



Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

ML307 ENVIRONMENTAL MANAGEMENT AND SUSTAINABILITY

SUBJECT CODE	CATEGOR Y	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assesse nt*	END SEM University Exam	Teachers Assesse nt*				
ML-307	Compulsory	Environmental Management and Sustainability	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 Objective

1. To create awareness towards various environmental problems.
2. To create awareness among students towards issues of sustainable development.
3. To expose students towards environment friendly practices of organizations.
4. To sensitize students to act responsibly towards environment.

Examination Scheme

The internal assessment of the students' performance will be done out of 40 Marks. The semester Examination will be worth 60 Marks. The question paper and semester exam will consist of two sections A and B. Section A will carry 36 Marks and consist of five questions, out of which student will be required to attempt any three questions. Section B will comprise of one or more cases / problems worth 24 marks.

Course Outcomes

1. The course will give students an overview of various environmental concerns and practical challenges in environmental management and sustainability.
2. Emphasis is given to make students practice environment friendly behavior in day-to-day activities.

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COURSE CONTENT

Unit I: Introduction to Environment Pollution and Control

1. Pollution and its types (Air, Water, and Soil): Causes, Effects and Control measures
2. Municipal Solid Waste: Definition, Composition, Effects
3. Electronic Waste: Definition, Composition, Effects
4. Plastic Pollution: Causes, Effects and Control Measures

Unit II: Climate Change and Environmental Challenges

1. Global Warming and Green House Effect
2. Depletion of the Ozone Layer
3. Acid Rain
4. Nuclear Hazards

Unit III: Environmental Management and Sustainable Development

1. Environmental Management and Sustainable Development: An overview
2. Sustainable Development Goals (17 SDGs)
3. Significance of Sustainable Development
4. Environment Friendly Practices At Workplace and Home (Three Rs' of Waste Management, Water Conservation, Energy Conservation)

Unit IV: Environmental Acts

1. The Water (Prevention and Control of Pollution) Act, 1974: Objectives, Definition of Pollution under this act, Powers and Functions of Boards
2. The Air (Prevention and Control of Pollution) Act, 1981: Objectives, Definition of Pollution under this act, Powers and Functions of Boards
3. The Environment (Protection) Act, 1986: Objectives, Definition of important terms used in this Act, Details about the act.
4. Environmental Impact Assessment: Concept and Benefits

Unit V: Role of Individuals, Corporate and Society

1. Environmental Values
2. Positive and Adverse Impact of Technological Developments on Society and Environment
3. Role of an individual/ Corporate/ Society in environmental conservation
4. Case Studies: The Bhopal Gas Tragedy, New Delhi's Air Pollution, Arsenic Pollution in Ground Water (West Bengal), Narmada Valley Project, Cauvery Water Dispute, Fukushima Daiichi Disaster (Japan), Ozone Hole over Antarctica, Ganga Pollution, Deterioration of Taj Mahal, Uttarakhand flash floods

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Suggested Readings:

1. Rogers, P.P., Jalal, K.F., Boyd, J.A. (Latest Edition). **An Introduction to Sustainable Development.** Earthscan
2. Kalam, A.P.J. (Latest Edition). **Target 3 Billion: Innovative Solutions Towards Sustainable Development.** Penguin Books
3. Kaushik, A. and Kaushik (Latest Edition). **Perspectives in Environmental Studies.** New Delhi: New Age International Publishers.
4. Dhameja, S.K. (Latest Edition). **Environmental Studies.** S.K. Kataria and Sons. New Delhi
5. Bharucha, E. (Latest Edition). **Environmental Studies for Undergraduate Courses.** New Delhi: University Grants Commission.
6. Wright, R. T. (Latest Edition). **Environmental Science: towards a sustainable future.** New Delhi: PHL Learning Private Ltd.
7. Rajagopalan, R. (Latest Edition). **Environmental Studies.** New York: Oxford University Press.

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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	Teach ers As- sess- ment *	End Sem Uni- versity Exam	Tea cher s As- sess men t*				
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 FE 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. Dhami (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 – Shantin Narayan.



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			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. .

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

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).
7. Text Book of Ordinary Differential Equations (2nd Ed.) – S. G. Deo, V. Lakshmikantham & V. Raghavendra (Tata McGraw Hill).
8. An Elementary Course in Partial Differential Equation – T. Amarnath (Narosa).
9. An Introductory Course on Ordinary Differential Equation – D. A. Murray

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

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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 – 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 $\text{K}[\text{Cr}(\text{C}_2\text{O}_4)_2 \cdot \text{H}_2\text{O}_2]$ Potassium dioxalatodiaquachromate (III),
 - (iv) Pentaammine carbonato Cobalt (III) ion.