श्री Davara University

Established under Chhattisgarh Private Universities (Establishment and Operation) Act, 2005

# SHRI DAVARA UNIVERSITY

# NAYA RAIPUR (C.G.)

**PROGRAMME- CURRICULUM**

**FOR**

**BACHELOR OF SCIENCE**

**(Physics, Chemistry, Mathematics) (PCM)**

**SEMESTER-II**

**AS PER NEW EDUCATION POLICY-2020**

**AND**

**NATIONAL EDUCATION POLICY-2025**

**FOUR YEAR UNDERGRADUATE PROGRAMME-2024-25**

**(EFFECTIVE FROM THE SESSION-2024-2025)**

Established under Chhattisgarh Private Universities (Establishment and Operation) Act, 2005

# FOUR YEAR UNDERGRADUATE PROGRAMME

## BACHELOR OF SCIENCE (PCM)

## COURSE STRUCTURE

**SEMESTER II**

| S.NO | COURSE CODE | COURSE TITLE | TEACHING HOURS PER WEEK | | | | EXAMINATION SCHEME | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| DISCIPLINE SPECIFIC COURSE (DSC) | | | L | T | P | C | THEORY | | PRACTICAL | | TOTAL MARKS |
| | | | | | | | EX | IN | EX | IN | |
| 1. | PHSC-02T | Electricity and Magnetism | 2 | 1 | 0 | 3 | 70 | 30 | - | - | 100 |
| 2. | CHSC-02T | Fundamental Chemistry-II | 2 | 1 | 0 | 3 | 70 | 30 | - | - | 100 |
| 3. | MASC-02 | Algebra | 3 | 1 | 0 | 4 | 70 | 30 | - | - | 100 |
| GENERAL ELECTIVE (GE) | | | | | | | | | | | |
| 4. | PSGE-02 | | 3 | 1 | 0 | 4 | 70 | 30 | - | - | 100 |
| ABILITY ENHANCEMENT COURSE ( AEC) | | | | | | | | | | | |
| 5. | AEC-02 | Hindi Language | 2 | 0 | 0 | 2 | 35 | 15 | - | - | 50 |
| SKILLS ENHANCEMENT COURSE (SEC) | | | | | | | | | | | |
| 6. | SEC-02 | Chemistry Lab Skills-II | 1 | 1 | 0 | 2 | 35 | 15 | - | - | 50 |
| PRACTICALS (LAB) | | | | | | | | | | | |
| 7. | CHSC-02P | Fundamental Chemistry-II | 0 | 0 | 2 | 1 | - | - | 35 | 15 | 50 |
| 8. | PHSC-O2P | Electricity and Magnetism-LAB | 0 | 0 | 2 | 1 | - | - | 35 | 15 | 50 |
| Total Contact hours Per Week:30 | | Total credit: | | | | 20 | Total mark | | | | 600 |

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# FOUR YEAR UNDERGRADUATE PROGRAMME

## DEPARTMENT OF PHYSICS

## COURSE CURRICULUM

| **PART-A:Introduction** | | | |
|---|---|---|---|
| **Progamme: Bachelor of Science (Certificate/Diploma/Degree Honors)** | | **Semester-II** | **Session: 2024-2028** |
| **Course Code** | **PHSC-2T** | | |
| **Course Title** | **Electricity and Magnetism** | | |
| **Course Type** | **Discipline Specific course (DSC)** | | |
| **Pre-requisite(if any)** | **As per programme** | | |
| **Course Learning. Outcomes (CLO)** | **At the end of this course, the students will be able to**<br>➢ State various laws related with electrostatics, dielectric, electric current, magnetism and electromagnetic induction<br>➢ Apply vector (electric fields, Coulomb's law) and scalar (electric Potential, electric potential energy) formalisms of electrostatics.<br>➢ Compare rise and decay of current in LR, CR, LCR circuits. | | |
| **Credit Value** | **3 Credits** | **Credit =15 Hours-learning & Observation** | |
| **Total Marks** | **Max. Marks:=100** | **Min Passing Marks: 40** | |

| **PART -B: Content of the Course** | | |
|---|---|---|
| Total No. of Teaching-learning Periods (01 Hr. per period) -45 Periods (45 Hours) | | |
| Unit | Topics (Course contents) | |
| I | **Power plants in Chhattisgarh:-**<br>An overview of thermal and hydroelectric power plants in Chhattisgarh.<br>**Vector Analysis:-**<br>Divergence & Curl of Vector fields, Line, surface and volume integrals of Vector fields, Gauss-divergence theorem and Stoke's theorem of vectors and its application in electrostatics and magneto statics.<br>**Electrostatics field:-**<br>Electrostatic Field, electric flux, Gauss's theorem of electrostatics, Applications of Gauss theorem- Electric field due to point charge, infinite line of charge, plane charged sheet, charged conductor. | 12 |
| II | **Electrostatic potential:-**<br>Electric potential as line integral of electric field, potential due to a point charge, Calculation of electric field from potential, Capacitance of Parallel plate capacitor, Energy per unit volume in electrostatic field.<br>**Dielectric & Electric Currents:-**<br>Dielectric medium, Polarisation, Displacement vector, Gauss's theorem in dielectrics, Parallel plate capacitor completely filled with. dielectric. Steady current, current density J, non-steady current and Continuity equation, Rise and decay of current in LR, CR, LCR circuits. | 11 |
| III | **Magnetism:-** | |

| | | |
|---|---|---|
| | Biot-Savart's law and its applications- straight conductor, circular coil, solenoid carrying current, Divergence and curl of magnetic field, Magnetic vector potential, Ampere's circuital law,Magnetic properties of materials: Magnetic intensity, magnetic induction, permeability, magnetic susceptibility, Brief introduction of dia, para and ferro-magnetic materials. | 11 |
| IV | **Electromagnetic Induction:-**<br>Faraday's laws of electromagnetic induction, Lenz's law, self and mutual inductance, L of single coil, M of two coils, Energy stored in magnetic field.<br><br>**Maxwell's equations and Electromagnetic wave propagation:-**<br>Equation of continuity of current, Displacement current, Maxwell's equations, Wave equation in free space. | 11 |
| ***Keywords*** | **Vector calculus, Electrostatics, Dielectrics and Electric Current, Magnetism, Electromagnetic Induction, Maxwell's Equation and Electromagnetic Wave Propagation.** | |
| ***Signature of Convener & Members (CBoS)*** | | |

**PART-C: Learning Resources**

**Text Books, Reference Books and Others**

1. Electricity and Magnetism, D C Tayal, 1988, Himalaya Publishing House.
2. Unified Physics Part II, R. P.Goyal, Shivlal Agrawal and Sons
3. Unified Physics-Navbodh Publications
4. Introduction to Electrodynamics and Electromagnetism, H.C.Verma,

**Text Books Recommended-**

**1**. Vector analysis-Schaum's Outline, M.R. Spiegel, S. Lipschutz, D. Spellman, 2nd Edn., 2009, McGraw-Hill Education.
2. University Physics, Ronald Lane Reese, 2003, Thomson Brooks/Cole.

Online Resources-

- e-books and e-learning portals
- http://www.swayam.ac.in
- http://www.ignou.ac.in
- http://www.egvankosh.ac.in
- http://www.itm.sc.in
- http://www.eskillindia.org
- http://www.eshiksha.mp.gov.in
- http://www.viah.co.in
- http://www.internshala.com

**PART -D: Assessment and Evaluation**

<table>
<tr><td colspan="3">Suggested Continuous Evaluation Methods:<br>Maximum Marks: 100 Marks<br>Continuous Internal Assessment (CIA): 30 Marks<br>End Semester Exam (ESE): 70 Marks</td></tr>
<tr><td colspan="2">Continuous Internal Assessment (CIA): 30<br>( By Course Teacher)</td><td>Internal Test/Quiz:20+20<br>Assignment/ Semenar-10<br>Total Marks-30</td><td>Better marks out of the two Tot Quiz + obtained marks in Assignment shall be considered against 15 Marks</td></tr>
<tr><td>End Semester Exam (ESE):70</td><td colspan="3">Two section A&B<br>Section A :Q1 Objective 10∗1=10 Marks, Q2 Short answer type-5∗4=20<br>Section B : Descriptive answer type qts 1 out of 2frm each- 4*10=40 Marks</td></tr>
<tr><td colspan="4">Signature of Convener & Members (CBoS)</td></tr>
</table>

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**FOUR YEAR UNDERGRADUATE PROGRAMME**

**DEPARTMENT OF PHYSICS**

**COURSE CURRICULUM**

| **PART- A: Introduction** | | | |
|---|---|---|---|
| **Progamme: Bachelor of Science**<br><br>**(Certificate/Diploma/Degree/Honors** | | **Semester-II** | **Session: 2024-2028** |
| **Course Code** | **PHSC-02P** | | |
| **Course Title** | **Lab.Course-02(Electricity and Magnetism)** | | |
| **Course Type** | **Laboratory course** | | |
| **Pre-requisite( if any)** | **As per programme** | | |
| **Course Learning. Outcomes (CLO)** | **At the end of this course, the students will be able to**<br>➢ Assemble required parts/devices and arrange them to perform experiments.<br>➢ Record/ observe data as required by the experimental objectives.<br>➢ Analyze recorded data and formulate it to get desired results.<br>➢ Interpret results and check for attainment of proposed objectives related to laws of mechanics and its applications. | | |
| **Credits Value** | **1 Credits** | **Credit =30 Hours Laboratory or Field learning/Training** | |
| **Total Marks** | **Max. Marks:50** | **Min Passing Marks: 20** | |

| **PART-B:** | **Content of the Course** | |
|---|---|---|
| Total No. of learning-Training/performance Periods: 30 Periods (30 Hours) | | |
| Module | Topics (Course contents) | No. of Period |
| Lab/ field Training/ Experiment Content of Course | 1. To use a Multimeter for measuring (a) Resistances, (b) AC and DC Voltages, (c) DC Current, and (d) checking electrical fuses.<br>2. To compare capacitances using De'Sauty's bridge.<br>3. Measurement of field strength B and its variation in a Solenoid Determine (dB/dx).<br>4 . To study the Characteristics of a Series RC Circuit.<br>5. To study a series LCR circuit and determine its (a) Resonant Frequency, (b) Quality Factor.<br>6. To study a parallel LCR circuit and determine its (a) Anti-resonant frequency and(b) Quality factor Q.<br>7. To determine a Low Resistance by Carey Foster's Bridge.<br>8. To verify the Thevenin and Norton theorem.<br>9. To verify the Superposition, and Maximum Power Transfer Theorem.<br>10. Study of magnetic field due to a current loop. | 30 |
| **Keywords** | **Multimeter, Capacitance Comparison, Magnetic Field, RC Circuit, Series LCR Circuit, Parallel LCR Circuit, Low Resistance Measurement, Electrical Theorems** | |

***Signature of Convener & Members (CBoS)***

**PART-C: Learning Resources**

1. Engineering Practical Physics, S.Panigrahi&B.Mallick, 2015, Cengage Learning India Pvt. Ltd.

2. A Text Book of Practical Physics, Indu Prakash and Ramakrishna, 11th Edition, 2011, Kitab Mahal, New Delhi.

3. Unified Practical Physics: RP Goyal, Shivlal Agrawal & Sons

4. Unified Practical Physics: Yugbodh Prakashan

5. Unified Practical Physics: Navbodh Prakashan

Text Books Recommended-

Reference Books Recommended-

1. Charak Samhita 1
2. "Medicinal Plants of India" by C.P. Khare

Online Resources-

- E-resources/e-books and e-learning portals
- http://www.swayam.ac.in
- http://www.ignou.ac.in
- www.egyankosh.ac.in
- www.litm.ac.in
- www.eskillindia.org
- www.eshiksha.mp.gov.in
- www.vlab.co.in

**PART -D: Assessment and Evaluation**

Suggested Continuous Evaluation Methods:
Maximum Marks: 50 Marks
Continuous Internal Assessment (CIA): 15 Marks
End Semester Exam (ESE): 35 Marks

| | | |
|---|---|---|
| Continuous Internal Assessment (CIA): 15<br>( By Course Teacher) | Internal Test/Quiz:10+10<br>Assignment/ Semenar-05<br>Total Marks-15 | Better marks out of the two Tot Quiz + obtained marks in Assignment shall be considered against 15 Marks |

| | |
|---|---|
| End Semester Exam (ESE):35 | Laboratory/Field Skill Performance: On spot Assessment<br>Section A : Performed the Task based on lab, work 20∗1=20 Marks<br>B: Sporting based on lab, work (written) 10*1=10Marks<br>Section B : Viva-voce (based on principle/technology) - 5*1=05 Marks |

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**FOUR YEAR UNDERGRADUATE PROGRAMME**

**DEPARTMENT OF CHEMISTRY**

**COURSE CURRICULUM**

| **PART-A:Introduction** | | | |
|---|---|---|---|
| **Progamme: Bachelor of Science (Certificate/Diploma/Degree Honors)** | | **Semester-II** | **Session: 2024-2028** |
| **Course Code** | **CHSC-02T** | | |
| **Course Title** | **Fundamental Chemistry-II** | | |
| **Course Type** | **Discipline Specific course (DSC)** | | |
| **Pre-requisite(if any)** | **As per programme** | | |
| **Course Learning. Outcomes (CLO)** | **At the end of this course, the students will be able to**<br>➢ To understand different acid-base theories and solvent system.<br>➢ To learn the preparation, bonding, and reactions of C-C σ- & π- bonded compounds.<br>➢ To understand the concept and chemistry of aromatic compounds and their reactions.<br>➢ To learn the basic concepts of various states of matter & understand the basic concepts of surface chemistry and chemical kinetics. | | |
| **Credit Value** | **3 Credits** | **Credit =15 Hours-learning & Observation** | |
| **Total Marks** | **Max. Marks:=100** | **Min Passing Marks: 40** | |

| **PART -B: Content of the Course** | | |
|---|---|---|
| Total No. of Teaching-learning Periods (01 Hr. per period) -45 Periods (45 Hours) | | |
| Unit | Topics (Course contents) | |
| I | **Acid, Base and Solvent System**<br>**Theories of acids and bases: Arrhenius, Bronsted-Lowry, conjugate acids and bases relative strengths of acids and bases, the Lux-flood, solvent system and Lewis concepts of acids and bases.**<br>**HSAB concept:** Classification of Acids and Bases According to HSAB Theory (Hard, Borderline, Soft). Applications of HSAB Theory in Inorganic Reactions – Solubility, Selectivity, Redox Reaction.<br>Non-aqueous solvents: Physical properties of a solvent, types of solvents and their general characteristics, Liquid ammonia as a solvent. Acid-base, precipitation and complex, formation reactions. Solutions of alkali and alkaline earth metals in ammonia-application) | 12 |
| II | **CHEMISTRY OF C-C σ-BONDING**<br>lkanes: Preparation (Wurtz reaction, reduction/hydrogenation of alkenes, Corey-House method). Reactions (mechanisms): halogenation, free radical substitution.<br>Cycloalkanes: Preparation (Dieckmanns ring closure, reduction of aromatic hydrocarbons), Reactions (mechanisms): substitution and ring-opening reactions.<br>tability of cycloalkanes – Baeyer's strain theory, Sachse and Mohr predictions, Conformational structures of ethane, n-butane and cyclohexane.<br><br>**HEMISTRY OF C-C π- BONDING**<br>lkenes: Preparation methods (dehydration, dehydrohalogenation, dehydrogenation, Holffmann and Saytzeff rules, cis and trans eliminations). Reactions (mechanisms): electrophilic and free | 11 |

| | | |
|---|---|---|
| | radical addition (hydrogen, halogen, hydrogen halide, hydrogen bromide, water, hydroboration, ozonolysis, dihydroxylation with $KMnO_4$).<br>ienes: 1,2 and 1,4-additions, Diels-Alder reactions.<br>lkynes: Preparation (dehdrohalogenation, dehydrogenation), Reactions: Acidity, formation of acetylides, addition of water, hydrogen halides and halogens, oxidation,<br>zonolysis, hydroboration/oxidation.<br>**romatic Hydrocarbons**<br>romatic hydrocarbons: Aromaticity: Huckel's rule, aromatic character of arenes, cyclic carbocations/ carnanions and heterocyclic compounds with suitable examples. Electrophilic aromatic substitution: halogenation, nitration, sulphonation and Friedel-Craft's alkylation/acylation with their mechanism. Directive effects of the groups. | |
| III | **Behaviour of ideal gases:** Kinetic theory of gases – postulates and derivation of the equation, $PV=1/3\ mne^2$ and derivation of the gas laws-Maxwell's distribution of molecular velocatities-effects of temperature- types of molecular velocities-degrees of freedom-Principle of equipartition of energy.<br>**Behaviour of Real gases:** Deviation from ideal behaviour, derivation of van der Waals, equation of state and critical constants.<br>Liquid state chemistry: structure of liquids (Eyring Theory), Properties of liquids, viscosity and surface tension.<br>**Solid state chemistry:** Nature of the solid state, law of constancy of interfacial angles, law of rational indices, Miller indices, elementary ideas of symmetry, symmetry elements and symmetry operations, seven crystal systems and fourteen Bravais lattices; X-ray diffraction, Bragg's law, Crystal defects. | 11 |
| IV | **A. Colloids and surface chemistry:** Classification, Optical, Kinetic and Electrical Properties of colloids, Coagulation, HrdySchuize law, flocculation value, Protection, Gold number, Emulsion, micelles and types, Gel, Syneresis and thixotropy, Physical adsorption, chemisorption,<br>**B.** Chemical kinetics: Rate of reaction, Factors influencing rate of reaction rate law, rate constant, Order and molecularity of reactions, rate determining step, Zero, First and Second order reactions, Rate and Rate Law, methods of determining order of reaction, Chain reactions. Temperature dependence of Reaction rate, Arrhenius theory, Physical significance of Activation energy, collision theory, demerits of collision theory, non-mathematical concept of transition state theory.<br>Catalysis: Homogeneous and Heterogeneous Catalysis, types of catalyst, characteristics of catalyst, Enzyme catalysed reactions, Industrial applications of catalysis. | 11 |
| **Keywords** | ***Acid & bases, Alkanes, Cycloalkanes, alkenes, Dienes, alkynes, Aromatic Hydrocarbons, Kinetic theory of gases, Real gases, Intermolecular forces, Crystal structure, Chemical kinetics.*** | |
| ***Signature of Convener & Members (CBoS)*** | | |

**PART-C: Learning Resources**

**Text Books, Reference Books and Others**


- Paula, B. Y. (2014). Organic Chemistry (7th Ed.). Pearson Education, Inc. (Singapore).
- Solomons, T. W. G. (2017). Organic Chemistry (Global Ed.). John Wiley & Sons.
- Morrison, R. T., & Boyd, R. N. (2010). Organic Chemistry (7th Ed.). Prentice-Hall Of India Limited.
- Laidler, K. J., & Meiser, J. H. (2006). Physical Chemistry (2nd Indian Ed.). CBS Publishers.
- . Atkins, P. W., & De Paula, J. (2006). Physical Chemistry (8th Ed.). Oxford University Press.
- . Dogra, S., & Dogra, S. (2006). Physical Chemistry through Problems (2nd Ed.). New Age International.

Sangaranarayanan, M. V., & Mahadevan, V. (2011). Textbook of Physical Chemistry. University Press.


Text Books Recommended-


- Bahl, A., & Bahl, B. S. (2014). Organic Chemistry (22nd Ed.). S. Chand & Sons.
- Ahhuwalia, V. K., & Goyal, M. (2001). A Textbook of Organic Chemistry. Narosa Publishing House.
- . Jain, M. K., & Sharma, S. C. (2017). Modern Organic Chemistry. Vishal Publishing Company. Puri, B. R., Sharma, L. R., & Pathania, M. S. (2013). Principles of Physical Chemistry (46th Ed.).
- Shoban Lal Nagin Chand And Co. 5. Bahl, B. S. A., & Tuli, G. D. (2009). Essentials of Physical Chemistry (Multicolour Ed.). S. Chand & Company Pvt Ltd. 6. Puri, B. R., Sharma, L. R., & Kalia, K. C. (2018). Principles of Inorganic Chemistry. Nagin Chand and Co., New Delhi,


Online Resources-

- e-books and e-learning portals
- https://bit.lv/3AvV3mZ
- https://bit.ly/30V85z
- https://bit.ly/3C9PXPS
- https://bit.ly/301p9rZ
- https://bit.ly/BPnwqe

**PART -D: Assessment and Evaluation**

Suggested Continuous Evaluation Methods:
Maximum Marks: 100 Marks
Continuous Internal Assessment (CIA): 30 Marks
End Semester Exam (ESE): 70 Marks

| | | |
|---|---|---|
| Continuous Internal Assessment (CIA): 30<br>( By Course Teacher) | Internal Test/Quiz:20+20<br>Assignment/ Semenar-10<br>Total Marks-30 | Better marks out of the two Tot Quiz + obtained marks in Assignment shall be considered against 15 Marks |

| | |
|---|---|
| End Semester Exam | Two section A&B |

| | |
|---|---|
| (ESE):70 | Section A :Q1 Objective 10∗1=10 Marks Q2 Short answer type-5*4=20<br>Section B : Descriptive answer type qts 1 out of 2frm each- 4*10=40 Marks |
| ***Signature of Convener & Members (CBoS)*** | |

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# FOUR YEAR UNDERGRADUATE PROGRAMME

## DEPARTMENT OF CHEMISTRY

## COURSE CURRICULUM

| **PART- A: Introduction** | | | |
|---|---|---|---|
| **Progamme: Bachelor of Science**<br><br>**(Certificate/Diploma/Degree/Honors** | | **Semester-II** | **Session: 2024-2028** |
| **Course Code** | **CHSC-02P** | | |
| **Course Title** | **Lab. Course -01 (FUNDAMENTAL CHEMISTRYII)** | | |
| **Course Type** | **Laboratory course** | | |
| **Pre-requisite( if any)** | **As per programme** | | |
| **Course Learning. Outcomes (CLO)** | **At the end of this course, the students will be able to**<br>➢ Demonstrating and using common glassware for accurate measurements.<br>➢ Studying the functional group analysis organic compounds.<br>➢ points to assess compound purity and employing distillation and sublimation techniques to establish boiling points.<br>➢ Equipping with essential skills in measuring liquid surface tension and solution viscosity. | | |
| **Credits Value** | **1 Credits** | **Credit =30 Hours Laboratory or Field learning/Training** | |
| **Total Marks** | **Max. Marks:50** | **Min Passing Marks: 20** | |
| PART-B: | Content of the Course | | |
| Total No. of learning-Training/performance Periods: 30 Periods (30 Hours) | | | |
| Module | Topics (Course contents) | | No. of Period |
| Lab/ field Training/ Experiment Content of Course | **Basic Laboratory Techniques:**<br>Demonstration 80-82 ˚of Laboratory Glassware and Equipment , Calibration of Thermometer : (Naphthalene), 113.5 ˚- 114 ˚C (Acetanilide), 132.5 ˚C – 133 ˚C (Urea), 100 ˚C (Distilled Water)<br>**Functional group analysis of Organic Compounds,** Detection of elements (N,S and halogens) and Functional groups.<br>**Physical Chemistry**<br>Surface tension measurements: Determine the surface tensionby (i) drop number (ii) drop weight method. Surface tension composition curve for a binary liquid mixture.<br>Viscosity measurement using Ostwald's viscometer, Determination of viscosity of aqueous solutions of (i) sugar (ii) ethanol at room temperature.<br>Study of the variation of viscosity of surface solution with th concentration of solute. Viscosity Composition curve for a binary liquid mixture. | | 30 |
| **Keywords** | **Basic laboratory techniques ,Equipment's, Calibration, Melting points, Qualitative analysis, physical chemistry, Surface tension, Viscosity.** | | |
| ***Signature of Convener & Members (CBoS)*** | | | |

**PART-C: Learning Resources**

Text Books, Reference Books and Others

Text Books Recommended-

1. Gurtu, J. N., & Kapoor, R. (1987). Experimental Chemistry. S. Chand & Co
2. Bajpai, D. N., Pandey, O. P., & Giri, S. (2013). Practical Chemistry. S. Chand & Co.
3. 3. Ahluwalia, V. K., Dhingra, S., &Dhingram, S. (2005). College Practical Chemistry. Universities.
4. Kamboj, P. C. (2014). Advanced University Practical Chemistry (Part 1). Vishal Publishing Co. 5. Fultariya, C., &Harsora, J. (2017). Volumetric Analysis: Conceptt and Experiments.

Reference Books Recommended-

1. Mcpherson, P. A. (2015). Practical Volumetric Analysis. Royal Society Of Chemistry.
2. Shobha, R., & Banani, M. (2017). Essentials of Analytical Chemistry. Pearson.
3. Venkateswaran, V., Veeraswamy, R., &Kulandaivelu, A. R. (2004). Basic Principles Of Practical Chemistry (2nd Ed.). S. Chand Publications.
4. Sundaram, S., & Raghavan, K. (1996), Practical Chemistry. S. Viswanathan Co. Pvt. 5. Svehla, G. (2011). Vogel's Textbook of Inorganic Qualitative Analysis (7th Ed.). Pearson Education

Online Resources-

- E-resources/e-books and e-learning portals
- http://www.swayam.ac.in
- http://www.ignou.ac.in
- www.egyankosh.ac.in
- www.litm.ac.in
- www.eskillindia.org
- www.eshiksha.mp.gov.in
- www.vlab.co.in

**PART -D: Assessment and Evaluation**

Suggested Continuous Evaluation Methods:
Maximum Marks: 50 Marks
Continuous Internal Assessment (CIA): 15 Marks
End Semester Exam (ESE): 35 Marks

| | | |
|---|---|---|
| Continuous Internal Assessment (CIA): 15<br>( By Course Teacher) | Internal Test/Quiz:10+10<br>Assignment/ Semenar-05<br>Total Marks-15 | Better marks out of the two Tot Quiz + obtained marks in Assignment shall be considered against 15 Marks |

| | |
|---|---|
| End Semester Exam (ESE):35 | Laboratory/Field Skill Performance: On spot Assessment<br>Section A : Performed the Task based on lab, work 20∗1=20 Marks<br>B: Performed the Task based on lab, work (written) 10*1=10Marks<br>Section B : Viva-voce (based on principle/technology) - 5*1=05 Marks |

***Signature of Convener & Members (CBoS)***

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# FOUR YEAR UNDERGRADUATE PROGRAMME

## DEPARTMENTOF MATHEMATICS

## COURSECURRICULUM

| **PART-A:Introduction** | | |
|---|---|---|
| **Progamme: Bachelor of Science (Certificate/Diploma/DegreeHonors)** | **Semester-II** | **Session:2024-2028** |
| **Course Code** | **MASC-02** | |
| **Course Title** | **Algebra** | |
| **Course Type** | **DSC** | |
| **Pre-requisite(ifany)** | **Knowledge of basic algebra, determinants and matrices.** | |
| **Course Learning. Outcomes(CLO)** | **This Course will enable the students to:**<br>➢ Learn about the Matrix algebra.<br>➢ Understand Set theory, Function and Relation<br>➢ Learn about the theory of equations.<br>➢ Learn about the fundamental concepts of groups, Subgroups.<br>➢ Understand cosets and normal subgroups | |
| **Credit Value** | **4Credits** | **1 Credit=** 15Hours-learning &Observation |
| **Total Marks** | **Max.Marks:** 100 | **MinPassing Marks:**40 |

**PART-B:Content oftheCourse**

**Total No. of Teaching-learning Periods(01 Hr.per period)-60 Periods(60 Hours)**

| Unit | Topics | No. of Period |
|---|---|---|
| **I** | **Matrix Algebra :**Introduction, elementary operations of matrices, Inverse of a matrix. Special types of matrices: Transpose of a matrix, Symmetric and Skew symmetric matrices, Hermitian and Skew Hermitian matrix, Rank of a matrix, Echelon form of a matrix, Normal form, Application of matrices to a system of linear (both homogeneous and non-homogeneous) equations , Theorems on consistency of a system of linear equations. Eigen values and Eigen vectors, relation between Eigen values and Eigen vectors. Process of finding Eigen values and Eigen vectors, Cayley Hamilton theorem, and its use in finding inverse of a matrix. | **15** |
| **II** | **Sets Theory &Functions:**Sets, subsets Set operations and the laws of set theory and Venn diagrams. Examples of finite and infinite sets. Finite sets and counting principle. Empty set, properties of empty set. Standard set operations. Classes of a set. Power set of a set. Difference and symmetric difference of two sets. Set identities, Generalized union and intersection.<br><br>**Relations and Functions:** Product set, Composition of relations, Types of relations, Partitions, Equivalence Relations with example of congruence modulo relation, Partial ordering relations. Function, Types of Function, Inverse Function, Composite of functions, Modular arithmetic and basic properties of congruences. | **15** |
| **III** | **Theory of equations:** Symmetric functions of the roots of an equation, Root of a multiplicity, Synthetic division, Greatest common Divisors, Relation between the roots and coefficients of general polynomial equations in one variable. Transformation of equations. Descarte's rule of signs. Solutions of cubic equations (Cardon method), Biquadrate equation. | **15** |

| | | |
|---|---|---|
| **IV** | **Group Theory:** Definition and properties of a group, Abelian groups, Examples of groups, Subgroups and examples, Cosets and their properties, Lagrange's theorem and its applications, Normal subgroups and their properties, Simple groups, Factors groups. | **15** |

**PART-C: Learning Resources**

**Text Books, Reference Books and Others**

**TextBooksRecommended-**

1. RamjiLal (2017). Algebra 1: Groups, Rings, Fields and Arithmetic. Springer.
2. Nathan Jacobson (2009). Basic Algebra 1 (2nd edition). Dover Publications
3. John B. Fraleigh (2007). A First Course in Abstract Algebra (7th edition). Pearson

**Reference Books Recommended-**

4. Michael Artin (2014). Algebra (2nd edition). Pearson.
5. Stephen H. Friedberg, Arnold J.Insel& Lawrence E. Spence (2003). Linear Algebra (4 edition). Prentice-Hall of India Pvt. Lt
6. Joseph A. Gallian (2017). Contemporary Abstract Algebra (9th edition). Cengage.
7. Kenneth Hoffman & Ray Kunze (2015). Linear Algebra (2nd edition). Prentice-Hall.
8. I. N. Herstein (2006). Topics in Algebra (2nd edition). Wiley India.

**E-resources:** https://onlinecourses.nptel.ac.in
https://epqp.inflibnet.aci.in
https://swayam.gov.in
https://www.mooc.org

**Part-D: Assessment and Evaluation**

**Suggested Continuous Evaluation Methods: Maximum Marks: 100 Marks**
**Continuous Internal Assessment(CIA): 30 Marks**
**End Semester Exam(ESE): 70 Marks**

| | | |
|---|---|---|
| **Continuous Internal.Assessment (CIA):** 30(By Course Teacher) | Internal Test/Quiz:20 + 20 Assignment/ Seminar-10<br>TotalMarks-30 | Better marks out of the two Total Quiz +obtained marks in Assignment shall be considered against30Marks |
| **End Semester Exam** | **Two section :** A & B<br>Section A: Q1.Objective 10*1=10 Marks Q2.Short answer type question - 5*4 = 20<br>Section B:Descriptive answer type question,1 out of 2from each unit - 4*10=40 Marks | |

***Signature of Members (BoS)***

श्री Davara University

Established under Chhattisgarh Private Universities (Establishment and Operation) Act, 2005

# FOUR YEAR UNDERGRADUATE PROGRAM (2025-26)

## DEPARTMENT OF ECONOMICS

## COURSE CURRICULUM

| **PART-A: Introduction** | | | |
|---|---|---|---|
| **Program: Bachelor in Arts (Certificate/Diploma/Degree Honors)** | | **Semester-II** | **Session: 2025-2026** |
| **Course Code** | **DUECOSC-02** | | |
| **Course Title** | **Basics of Indian Economy** | | |
| **Course Type** | **DSC (Discipline specific Course)** | | |
| **Pre-requisite(if any)** | **As per program** | | |
| **Course Learning. Outcomes (CLO)** | ➢ The student learn about the state of Indian Economy pre and post independence.<br>➢ The students gets and understanding about the planning process and achievement in Indian Economy.<br>➢ The student will come to know about social problem like over population, un education, poor health, malnutrition, poverty and unemployment.<br>➢ It covers the topics like industrial development, foreign trade in India, role of different factors and their significance.<br>➢ The students learn about the economy of Chhattisgarh GSDP calculation per capita income and also the state of agricultural economy of Chhattisgarh.<br>➢ The students learn about various industries and infrastructure development of Chhattisgarh. | | |
| **Credit Value** | **4 Credits** | **Credit =60 Hours-learning & Observation** | |
| **Total Marks** | **Max. Marks:=100** | **Min Passing Marks: 40** | |
| **PART -B: Content of the Course** | | | |
| **Total No. of Teaching-learning Periods (01 Hr. per period) -60 Periods (60 Hours)** | | | |

| UNIT | TOPICS (Course Contents) | No of Periods |
|---|---|---|
| UNIT I- AN INTRODUCTION TO INDIAN ECONOMY | 1. INDIAN ECONOMY AT THE TIME OF INDEPENDENCE<br>2. POST INDEPENDENCE INDIAN ECONOMY | 15 |

| | | |
|---|---|---|
| | 3. DEVELOPMENT THROUGH FIVE YEAR PLANS<br>4. NITI AAYOG<br>5. NEW ECONOMIC REFORMS | |
| UNIT II- DEMOGRAPHY | 1. DEMOGRAPHIC TRENDS OF INDIA<br>2. ISSUES OF EDUCATION, HEALTH, MALNUTRITION AND MIGRATION.<br>3. POVERTY AND INEQUALITY<br>4. UNEMPLOYMENT & OCCUPATIONAL DISTRIBUTION | 15 |
| UNIT III- AGRICULTURE | 1. NATURE & IMPORTANCE OF AGRICULTURE<br>2. AGRICULTURE PRODUCTION & PRODUCTIVITY<br>3. MAJOR PROBLEMS IN INDIAN AGRICULTURE<br>4. LAND USE PATTERN & LAND REFORMS<br>5. NEW AGRICULTURE STRATIGIES & GREEN REVOLUTION | 15 |
| UNIT IV- INDUSTRY & FOREIGN TRADE | 1. INDUSTRIAL GROWTH & PRODUCTIVITY<br>2. INDUSTRIAL POLICY & ECONOMIC REFORMS<br>3. MICRO, SMALL & MEDIUM INDUSTRIES (MSME)<br>4. PROBLEMS OF SMALL SCALE INDUSTRIES<br>5. PUBLIC ENTERPRIZES IN INDIA<br>6. ROLE OF FOREIGN TRADE IN INDIA'S DEVELOPMENT | 15 |

*Signature of Convener & Members CBoS:-*

**PART-C, LEARNING RESOURCES ,Reference Books& others**

| AUTHOR | TITLE | PUBLISHER |
|---|---|---|
| Uma Kapila | India Economy: Performance & Policies | Academic Foundation |
| Datt, Ruddar & K.P.M. Sundharam | Indian Economy | S. Chand & Co. new Delhi |
| Mishra & Puri | Indian Economy | Himalaya Publishing House |
| Govt. of India | Economic Survey (Various Issues) | Govt. of India |
| Brahmanand, P.R. & V.R. Panchmukhi (Eds) | The development process of the Indian Economy | Himalaya Publishing, Mumbai |

| Online Resources | |
|---|---|
| 1 | https://www.swayamprabha.gov.in/index.php |
| 2 | https://vidyamitra.inflibnet.ac.in/index.php |
| 3 | https://epgp.inflibnet.ac.in/Home/ViewSubject |

## PART-D ASSESSMENT & EVALUATION

**Suggested Continuous Evaluation Methods:**

Maximum Marks :100 Marks
Continuous Internal Assessment (CIA) : 30 Marks,
End Semester Exams (ESE) :70 marks

| | | |
|---|---|---|
| **Continuous Internal Assessment (CIA):** (By Course Teacher) | Internal Tests/Quiz–(2) : 20 & 20<br>Assignment/Seminar/Attendance - 10<br>Total Marks - 30 | Better marks out of the two Test /Quiz +Obtained marks in Assignment shall be considered against 30 Marks |
| **End Semester Exams** (ESE) : | **Two Section – A & B**<br>**Section A**:Q 1- Objective- 10x1=10 Marks<br>Q 2-Short answer type- 5x4=20 Marks<br>**Section B**: Descriptive answer type questions,<br>1 out of 2 from each unit - 4x10=40 Marks | |

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# FOUR YEAR UNDERGRADUATE PROGRAMME

## DEPARTMENT OF HINDI

## COURSE CURRICULUM

| **PART-A:Introduction** | | | |
|---|---|---|---|
| **Progamme: Bachelor of Science (Certificate/Diploma/Degree Honors)** | | **Semester-II** | **Session: 2024-2028** |
| **Course Code** | **AEC-02** | | |
| **Course Title** | **Hindi Language** | | |
| **Course Type** | **Ability Enhancement Course** | | |
| **Pre-requisite(if any)** | **As per PROGRAMME** | | |
| **Course Learning. Outcomes (CLO)** | **After the completion of this course, the students will be able to-**<br>➢ fo\|kFkhZfgUnhHkk'kk,oaO;kdj.klaca/khKkulsle`)gksaxsA<br>➢ Hkk'kkKkudsek/;elsHkkjrh;laLd`fr,oaHkkoukRed,drkds egRodks le>us dh {kerkfodflrgksldsxhA<br>➢ eqgkojs,oayksdksfDr;k¡dkegRole>ldsaxsAO;aX;]fuca/k ,oadforkfo\|klsifjfprgksaxsA<br>➢ fuca/kys[ku,oavifBrx\|ka"kdsek/;elsfo\|kfFkZ;ksZadkckSf)d fodklgksldsxkA | | |
| **Credit Value** | **2 Credits** | **Credit =30 Periods-learning & Observation** | |
| **Total Marks** | **Max. Marks:=50** | **Min Passing Marks: 20** | |

| **PART -B: Content of the Course** | | |
|---|---|---|
| Total No. of Teaching-learning Periods (45 Min. per period) -30 Periods | | |
| Unit | Topics (Course contents) | |
| I | **jpuk,a**<br>भारतवंदना–सूर्यकांतत्रिपाठी'निराला'(कविता)<br>जीव–हरिशंकरपरसाई(व्यंग्य)चोरीऔरप्रायश्चित–महात्मागांधी (निबंध) | 08 |
| II | हिन्दीव्याकरणएवंशब्दरचना<br>प्रत्यय,संधिसमास<br>पर्यायवाचीशब्द,विलोमशब्द,अनेकार्थीशब्द,समश्रुतशब्द,अनेक शब्दोंकेलिएएकशब्द | 07 |
| III | हिन्दीव्याकरण एवंरचनापक्ष<br>मुहावरेएवंलोकोक्तियां<br>परिभाशिकषब्दावलीएवंहिन्दीमेंपदनाम,षब्दषुद्धि,वाक्यषुद्धि | 08 |
| IV | रचनात्मकलेखन<br>निबंध लेखन<br>अपठितगद्यांश<br>¼uksV&fo\|kFkhZdksfdlh ,d fo'k; ijfuca/k o iznRRkx\|ka"k dk f'k'kZdrFkklkjka"kfy[kuk gksxkA½ | 07 |
| ***Keywords*** | रचनात्मकलेखननिबंध लेखनहिन्दीव्याकरण एवंरचनापक्ष | |
| ***Signature of Convener & Members (CBoS)*** | | |

| **PART-C: Learning Resources** |
|---|
| Text Books, Reference Books and Others |
| Text Books Recommended- |
| 1- भारतीयताकेअमरस्वर–डॉ.धनंजयवर्मा,मध्यप्रदेशहिन्दीअकादमी<br>2- आधुनिकहिन्दीव्याकरणऔररचना–डॉवासुदेवनंदन<br>3- हिन्दीभाषाऔरव्यवहार–डॉ.गंगाचरणत्रिपाठी<br>4- हिन्दीव्याकरणमाला–डॉ.के.आर.गहिया,डॉविमलेशशर्मा<br>5- हिन्दीव्याकरण–कामताप्रसादगुरू |
| Online Resources-<br>➢ Applying Communication Theory for Professional Life: A Practical Introduction. Dainton and Zelley, http://taime.uz.ac.zw/claroline/backends/download.php?urf-L0ludHJvX3RvX2NvbW1lbmljYXRpb25f<br>➢ https://www.coursera.org/lecture/emergence-of-life/4-5-invertebrates-successes-of-life-http://www.ignou.ac.in<br>➢ https://web.sol.du.ac.in/my modules/type/cbcs-11- 2/data/root/B.Com/Semester%202/ABILITY-ENHANCEMENT%20COMPULSORY%20COURSE-AECC/English%20Communication%20A-B-C/Unit%201-5.<br>➢ pdf https://www.youtube.com/watch?v=uK-XYhttp://www.eshiksha.mp.gov.in<br>➢ https://www.youtube.com/watch?v=WxMSckEcio4http://www.internshala.com<br>➢ https://archive.org/details/personality-development-book/mode/lup<br>➢ https://www.coursera.org/articles/presentation-skills<br>➢ https://www.cbs.de/en/blog/15-effective-presentation-tips-to-improve-presentation-skills/<br>➢ https://benjaminball.com/blog/good-body-language-best-visual-aid-talks/ |
| **PART -D: Assessment and Evaluation** |
| Suggested Continuous Evaluation Methods:<br>Maximum Marks: 50 Marks<br>Continuous Internal Assessment (CIA): 15 Marks<br>End Semester Exam (ESE): 35 Marks |

| | | |
|---|---|---|
| Continuous Internal Assessment (CIA): 15<br>( By Course Teacher) | Internal Test/Quiz:10+10<br>Assignment/ Semenar-05<br>Total Marks-15 | Better marks out of the two Quiz + obtained marks in Assignment shall be considered against 15 Marks |

| | |
|---|---|
| End Semester Exam (ESE):70 | Two section A&B<br>Section A :Q1 Objective 1∗5=5 Marks<br>Q2 Short answer type-2∗5=10 (I. Vocabulary, II Unseen passage<br>Section B : Descriptive answer type qts 1 out of 2frm each- 5*4=20 Marks |
| ***Signature of Members (BoS)*** | |

**FOUR YEAR UNDERGRADUATE PROGRAMME**

श्री Davara University

Established under Chhattisgarh Private Universities (Establishment and Operation) Act, 2005

# DEPARTMENT OF CHEMISTRY

## COURSE CURRICULUM

| **PART-A:Introduction** | | | |
|---|---|---|---|
| **Progamme: Bachelor of Science (Certificate/Diploma/Degree Honors)** | | **Semester-II** | **Session: 2024-2028** |
| **Course Code** | **SEC-01** | | |
| **Course Title** | **Chemistry Lab Skills -II** | | |
| **Course Type** | **Skill Enhancement Course (SEC)** | | |
| **Pre-requisite(if any)** | **As per programme** | | |
| **Course Learning. Outcomes (CLO)** | **Completing this course, students will be able to: -**<br>➢ To understand different acid-base theories and solvent system.<br>➢ To learn the preparation, bonding, and reactions of C-C σ- & π- bonded compounds.<br>➢ To understand the concept and chemistry of aromatic compounds and their reactions.<br>➢ To learn the basic concepts of various states of matter & understand the basic concepts of surface chemistry and chemical kinetics. | | |
| **Credit Value** | **1 Credits** | **Credit =30Periods-learning & Observation** | |
| **Total Marks** | **Max. Marks:=50** | **Min Passing Marks: 20** | |

| **PART -B: Content of the Course** | | |
|---|---|---|
| Total No. of Teaching-learning Periods (45 Min. per period) -15 Periods | | |
| Unit | Topics (Course contents) | |
| I | **Introduction of Chemistry Laboratory**<br>General introduction of the chemistry laboratory, common instructions for safe working in chemical laboratories, Good Laboratory Practices (GLP), Good Manufacturing Practices (GMP).Laboratory design, Storage, ventilation, lighting, fume, cupboard, arrangement of the store, Safety provisions, Organization of practical work, Maintenance of laboratory, equipment Cleaning of laboratories and glasswares/ plasticwares and preparation room. Classification ofapparatus in store and laboratory. | 08 |
| II | **Introduction of Chemistry Apparatus**<br>Glass apparatus - Beaker, test tube, boiling tube, funnel, separating funnel, filtrationflask, roundbottom flask, flat bottom flask, condenser Liebig flask, watglassetc. measuring conical orcondenser, Petridis, desiccators. Volumetric Apparatus – Measuring cylinder, burette, pipette,volumetric flask, analytical balance, single-pan electronic balance/ electrical analytical balance,Micropipette, Three way Pipette Bulb etc. | 07 |
| III | **Introduction of Chemistry Equipments**Clevenger apparatus, Buchner funnel, Soxhlet extractor, wire gauze, cork borers, filter pumps,crucible, mohr clip, pipe clay triangle, pestle and mortar, sprit lamp,spatulas, thermometer, pHmeter. | 08 |
| IV | **Introduction of Chemistry Equipments**- laboratory centrifuge. Apparatus for heating and reaction: Magnetic Stirrer, Bunsenburner, water bath, oil bath hot plate, sand ,bath, hot air oven, heating mantle etc. | 07 |
| ***Keywords*** | ***Introduction of Chemistry Laboratory.*** **Introduction of Chemistry Apparatus. Introduction of Chemistry Equipment's.** | |

| *Signature of Convener & Members (CBoS)* |
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| |

| **PART-C: Learning Resources** |
|---|
| Text Books, Reference Books and Others |
| Text Books Recommended- |
| **Reference Books Recommended-**<br>➢ Bahl, A., & Bahl, B. S. (2014). Organic Chemistry (22nd Ed.). S. Chand & Sons.<br>➢ Ahhuwalia, V. K., & Goyal, M. (2001). A Textbook of Organic Chemistry. Narosa Publishing House.<br>➢ . Jain, M. K., & Sharma, S. C. (2017). Modern Organic Chemistry. Vishal Publishing Company. Puri, B. R., Sharma, L. R., & Pathania, M. S. (2013). Principles of Physical Chemistry (46th Ed.).<br>➢ Shoban Lal Nagin Chand And Co. 5. Bahl, B. S. A., & Tuli, G. D. (2009). Essentials of Physical Chemistry (Multicolour Ed.). S. Chand & Company Pvt Ltd. 6. Puri, B. R., Sharma, L. R., & Kalia, K. C. (2018). Principles of Inorganic Chemistry. Nagin Chand and Co., New Delhi, |
| Online Resources-<br>➢ Introduction to Computer Fundamental from W3school: https://www.w3schools.blog/computer-fundamentals-tutorial<br>➢ Introduction to MS-Word from W3school: https://www.w3schools.blog/ms-word-tutorial<br>➢ Introduction to MS-Excel from W3school:https://www.w3schools.com/excel/excel_introduction.php<br>➢ ntroduction to MS-PowerPoint from W3school:https://www.w3schools.blog/powerpoint-tutorial<br>Introduction to MS-Access from W3school:<br>➢ https://www.youtube.com/watch?v=WxMSckEcio4http://www.internshala.com |

| **PART -D: Assessment and Evaluation** | | |
|---|---|---|
| Suggested Continuous Evaluation Methods:<br>Maximum Marks: 50 Marks<br>Continuous Internal Assessment (CIA): 15 Marks<br>End Semester Exam (ESE): 35 Marks | | |
| Continuous Internal Assessment (CIA): 15<br>( By Course Teacher) | Internal Test/Quiz:10+10<br>Assignment/ Semenar-10<br>Total Marks-15 | Better marks out of the two Tot Quiz + obtained marks in Assignment shall be considered against 15 Marks |
| End Semester Exam (ESE):50 | Two section A&B<br>Section A :Q1 Objective 5∗1=5 Marks Q2 Short answer type-5∗4=20<br>Section B : Descriptive answer type qts 1 out of 2frm each- 10*1=10 Marks | |
| *Signature of Convener & Members (CBoS)* | | |