# Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

## ML307 ENVIRONMENTAL MANAGEMENT AND SUSTAINABILITY

| 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-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.

## 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 1V: 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

| Chairperson Board of Studies Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore | Chairperson Faculty of Studies Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore | Controller of Examinations Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore | Registrar Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore | Vice Chancellor Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore |
|---|---|---|---|---|

**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 Billon: 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.


| Chairperson | Chairperson | Controller of Examinations | Registrar | Vice Chancellor |
|---|---|---|---|---|
| Board of Studies | Faculty of Studies | Shri Vaishnav Vidyapeeth | Shri Vaishnav Vidyapeeth | Shri Vaishnav Vidyapeeth |
| Shri Vaishnav Vidyapeeth | Shri Vaishnav Vidyapeeth | Vishwavidyalaya, Indore | Vishwavidyalaya, Indore | Vishwavidyalaya, Indore |
| Vishwavidyalaya, Indore | Vishwavidyalaya, Indore | | | |

# Shri Vaishnav Vidyapeeth Vishwavidyalaya

## B.Sc. (Chemistry Hons)

### Choice Based Credit System (CBCS)(Batch 2021-2024)

**Semester III (B.Sc. Chemistry Hons)**

| 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* | | | | |
| BSHCH301 | DC | **Chemistry of Elements** | 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.

**Concept of Inorganic Chemistry - II**

**Course Objective:**

(i) To develop the understanding of fundamentals of Metallurgy.
(ii) To develop the understanding of s block & p block elements.
(iii) To give basic knowledge of compounds of Nobel gases.

**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 Fundamentals of Metallurgy and Chemistry of s-block elements.

CO2. Became aware of the importance of p- block elements and common features of alkali and alkaline earth metal compounds.

CO3. Understanding the concept of electronic configuration, atomic and ionic size, metallic/non-metallic character, melting point, ionization enthalpy, electron gain enthalpy, electronegativity, and bioinorganic Chemistry

CO4. Demonstrate a fundamental/systematic understanding of the practical field of Inorganic Chemistry

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# Shri Vaishnav Vidyapeeth Vishwavidyalaya

## B.Sc. (Chemistry Hons)

### Choice Based Credit System (CBCS)(Batch 2021-2024)

**Semester III (B.Sc. Chemistry Hons)**

| 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* | | | | |
| BSHCH301 | DC | Chemistry of Elements | 60 | 20 | 20 | 0 | 0 | 4 | 0 | 0 | 4 |

**Unit-I General Principles of Metallurgy**

Chief modes of occurrence of metals based on standard electrode potentials. Ellingham diagrams for reduction of metal oxides using carbon and carbon monoxide as reducing agent. Electrolytic Reduction, Hydro metallurgy with reference to cyanide process for silver and gold. Methods of purification of metals: Electrolytic process, van-Arkel- process and Mond's process, Zone refining.

**Unit-II Chemistry of s Block Elements:**

General characteristics: melting point, flame color, reducing nature, diagonal relationships and anomalous behavior of first member of each group. Reactions of alkali and alkaline earth metals with oxygen, hydrogen, nitrogen and water. Common features such as ease of formation, thermal stability and solubility of the following alkali and alkaline earth metal compounds: hydrides, oxides, peroxides, carbonates, nitrates, sulphates. Complex formation tendency of s-block elements; structure of crown ethers and cryptates of Group I.

**Unit-III Chemistry of p Block Elements:**

Electronic configuration, atomic and ionic size, metallic/non-metallic character, melting point, ionization enthalpy, electron gain enthalpy, electronegativity, Allotropy of C, P, S; inert pair effect, diagonal relationship between B and Si and anomalous behavior of first member of each group.

**Unit-IV Transition Elements:** Transition Elements: General group trends with special reference to electronic configuration, colour, variable valency, magnetic properties (no temperature dependence), catalytic properties, and ability to form complexes. Latimer diagrams of Mn, Fe and Cu in acidic and basic media A brief discussion of differences between the first, second and third transition series. Some important compounds of Cr, Mn, Fe and Co and their roles as laboratory reagents.

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# Shri Vaishnav Vidyapeeth Vishwavidyalaya

## B.Sc. (Chemistry Hons)

### Choice Based Credit System (CBCS)(Batch 2021-2024)

**Semester III (B.Sc. Chemistry Hons)**

| 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* | | | | |
| BSHCH301 | DC | **Chemistry of Elements** | 60 | 20 | 20 | 0 | 0 | 4 | 0 | 0 | 4 |

**Unit-V Bioinorganic Chemistry:**

Elements of life: essential major, trace and ultra-trace elements. Basic chemical reactions in the biological systems and the role of metal ions (specially $Na^+$, $K^+$, $Mg^{2+}$, $Ca^{2+}$, $Fe^{3+/2+}$, $Cu^{2+/+}$, and $Zn^{2+}$). Metal ion transport across biological membrane $Na^+$-ion pump, ionophores. Biological functions of hemoglobin and myoglobin, cytochromes and ferredoxins, carbonate bicarbonate buffering system and carbonic anhydrase. Biological nitrogen fixation, Photosynthesis: Photosystem-I and Photosystem-II. Toxic metal ions and their effects, chelation therapy (examples only), Pt and Au complexes as drugs (examples only), metal dependent diseases.

**Books:**


1. Lee, J.D. Concise Inorganic Chemistry, Pearson Education.
2. Douglas, B.E; Mc Daniel, D.H. & Alexander, J.J. Concepts & Models of Inorganic Chemistry, John Wiley Sons, N.Y.
3. Greenwood, N.N. & Earnshaw. Chemistry of the Elements, Butterworth-Heinemann.
4. Cotton, F.A. & Wilkinson, G. Advanced Inorganic Chemistry, Wiley, VCH, Miessler, G. L. & Donald, A. Tarr. Inorganic Chemistry, Pearson.
5. Shriver, D.F., Atkins P.W and Langford, C.H., Inorganic Chemistry, Oxford University Press.

# Shri Vaishnav Vidyapeeth Vishwavidyalaya

## B.Sc. (Chemistry Hons)

### Choice Based Credit System (CBCS)(Batch 2021-2024)

**Semester III (B.Sc. Chemistry Hons)**

| 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* | | | | |
| **BSHCH 303** | **DC** | **Functional groups of Organic Chemistry** | **60** | **20** | **20** | **0** | **0** | **4** | **0** | **0** | **4** |

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***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 Chemistry of Halogenated hydrocarbons, Alcohols, Phenols, Ethers & Epoxides.

(ii) To give basic knowledge of Carbonyl compounds, Carboxylic acids & their derivatives.

**Course Outcomes:**

After completion of the course the students will be able to understand:

(i) Understanding of the organic functional groups, which include halogenated hydrocarbons and oxygen containing functional groups and their reactivity patterns.

(ii) Fundamentals of Carbonyl compounds, Carboxylic acids & their derivatives.

**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 Fundamentals of Chemistry of Halogenated hydrocarbons, Alcohols, Phenols, Ethers & Epoxides

CO2. Use the synthetic chemistry learnt in this course to do functional group transformations.

CO3. To propose plausible mechanisms for any relevant reaction

CO4. Demonstrate a fundamental/systematic understanding of the practical field of Organic Chemistry

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# Shri Vaishnav Vidyapeeth Vishwavidyalaya

## B.Sc. (Chemistry Hons)

### Choice Based Credit System (CBCS)(Batch 2021-2024)

**Semester III (B.Sc. Chemistry Hons)**

| 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* | | | | |
| **BSHCH 303** | **DC** | **Functional groups of Organic Chemistry** | **60** | **20** | **20** | **0** | **0** | **4** | **0** | **0** | **4** |

**Unit I Chemistry of Halogenated Hydrocarbons:**
Alkyl halides: Methods of preparation and properties, nucleophilic substitution reactions – $SN_1$, $SN_2$ and $SN_1$ mechanisms with stereochemical aspects and effect of solvent etc.; nucleophilic substitution vs. elimination.
Aryl halides: Preparation (including preparation from diazonium salts) and properties, nucleophilic aromatic substitution; SNAr, Benzyne mechanism.
Relative reactivity of alkyl, allyl, benzyl, vinyl and aryl halides towards nucleophilic substitution reactions. Organometallic compounds of Mg (Grignard reagent) –Use in synthesis of organic compounds.

**Unit II Alcohols, Phenols, Ethers, and Epoxides:**
Alcohols: preparation, properties, and relative reactivity of 1°, 2°, 3° alcohols, Bouvaelt-Blanc Reduction; Oxidation of diols by periodic acid and lead tetra acetate, Pinacol- Pinacolone rearrangement; Phenols: Preparation and properties; Acidity and factors effecting it, Ring substitution reactions, Reimer– Tiemann and Kolbe's–SchmidtReactions, Fries and Claisen rearrangements with mechanism; Ethers and Epoxides:

Preparation and reactions with acids. Reactions of epoxides with alcohols, ammonia derivatives and LiAlH4.

**Unit III Carbonyl Compounds:**
Structure, reactivity, preparation, and properties.
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.

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## B.Sc. (Chemistry Hons)

### Choice Based Credit System (CBCS)(Batch 2021-2024)

**Semester III (B.Sc. Chemistry Hons)**

| 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* | | | | |
| **BSHCH 303** | **DC** | **Functional groups of Organic Chemistry** | **60** | **20** | **20** | **0** | **0** | **4** | **0** | **0** | **4** |

Addition reactions of á, â-unsaturated carbonyl compounds: Michael addition. Active methylene compounds:Keto-enoltautomerism. Preparation and synthetic applications of diethyl malonate and ethyl acetoacetate.

**Unit IV Carboxylic Acids and their Derivatives:**
General methods of preparation, physical properties and reactions of monocarboxylic acids, effect of substituents on acidic strength. Typical reactions of dicarboxylic acids , hydroxy acids and unsaturated acids. Preparation and reactions of acid chlorides, anhydrides, esters and amides.

**Unit V Carbohydrate:**
Monosaccharides: Aldoses upto 6 carbons, structure of D-glucose & D-ructose (configuration & conformation), anomeric effect, mutarotation. Reactions: osazone formation, bromine – water oxidation, stepping–up (Kiliani method) and stepping–down (Ruff's & Wohl's method) of aldoses. Disaccharides: glycosidic linkages, structure of sucrose.

**Books:**


1. Morrison, R. T. & Boyd, R. N. Organic Chemistry, Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).
2. Finar, I. L.Organic Chemistry (Volume 1), Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).
3. Graham Solomons, T.W. Organic Chemistry,John Wiley & Sons, Inc.


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# Shri Vaishnav Vidyapeeth Vishwavidyalaya

## B.Sc. (Chemistry Hons)

### Choice Based Credit System (CBCS)(Batch 2021-2024)

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| **Board of Studies** | **Faculty of Studies** | **SVVV, Indore** | **SVVV, Indore** |
| **Physical Sciences** | **Science** | | |

# Shri Vaishnav Vidyapeeth Vishwavidyalaya

## B.Sc. (Chemistry Hons)

### Choice Based Credit System (CBCS)(Batch 2021-2024)

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|---|---|---|---|
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| **Board of Studies** | **Faculty of Studies** | **SVVV, Indore** | **SVVV, Indore** |
| **Physical Sciences** | **Science** | | |

# Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

## B. Sc. Hons. Maths/Chemistry

### III Sem

| Subject Code | Category | Subject Name | Teaching and Evaluation Scheme | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Theory | | | Practical | | Th | T | P | CREDITS |
| | | | End Sem University Exam | Two Term Exam | Teachers Assessment | End Sem University Exam | Teachers Assessment | | | | |
| BSPH 302 | DC | Electronics: Principles and Devices | 60 | 20 | 20 | 30 | 20 | 3 | 1 | 0 | 4 |

| | |
|---|---|
| **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.<br>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 Electronics: Principles and Devices.<br>2. Student will be able to determine physical parameter experimentally with optimal usage of resources and complete the assignments in time. |

| Abbreviation | | |
|---|---|---|
| Th | Theory | **Teacher Assessment (Theory) shall be based on following components: Quiz/Assignment/ Project/Participation in class (Given that no component shall be exceed 10 Marks).** |
| 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 | |

Registrar
Shri Vaishnav Vidyapeeth Vishwavidyalaya
INDORE (M.P.)

Dr. UTTAM SHARMA
Professor & Head
Department of Chemistry
Shri Vaishnav Vidyapeeth Vishwavidyalaya

Chairperson
Board of Studies
Shri Vaishnav Vidyapeeth Vishwavidyalaya
Indore

# Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

## BSPH 302: Electronics : Principles and Devices

**UNIT I:** Classical FE Model, Debye Model, Summer Field 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 Matter.

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

**UNIT III:** Zener and tunnel diodes, light emitting diode, schottkey diod, solar cell Diode, load line concept, rectification, Half wave and full wave rectifier, ripple factor, voltage stabilization, IC voltage regulation, Transistors, Characteristics of a transistor in CB, CE and CC mode, h-parameters.

**UNIT IV:** FETs: Field effect transistors, n-channel FET, p-channel FET, JFET, MOSFET, 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 V:** Oscillators, Feedback in amplifiers, principle, its effects on amplifiers, characteristicsPrinciple of feedback amplifier, Barkhausen criteria, Hartley, Colpitt and Wein bridge oscillators. Condition for oscillations and frequency derivation – Crystal oscillator, Monostable, Bi-stable and Astable multivibrators, propogation of radio waves in the absence of magnetic field, role of ionosphere, elementry idea of microwave, optical and satelite communication, basic theory of amplitude modulation.

Registrar
Shri Vaishnav Vidyapeeth Vishwavidyalaya
Indore

Dr. UTTAM SHARMA
Professor & Head
Department of Physics
Shri Vaishnav Institute of Science

Chairperson
Board of Studies
Shri Vaishnav Vidyapeeth Vishwavidyalaya
Indore

# Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

## Shri Vaishnav Institute of Science

### Department of Physics

### Choice Based Credit System (CBCS)

### B.Sc. Chemistry/Maths Hons. III Sem

| Subject Code | Category | Subject Name | Teaching and Evaluation Scheme | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Theory | | | Practical | | Th | T | P | CREDITS |
| | | | End Sem University Exam | Two Term Exam | Teachers Assessment | End Sem University Exam | Teachers Assessment | | | | |
| BSCHPRP306 | DC | Physics Laboratory III | 60 | 20 | 20 | 30 | 20 | 0 | 0 | 2 | 1 |

| | |
|---|---|
| **Course Objectives** | To work ethically as member as well as leader in a diverse team. |
| **Course Outcomes** | Student will be able to determine physical parameter experimentally with optimal usage of resources and complete the assignments in time. |

| Abbreviation | | |
|---|---|---|
| Th | Theory | **Teacher Assessment (Theory) shall be based on following components: Quiz/Assignment/Project/ Participation in class (Given that no component shall be exceed 10 Marks).** |
| 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 Vidyapeeth Vishwavidyalaya, Indore

## Shri Vaishnav Institute of Science

### Department of Physics

### Choice Based Credit System (CBCS)

### BSCHPRP306: Physics Laboratory III

**List of Experiments (Any Five)**

1. To find V-I characteristics of P-N 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. To determine energy band gap using PN junction diod.
8. To study frequency of Hartley oscillator.
9. To study frequency of Wein bridge oscillator.
10. To Study RC coupled amplifiers.

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# Shri VaishnavVidyapeethVishwavidyalaya Indore

## Shri Vaishnav Institute of Computer Applications

**Name of the Program : B.Sc. Physics (Honors) and Chemistry (Honors)**

| 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* | | | | |
| BSCS304 | COMPULSORY | Fundamentals of Data Structure | 60 | 20 | 20 | 0 | 0 | 3 | 0 | 0 | 3 |

**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 understand the students with the applications of Standard data structure in real world problems.
- To provide knowledge of creation of new data structures.
- To familiarize the students with the analysis and design a particular problem.

**Course Outcomes (Cos):students will be able to**

- Demonstrate familiarity with major algorithms and data structures.
- Analyze performance of algorithms.
- Choose the appropriate data structure and algorithm design method for a specified application.
- Demonstrate understanding of the abstract properties of various data structures such as stacks, queues, lists, trees and graphs
- Demonstrate understanding of various sorting algorithms, including bubble sort, insertion sort, selection sort, heap sort and quick sort.
- Understand and apply fundamental algorithmic problems including Tree traversals, Graph traversals, and shortest paths.
- Demonstrate understanding of various searching algorithms.

**UNIT 1**

**Introduction and Overview:** Introduction, Basic Terminology, Elementary Data Organization, Overview of Data Structures Types, Data Structure Operations, Algorithms: Complexity, Time-Space Tradeoff, Frequency count: Simple algorithms. Abstract data type (ADT), Fundamental and derived data types, Primitive data structures.

**Name of the Program : B.Sc. Physics (Honors) and Chemistry (Honors)**

| 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* | | | | |
| BSCS304 | COMPULSORY | Fundamentals of Data Structure | 60 | 20 | 20 | 0 | 0 | 3 | 0 | 0 | 3 |

**UNIT 2**

**Arrays**: Definition, Terminology, One dimensional array: Memory allocation, Operations, Application, Multidimensional Arrays: Two dimensional Arrays, Sparse matrices, Three dimensional and n-dimensional Arrays, Pointer Arrays.

**UNIT 3**

**Stacks**: Introduction, Definition, Representation of stacks, Operations on stacks, Applications of stacks.
**Linked List**: Definition, Singly Linked List: Representation, Operations; Circular Linked List, Header Linked Lists, Doubly Linked List: Operations, Circular Doubly Linked List: Operations, Application of Linked Lists: Sparse Matrix Manipulation, Polynomial Representation; Dynamic Storage Management; Memory Representation: Fixed, Variable block storage, Deallocation Strategy.

**UNIT 4**

**Queues**: Introduction, Definition, Representation of Queues: Arrays Representation, Linked list Representation; Various Queue structures: Circular Queue, Deques, Priority Queue; Applications of Queues.
**Trees**: Concepts, Representation of Binary Trees in Memory, Operations on Binary Tree, Types of Binary Trees.
**Graphs**: Introduction, Graph terminologies, Sequential Representation of Graphs: Adjacency Matrix, Path Matrix; Adjacency List Representation, Shortest Path Algorithms: Dijkstra's Technique, Bellman-Ford Algorithm, Floyd-Warshall Algorithm; Minimum Spanning Tree Algorithms: Kruskal's Algorithm, Prim's Algorithm; Operations on Graphs, Traversing and Searching a Graph, Application of Graph Structures.

**UNIT 5**

**Searching**: Sequential and Binary Search, Indexed Search, Hashing Schemes, Hashing functions: Division/Remainder methods, Mid Square method, Folding method; Hash Collision: linear probing, Chaining, Bucketing.

**Name of the Program : B.Sc. Physics (Honors) and Chemistry (Honors)**

| 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* | | | | |
| BSCS304 | COMPULSORY | Fundamentals of Data Structure | 60 | 20 | 20 | 0 | 0 | 3 | 0 | 0 | 3 |

**Sorting**: Selection sort, Bubble sort, Insertion sort, Quick sort, Merge sort, Radix sort, Shell sort, Heap sort, Comparison of time complexities.

**TEXT BOOKS:**

[T1] Seymour Lipschutz, Data Structures, *TheMcGraw Hill Companies*

[T2] Horowitz, Sahni, Anderson-Freed; Fundamentals of Data Structures in C; *Universities Press*

**REFERENCE BOOKS:**

[R1] NarasimhaKarumanchi, Data Structures and Algorithms Made Easy,*CareerMonk Publications*

[R2] Thomas H. Cormen , Charles E. Leiserson, Ronald L. Rivest, Clifford Stein; Introduction to Algorithms, *The MIT Press*

[R3] Debasis Samanta, Classic Data Structures, *Prentice Hall India*

# Shri VaishnavVidyapeethVishwavidyalaya Indore

## Shri Vaishnav Institute of Computer Applications

**Name of the Program : B.Sc. Physics (Honors) and Chemistry (Honors)**

| 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* | | | | |
| BSCL308 | COMPULSORY | Lab in Data Structure | 0 | 0 | 0 | 30 | 20 | 0 | 0 | 2 | 1 |

**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 Learning 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.
- 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.
- To choose a suitable data structure for a given problem.
- Write the programs using pointers and to manage memory.
- Implement programs of file handling.

**Note: Program should be fully documented with sample I/O. Data Flow charts should be developed wherever necessary.**

Write an Algorithm and Program using functions for:
1. Traversing the elements of an Array
2. Inserting an element in an Array
3. Deleting an element from an Array
4. Merging of two Arrays

| 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* | | | | |
| BSCL308 | COMPULSORY | Lab in Data Structure | 0 | 0 | 0 | 30 | 20 | 0 | 0 | 2 | 1 |

5. Linear Search

6. Binary Search
7. Insertion Sort
8. Bubble Sort
9. Selection Sort
10. Implementing PUSH & POP operations of a Stack
11. Array Implementation of a Queue and Circular Queue
12. Converting infix notation into post fix notation
13. Insertion in single and double Linked List
14. Deletion from single and double Linked List

**TEXT BOOKS:**

[T1] Seymour Lipschutz, Data Structures, *TheMcGraw Hill Companies*

[T2] Horowitz, Sahni, Anderson-Freed; Fundamentals of Data Structures in C; *Universities Press*

**REFERENCE BOOKS:**

[R1] NarasimhaKarumanchi, Data Structures and Algorithms Made Easy,*CareerMonk Publications*

[R2] Thomas H. Cormen , Charles E. Leiserson, Ronald L. Rivest, Clifford Stein; Introduction to Algorithms, *The MIT Press*

[R3] DebasisSamanta, Classic Data Structures, *Prentice Hall India*

# Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

## B.Sc. (Chemistry) Hons.

**BSBT304: Metabolism**

| COURSE CODE | Category | COURSE 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* | | | | |
| BSBT304 | DC | Metabolism | 60 | 20 | 20 | 30 | 20 | 3 | | 2 | 4 |

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

**Course Objectives:**

1. To understand the biochemistry of primary and secondary metabolism
2. To understand the principles of metabolic pathways

**Course Outcomes:**

1. Student will have the knowledge of synthesis and degradation of Biomolecules
2. Students will be able to understand the regulatory pathway of metabolism

**Unit –I**

Carbohydrate metabolism – aerobic and anaerobic glycolysis and regulation, Citirc acid cycle, Gluconeogenesis, Pentose phosphate pathway and regulation.

**Unit – II**

Lipid metabolism – synthesis and degradation of Triacylglycerols, β-oxidation of fatty acids, ketone bodies, regulations of fatty acid synthesis

**Unit III**

Nitrogen metabolism: Biological nitrogen fixation, Nitrate reduction and its regulation, Ammonia assimilation

Amino acids metabolism, Oxidation of amino acids and production of urea.

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**Unit-IV**

Protein metabolism, Hormonal control of protein digestion, Protein targeting and degradation.

**Unit – V**

Structures of purines and pyrimidines, Biosynthesis and degradation of purines and pyrimidines.

**BSBTL304 Practical:**

1. Estimation of reducing sugar by Dinitrosalicylic (DNS) Method
2. Separation of sugars using paper chromatography.
3. To construct a standard maltose curve
4. Extraction and estimation of lipids
5. Estimation of amino acids by ninhydrin method.
6. Estimation of protein by the Biuret method
7. Gel electrophoresis of proteins
8. Extraction of DNA from plant cells
9. Spectrophotometric analysis of DNA

**Books:**

1. Campbell, MK (2012) Biochemistry, 7th ed., Published by Cengage Learning
2. Campbell, PN and Smith AD (2011) Biochemistry Illustrated, 4th ed., Published by Churchill Livingstone
3. Tymoczko JL, Berg JM and Stryer L (2012) Biochemistry: A short course, 2nd ed., W.H.Freeman
4. Berg JM, Tymoczko JL and Stryer L (2011) Biochemistry, W.H.Freeman and Company

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# Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

## Name of the Program: B. Sc. (Honors)

| SUBJECT CODE | Category | SUBJECT NAME | TEACHING & EVALUATION SCHEME | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | THEORY | | | PRACTICAL | | Th | T | P | CREDITS |
| | | | END SEM | MST | Q/A | END SEM | Q/A | | | | |
| BSHMA304 | BS | Integral Calculus and Differential Equations | 60 | 20 | 20 | - | - | 4 | 0 | 0 | 4 |

## Course Objective

*To introduce the students with the Fundamentals of the Integral Calculus and Ordinary Differential Equations.*

## Course Outcomes

*This course will enable the students to:*

1. *Understand and apply the basics of the Integral Calculus.*
2. *Evaluate Integrals of various types.*
3. *Apply the techniques to find length, surface area and volume by integration.*
4. *Know the reason behind formation and solution of Differential Equations.*
5. *Apply the basics of the Differential Equations.*

## Course Content:

**UNIT – I**

**Integral Calculus:** 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. Evaluation of definite integrals. Integration as the limit of a sum (with equally spaced as well as unequal intervals).Reduction formulae of $\int \sin^m x dx \cos^n x dx$, $\int (\sin^m x/\cos^n x) dx$, $\int \tan^n x\, dx$ and associated problems ($m$ and $n$ are non-negative integers).

**UNIT – II**

**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).Working knowledge of Double integral.

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|---|---|---|---|
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| Shri Vaishnav Vidyapeeth | Shri Vaishnav Vidyapeeth | Vishwavidyalaya, Indore | Vishwavidyalaya, Indore |
| Vishwavidyalaya, Indore | Vishwavidyalaya, Indore | | |

# Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

## Name of the Program: B. Sc. (Honors)

| SUBJECT CODE | Category | SUBJECT NAME | TEACHING & EVALUATION SCHEME | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | THEORY | | | PRACTICAL | | Th | T | P | CREDITS |
| | | | END SEM | MST | Q/A | END SEM | Q/A | | | | |
| BSHMA304 | BS | Integral Calculus and Differential Equations | 60 | 20 | 20 | - | - | 4 | 0 | 0 | 4 |

**UNIT – III**

**Applications:** Rectification, Quadrature, Volume and Surface areas of solids formed by revolution of plane curve and areas – Problems only.

**UNIT – IV**

**Differential Equations:** Order, degree and solution of an ordinary differential equation (ODE) in presence of arbitrary constants. Formation of ODE. First order equations:(i) Variables separable.(ii) Homogeneous equations and equations reducible to homogeneous forms.(iii) Exact equations and those reducible to such equation.

**UNIT – V**

Euler's and Bernoulli's equations (Linear).Clairaut's Equations: General and Singular solutions. Simple applications : Orthogonal Trajectories. **Second order linear equations:** Second order linear differential equations with constant. Coefficients. Euler's Homogeneous equations.

**BOOKS:**


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
6. Differential Equations – Lester R. Ford (McGraw Hill).
7. Differential Equations – S. L. Ross (John Wiley).
8. Differential Equations – H. T. H. Piaggio.
9. A Text Book of Ordinary Differential Equations – Kiseleyev, Makarenko&Krasnov (Mir).
10. Differential Equations – H. B. Phillips (John Wiley & Sons).
11. Differential Equations with Application & Programs – S. BalachandaRao, H.R. Anuradha (University Press).


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