floods and droughts, Dams: benefits and problem, Mineral resources: use and exploitation, environmental effects of extracting and using mineral resources, Land resources: Forest resources, Energy resources:

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Growing energy needs, renewable energy source, case studies.

Unit III: Ecosystems: Definition, Scope and Importance ecosystem. Classification, Structure and function of an ecosystem, Food chains, food webs and ecological pyramids. Energy flow in the ecosystem, Biogeochemical cycles, Bioaccumulation, Ecosystem Value, Devices and Carrying Capacity, Field visits.

Unit IV: Biodiversity and its Conservation - Introduction - Definition: genetic, species and ecosystem diversity. Bio-geographical classification of India - Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values - . Biodiversity at global, National and local levels. - . India as a megadiversity nation - Hot-spots of biodiversity - Threats to biodiversity: habitat loss, poaching of wildlife, man wild life conflicts; Conservation of biodiversity: In-situ and Ex-situ conservation. National Biodiversity Act.

Unit V: Environmental Policy, Legislation & EIA - Environmental Protection act, Legal aspects Air Act- 1981, Water Act, Forest Act, Municipal solid waste management and handling rules, biomedical waste management and handling rules, hazardous waste management and handling rules. EIA: EIA structure, methods of baseline data acquisition. Overview on Impacts of air, water, biological and Socio- economical aspects. Strategies for risk assessment, Concepts of Environmental Management Plan (EMP)

Recommended Readings:

1. Agarwal, K.C. (2001). *Environmental Biology*. Bikaner: Nidi Pub. Ltd.
2. Brunner, R.C. (1993). *Hazardous Waste Incineration*. New Delhi: McGraw Hill Inc.
3. Clank, R.S. (2001). *Marine Pollution*. New York: Oxford University Press.
4. De, A.K. (2001). *Environmental Chemistry*. New Delhi: Wiley Western Ltd.
5. Bharucha , Erach (2005). *Environmental Studies for Undergraduate Courses*. New Delhi: University Grants Commission.
6. Rajagopalan, R. (2006). *Environmental Studies*. New York: Oxford University Press.
7. AnjiReddy, M. (2006). *Textbook of Environmental Sciences and Technology*. BS Publication.
8. Wright, Richard T. (2008). *Environmental Science: towards a sustainable future* .New Delhi: PHL Learning Private Ltd.
9. Gilbert M. Masters and Wendell P. Ela .(2008). *Environmental Engineering and science*. University Kindom: PHI Learning Pvt Ltd.
10. Botkin ,Daniel B. & Edwards A. Keller(2008). *Environmental Science*. New Delhi: Wiley INDIA edition.
11. Kaushik ,Anubha (2009). *Environmental Studies*. New Delhi: New age international publishers.

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Indore



DEGREE PROGRAM

B.Sc III Sem

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 *				
BSPH302	DC	Electronics: Principles and Devices	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 Electronics: Principles and Devices 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 Electronics: Principles and Devices,
2. Student will be able to determine physical parameter experimentally with optimal usage of resources and complete the assignments in time.



BSPH 302- Electronics: Principles and Devices

Unit 1:-

Classical FE Model, Debye Model, Sommerfeld Model, Band Model, Kronig-Penney Model, Effective Mass, Formulation of Energy Bands, Gap in Solids, Motion of e^- in Metals, Density of States, Fermi Level, Fermi Velocity and Fermi Dirac Distribution of e^- Inside a Material.

Unit-2

Semiconductors; Intrinsic-semiconductors, electrons and holes, Fermi Level, Temperature dependence of electron and hole concentrations Doping: impurity states, n and p type semiconductors, conductivity, mobility, Hall Effect, Hall Coefficient. Semiconductor devices: Metal-semiconductor junction, p-n junction, majority and minority carriers,

Unit-3

Zener and tunnel diodes, light emitting diode, solar cell Diode as a circuit element, load line concept, rectification, ripple & factor, Zener diode, voltage stabilization, IC voltage regulation. FETs: Field effect transistors JEET, BJT, MOSFET, Transistors, Characteristics of a transistor in CB, CE and CC mode, h-parameters,

Unit-4

Amplifiers, Small signal amplifiers; General Principle of operation, classification, distortion, RC coupled amplifier, gain frequency response, input and output impedance, multistage amplifiers. Transformer coupled amplifiers, Equivalent circuits at low, medium and high frequencies, emitter follower, low frequency common source and common drain amplifier, Noise in electronic circuits.

Unit-5

Oscillators, Feedback in amplifiers, principle, its effects on amplifiers, characteristics Principle of feedback amplifier, Barkhausen criteria, Hartley, Colpitt and Wein bridge oscillators. Condition for oscillations and frequency derivation - Crystal oscillator - UJT Relaxation oscillator. Monostable, Bi-stable and Astable multivibrators

References:

1. Introduction to Solid State Physics C. Kittel
2. Solid State Physics : R.L, Singhal
3. Micro Electronics J- Millman and A. Grabel
4. Electronic Devices and Circuits : Millman Halkias
5. Electronic Devices Circuits and Applications : J.D. Ryder
6. Electronic Devices and Circuits: Robert Boylestad and Louis Nashelsky



List of Experiments (Any Eight)

1. Find V-I characteristics of PN Junction Diode.
2. To Find V-I characteristics of Zener Diode
3. To Find V-I characteristics of Tunnel Diode
4. To Find V-I characteristics of Photo Diode
5. To find Input/output characteristics of common base PNP/NPN transistor.
6. To find Input/output characteristics of common emitter PNP/NPN transistor.
7. Determination of Energy band gap (E_g) using PN Junction Diode.
8. Study of regulated power supply.
9. Determination of Energy band gap ' E_g ' of Ge using Four Probe method.
10. To Study Frequency of Hartley oscillator
11. To Study Frequency of Wein bridge oscillator
12. Study of RC coupled amplifiers



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 304	DC	Integral Calculus	60	20	20	-	-	3	1	-	4

Course Objective

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

Course Outcomes

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

- 1. evaluate some standard integrals.*
- 2. know and apply various properties of the Definite Integral.*
- 3. find length, surface area and the volume by single and the multiple integrals.*

Course Content:

UNIT – I

Integration: Integration of the form : $\int \frac{dx}{a \cos x + b \sin x + c}$, $\int \frac{a \cos x + b \sin x + c}{p \cos x + q \sin x + r} dx$ and

Integration of Rational functions, six important integral, Reduction formulae of $\int \sin^m x \cos^n x dx$, $\int (\sin^m x / \cos^n x) dx$, $\int \tan^n x dx$ and associated problems (m and n are non-negative integers).

UNIT – II



Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

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

Definite Integral: Evaluation of definite integrals, Properties of integral Calculus, Integration as the limit of a sum (with equally spaced as well as unequal intervals), summation of series.

UNIT – III

Definition of Improper Integrals: Statements of (i) μ -test, (ii) Comparison test (Limit form excluded) – Simple problems only. Use of Beta and Gamma functions (convergence and important relations being assumed).

UNIT – IV

Rectification: Length of Plane Curve, Intrinsic Equation of a Curve, Quadrature, Working knowledge of Double integral, Application of Double integral, Change Order of integration.

UNIT – V

Volume and Surfaces of Revolution: Volume and Surface areas of solids formed by revolution of plane curve and areas Problems only.

Texts:

- 1 Integral Calculus – Shanti Narayan & P. K. Mittal (S. Chand & Co. Ltd.)
- 2 Integral Calculus – H. S. Dhani (New Age International)
- 3 Integral Calculus – B. C. Das & B. N. Mukherjee (U. N. Dhur)
- 4 Differential & Integral Calculus (Vols. I & II) – Courant & John.
- 5 Differential & Integral Calculus (Vol. I) – N. Piskunov (CBS Publishers & Distributors)
6. Integral Calculus – Shantinayakan.

SEMESTER III

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*				
BSCH 304	DC	Inorganic Chemistry I	60	20	20	30	20	3	1	6	8

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.

Unit – 1

I. Atomic Structure:

Idea of de-Broglie matter waves, Heisenberg uncertainty principle, atomic orbitals, Schrödinger wave equation, significance of ψ and ψ^2 , quantum numbers, radial and angular wave functions and probability distribution curves, shapes of s, p, d, orbitals, Aufbau and Pauli exclusion principles, Hund's multiplicity rule, Electronic configurations of the elements, effective nuclear charge.

II. Periodic Properties:

Detailed discussion of the following properties with examples

- (a) Effective nuclear charge, shielding or screening effect, Slater rules, variation of effective nuclear charge in periodic table.
- (b) Atomic radii (van der Waals)
- (c) Ionic and crystal radii.

- (d) Covalent radii (octahedral and tetrahedral)
- (e) Ionization enthalpy, Successive ionization enthalpies and factors affecting ionization energy. Applications of ionization enthalpy.
- (f) Electron gain enthalpy, trends of electron gain enthalpy.
- (g) Electronegativity.

Unit-2

Chemical Bonding:

(A) Covalent Bond – Valence bond theory and its limitations, directional characteristics of covalent bond, various types of hybridization and shapes of simple inorganic molecules and ions, valence shell electron pair repulsion (VSEPR) theory to NH_3 , SF_4 , ICl_2^- and H_2O , MO theory, homonuclear and heteronuclear (CO and NO) diatomic molecules, bond strength and bond energy, percentage ionic character from dipole moment and electro-negativity difference.

(B) Ionic Solids – Ionic structures, radius ratio effect and coordination number, limitation of radius ratio rule, lattice defects, lattice energy and polarizing power and polarisability of ions, Fajan's rule.

(C) Weak Interactions – Hydrogen bonding, Vander Waals forces.

Unit- 3

Chemistry of *s* and *p* block elements:

Inert pair effect, Relative stability of different oxidation states, diagonal relationship and anomalous behaviour of first member of each group. Allotropy and catenation.

Hydrides and their classification ionic, covalent and interstitial.

Study of the following compounds with emphasis on structure, bonding, preparation, properties and uses.

Boric acid and borates, boron nitrides, borohydrides (diborane) carboranes, silanes, Oxides and oxoacids of nitrogen, Phosphorus and chlorine. Peroxo acids of sulphur, interhalogen compounds pseudohalogens and basic properties of halogens.

UNIT-4

Coordination Compounds

Werner's coordination theory and its experimental verification, effective atomic number concept, chelates, nomenclature of coordination compounds, isomerism in coordination compounds, valence bond theory of transition metal complexes.

UNIT-5

Hard and Soft Acids and Bases (HSAB)

Classification of acids and bases as hard and soft, Pearson's HSAB concept, acid-base strength and hardness and softness, Symbiosis, theoretical basis of hardness and softness, electro negativity and hardness and softness.

Recommended Texts:

1. Huheey, J.E. *Inorganic Chemistry*, Prentice Hall
2. Douglas, B.E. and Mc Daniel, D.H., *Concepts & Models of Inorganic Chemistry*, Oxford
3. Lee, J.D. *Concise Inorganic Chemistry*, ELBS
4. Shriver & Atkins, *Inorganic Chemistry*, Third Edition, Oxford Press
5. H.W. Porterfield, *Inorganic Chemistry*, Second Edition, Academic Press,
6. Canham, G.R. and Overton, T., *Descriptive Inorganic Chemistry*, Freeman & Co.
7. Cotton, F.A. and Wilkinson, G, *Advanced Inorganic Chemistry*, Wiley, VCH.

8. Lippard, S.J. & Berg, J.M. *Principles of Bioinorganic Chemistry* Panima Publishing Company

Practicals:

1. Calibration and use of apparatus.
2. Preparation of solutions of different Molarity/Normality.
3. Identification of cations and simple anions in a mixture of salts containing not more than six ions (Three cations and three anions).
4. Estimation of Fe (II) and oxalic acid using standardized KMnO_4 solution.
5. Estimation of available chlorine in bleaching powder iodometrically.
6. Inorganic Preparations
 - (i) Tetraammine copper (II) sulphate, $[\text{Cu}(\text{NH}_3)_4]\text{SO}_4 \cdot \text{H}_2\text{O}$,
 - (ii) Potassium trisoxalatochromate (III), $\text{K}_3[\text{Cr}(\text{C}_2\text{O}_4)_3]$,
 - (iii) Cis and trans $\text{K}[\text{Cr}(\text{C}_2\text{O}_4)_2 \text{H}_2\text{O}_2]$ Potassium dioxalatoaquachromate (III),
 - (iv) Pentaammine carbonato Cobalt (III) ion.

SEMESTER IV

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*				
BSCH 404	DC	Inorganic Chemistry II	60	20	20	30	20	3	1	4	8

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UNIT-1

Chemistry of Elements of First Transition Series

Characteristic properties of d-block elements.

Binary compounds (hydrides, carbides and oxides) of the elements of the first transition series and complexes with respect to relative stability of their oxidation states, coordination number and geometry.

II. Chemistry of Elements of Second and Third Transition Series

General characteristics, comparative treatment of Zr/Hf, Nb/Ta, Mo/W in respect of ionic radii, oxidation states, magnetic behavior, spectral properties and stereochemistry.

UNIT-2

I. Metal-ligand bonding in Transition Metal Complexes

An elementary idea of crystal field theory, crystal field splitting in octahedral, tetrahedral and square planar complexes, factors affecting the crystal-field parameters.

II. Thermodynamic and Kinetic Aspects of Metal Complexes

A brief outline of thermodynamics stability of metal complexes and factors affecting the stability, stability constants of complexes and their determination.

UNIT-3

I. Magnetic Properties of Transition Metal Complexes

Types of magnetic behavior, methods of determining magnetic susceptibility, spin-only formula, L-S coupling, correlation of μ_s and μ_{eff} values, orbital contribution to magnetic moments.

II. Electronic spectra of Transition Metal Complexes

Types of electronic transitions, selection rules for d-d transitions, spectroscopic ground states, spectrochemical series, Orgel-energy level diagram.

UNIT –4

Organometallic Chemistry

Definition, nomenclature and classification of organometallic compounds.

Metal carbonyls: 18 electron rule, preparation, structure and nature of bonding in the mononuclear carbonyls.

UNIT-5

Lanthanoids and actinoids:

electronic configuration, oxidation states, colour, spectral and magnetic properties of Lanthanoids and actinoids, lanthanide contraction, separation of lanthanides (ion-exchange method only).

Recommended Texts:

1. Huheey, J.E. *Inorganic Chemistry*, Prentice Hall
2. Douglas, B.E. and McDaniel, D.H., *Concepts & Models of Inorganic Chemistry*, Oxford
3. Lee, J.D. *Concise Inorganic Chemistry*, ELBS
4. Shriver & Atkins, *Inorganic Chemistry*, Third Edition, Oxford Press
5. H.W. Porterfield, *Inorganic Chemistry*, Second Edition, Academic Press,
6. Canham, G.R. and Overton, T., *Descriptive Inorganic Chemistry*, Freeman & Co.
7. Cotton, F.A. and Wilkinson, G., *Advanced Inorganic Chemistry*, Wiley, VCH.
8. Lippard, S.J. & Berg, J.M. *Principles of Bioinorganic Chemistry* Panima Publishing Company

SEMESTER V

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*				
BS.P.CH 503	DC	Organic Chemistry I	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.

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Unit 1: Structure and Bonding:

Hybridization, bond lengths and bond angles, bond energy, localized and delocalized chemical bonding, van der Waals interactions, inclusion compounds, clathrates, charge transfer complexes, resonances, hyperconjugation, aromaticity, inductive and field effects, hydrogen bonding.

Unit 2: Mechanism of Organic Reactions:

Curved arrow notation, drawing electron movements with allows, half-headed and double-headed arrows, homolytic and heterolytic bond fission, Types of reagents – electrophiles and nucleophiles, Types of organic reactions, Energy considerations. Reactive intermediates – Carbocations, carbanions, free radicals, carbenes, arynes and nitrenes (with examples). Assigning formal charges on intermediates and other ionic species. Methods of determination of reaction mechanism (product analysis, intermediates, isotope effects, kinetic and stereochemical studies).

Unit 3: Alkanes and Cycloalkanes:

IUPAC nomenclature of branched and unbranched alkanes, the alkyl group, classification of carbon atom in alkanes, Isomerism in alkanes, sources methods of formation (with special reference to Wurtz reaction, Kolbe reaction, Corey-House reaction and decarboxylation of carboxylic acids), physical properties and chemical reactions of alkanes, Mechanism of free radical halogenation of alkanes: orientation, reactivity and selectivity. Cycloalkanes – Nomenclature, methods of formation, chemical reactions, Baeyer's strain theory and its

limitations. Ring strain in small rings (cyclopropane and cyclobutane), theory of strain less rings. The case of cyclopropane ring, banana bonds.

Unit 4: Alkenes and Cycloalkenes:

Nomenclature of alkenes, methods of formation, mechanisms of dehydration of alcohols and dehydrohalogenation of alkyl halides, regioselectivity in alcohol dehydration, The Saytzeff rule, Hofmann elimination, physical properties and relative stabilities of alkenes. Chemical reactions of alkenes – mechanism involved in hydrogenation, electrophilic and free radical additions, Markownikoff's rule, hydroborationoxidation, oxymercuration-reduction. Epoxidation, ozonolysis, hydration, hydroxylation and oxidation with KMnO_4 , Polymerization of alkenes, Substitution at the allylic and vinylic positions of alkenes, Industrial applications of ethylene and propene. Methods of formation, conformation and chemical reactions of cycloalkenes;

Unit 5: Dienes and Alkynes:

Nomenclature and classification of dienes : isolated, conjugated and cumulated dienes, Structure of allenes and butadiene, methods of formation, polymerization, chemical reaction – 1, 2 and 1, 4 additions, Diels-Alder reaction. Nomenclature, structure and bonding in alkynes, Methods of formation, Chemical reactions of alkynes, acidity of alkynes, Mechanism of electrophilic and nucleophilic addition reactions, hydroboration-oxidation, metal-ammonia reductions, oxidation and polymerization.

REFERENCES

1. Robert Thornot Morrison and Robert Neilson Boyd, "Organic Chemistry", Prentice Hall of India Pvt Ltd, New Delhi, Sixth Edition, 1992.
2. Bhupinder Mehta, Manju Mehta, "Organic Chemistry", Prentice Hall of India Pvt Ltd, New Delhi, 2005.
3. James B Hedrickson Donald J. Cram and George S. Hammond, "Organic Chemistry", McGraw-Hill Kogakusha, Ltd., Third Edition.
4. Arun Bahl, B. S. Bahl, "Advance Organic Chemistry", S. Chand & Company Ltd., New Delhi, First Edition, 2003.
5. I. L. Finar, "Organic Chemistry", Pearson Education Pvt Ltd, New Delhi, First Edition, 2002.
6. G. Marc Loudon, "Organic Chemistry", Oxford University Press, Forth Indian edition, 2010.
7. P.S.Kalsi, "Text book of Organic Chemistry", MacMillan of India Pvt. Ltd., 1999.
8. P.L. Soni and H.M. Chawala, "Text book of Organic Chemistry", Sultan Chand & Sons Publication, New Delhi, 26th Edition, 1995.

SEMESTER VI

SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEMI University Exam	Two Term Exam	Teachers Assessment*	END SEMI University Exam	Teachers Assessment*				
BS.P.CH 504	DC	Organic Chemistry II	60	20	20	30	20	3	1	4	6

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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.

Unit: I Stereochemistry of Organic Compounds I:

Concept of isomerism, Types of isomerism; Optical isomerism – elements of symmetry, molecular chirality, enantiomers, stereogenic center, optical activity, properties of enantiomers, chiral and achiral molecules with two stereogenic centers, diastereomers, threo and erythro diastereomers, meso compounds, resolution of enantiomer, inversion, retention and racemization. Relative and absolute configuration, sequence rules, D & L and R & S systems of nomenclature.

Unit: II Stereochemistry of Organic Compounds II:

Geometric isomerism – determination of configuration of geometric isomers, E & Z system of nomenclature, geometric isomerism in oximes and alicyclic compounds.

Conformational isomerism – conformational analysis of ethane and n-butane; conformations of cyclohexane, axial and equatorial bonds, conformation of mono substituted cyclohexane derivatives, Newman projection and Sawhorse formulae, Fischer and flying wedge formulae, Difference between configuration and conformation.

Unit: III Arenes and Aromaticity:

Nomenclature of benzene derivatives, The aryl group, Aromatic nucleus and side chain, Structure of benzene; molecular formula and Kekulé structure, stability and carbon-carbon bond lengths of benzene, resonance structure, MO picture.

Aromaticity: The Huckel rule, aromatic ions. Aromatic electrophilic substitution – general pattern of the mechanism, role of σ and π complexes, Mechanism of nitration, halogenation, sulphonation, mercuration and Friedel-Crafts reaction. Energy profile diagrams. Activating and deactivating substituents, orientation and ortho/para ratio, Side chain reactions of benzene derivatives, Birch reduction; Methods of formation and chemical reactions of alkylbenzenes, alkynylbenzenes and biphenyl, naphthalene and Anthracene.

Unit: IV

Heterocyclic Compounds:

Introduction, structure of Pyrrole, Furan and Thiophene, Paal Knorr synthesis and electrophilic substitution of Pyrrole, Furan and Thiophene, reactivity and orientation of electrophilic substitution reactions (ESR) in five membered heterocycles (Pyrrole, Furan and Thiophene) Structure of Pyridine, Electrophilic and Nucleophilic substitution reactions of pyridine. Basicity of pyridine.

Unit: V

[A] Carbohydrates

Introduction, classification of carbohydrates, osazone formation, epimerization, step up and step down reactions of monosaccharides, simple structures of glucose and fructose, Fischer's proof of configuration of D-glucose.

[B] Amino acid : Introduction of amino acid, Classification and properties of amino acids, Zwitter ion , Isoelectric point, Strecker's and Gabriel phthalimide synthesis of amino acids.

Reference Books (1) Organic Chemistry: I. L. Finar, Vol-II, 5th Edition, Pearson Education Ltd.

(2) Organic Chemistry: Morrison & Boyd, 6th Edition, Prentice Hall of India Pvt. Ltd.

(3) Stereochemistry of carbon compounds: E. L. Eliel, Wiley Eastern Ltd.

(4) Stereochemistry and mechanism through solved problems: P. S. Kalsi, New Age International.

(5) Stereochemistry of Organic Compounds: Principles and Applications: D. Nasipuri; New Academic Science; 4th Revised Edition.

(6) Organic Chemistry: Hendrickson, Cram, Hammond, Mc Graw-Hill.

(7) Organic Chemistry: 6 th Edition, John McMurry, Brooks Cole, International Edition.

(8) Organic Chemistry: T.W. Graham Solomons and Craig B. Fryhle Wiley, 8 th Edition.

(9) Organic Chemistry: Francis A. Carey, Mc Graw-Hill, 7 th Edition.

(10) Organic Chemistry: Leroy G.Wade, Prentice Hall, 6 th Edition.

(11) Organic Chemistry: Jonathan Clayden, Nick Greeves, Stuart Warren and Peter Wothers.
Oxford University Press, USA.



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 305	DC	Differential Equations	60	20	20	-	-	3	1	-	4

Course Objective

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

Course Outcomes

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

- 1. solve first order and first degree differential equation.*
- 2. find the solution of first order and higher degree differential equation.*
- 3. apply the techniques of the orthogonal trajectories.*
- 4. know the solution of the second order linear differential equation.*
- 5. solve Euler's Homogeneous equations.*

Course Content:

UNIT – I

Differential equation of first degree and first order: Order, degree and solution of an ordinary differential equation (ODE) in presence of arbitrary constants, Formation of ODE, First order equations, Variables separable, Homogeneous equations and equations reducible to homogeneous forms, Exact equations and those reducible to such equation, Euler's and Bernoulli's equations (Linear).

UNIT – II



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Equation of the first order but not of the first degree: Equation solvable for P, Equation solvable for X, Equation solvable for y, Clairaut's Equations (General and Singular solutions).

UNIT – III

Orthogonal Trajectories: Definition, Cartesian coordinates, polar coordinates, Self Orthogonal families.

UNIT – IV

Second order linear equations: Second order linear differential equations, with constant coefficients, operator, Rule of finding particular integral.

UNIT – V

Homogeneous equations: Euler's Homogeneous equations, Equation reducible to homogeneous form.

Texts:

1. Differential Equations – Lester R. Ford (McGraw Hill).
2. Differential Equations – S. L. Ross (John Wiley).
3. Differential Equations – H. T. H. Piaggio.
4. A Text Book of Ordinary Differential Equations – Kiseleyev, Makarenko & Krasnov (Mir).
5. Differential Equations – H. B. Phillips (John Wiley & Sons).
6. Differential Equations with Application & Programs – S. Balachanda Rao, H. R. Anuradha (University Press).
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