



**CAREER POINT
UNIVERSITY**



CAREER POINT UNIVERSITY KOTA (RAJASTHAN)

School of Education

**Syllabus and Course Scheme
(Annual Scheme)**

**Integrated Program of
B.Sc.-B.Ed.
(Mathematics)**

Session – 2021-22

Duration of the Course - Four Years

Course Scheme of B.Sc. B.Ed. Part-I

Annual Course Scheme of B.Sc. B.Ed. Part-I				
Branch-Mathematics				
S.No.	Paper Code	Paper Name	Marks	
			Min. Marks	Max. Marks
1	HUL011	General English*	36	100
2	EDL011-I	Childhood and Growing up	36	100
3	EDL011-II	Contemporary India and Education	36	100
4	EDL011-III	Instructional System & Educational Evaluation	36	100
5	CHL011-I	Inorganic Chemistry	18	50
6	CHL011-II	Organic Chemistry	18	50
7	CHL011-III	Physical Chemistry	18	50
8	CHP011	Chemistry Practical	18	50
9	MAL011-I	Abstract Algebra	16	44
10	MAL011-II	Differential Calculus	24	66
11	MAL011-III	Vector Calculus	25	68
12	MAP011	Maths Practical	8	22
13	PHL011-I	Mechanics	18	50
14	PHL011-II	Electromagnetism	18	50
15	PHL011-III	Optics	18	50
16	PHP011	Physics Practical	18	50
				G.T.
				900

- Some of the papers are fully Sessional of having according to their practical marks as the case may be Chemistry, Physics & Mathematics.

University Campus: Alaniya, Kota 325 003, Rajasthan Ph: +91-80941-62999

City office: CP Tower (4th Floor), IPIA, Road No-1, Kota (Raj.) -324005 Ph: +91-744-3040045 Fax: +91-744-3040050

Syllabus of B.Sc.-B.Ed. Maths Part - I

HUL011: General English

Objectives

An essentially language-based course that aims at making students study English Prose with a view to enlarge their comprehension of the language and develop all the four skills. It also aims at giving them basic skills in grammar, widening their vocabulary and teaching them to write simple and correct English.

The question paper will have 100 multiple choice questions.

1) Comprehension and vocabulary Prose: Indian Voices: A course in English literature and language; ed. By Kshamta Chaudhary and Sanjay Chawla. Published by Orient Blackswan, Hyderabad. The following chapters from the text have been prescribed:

1. The Child: Premchand

2. The mark of Vishnu: Khushwant Singh

3. Brain Bownik's Ailment: Satyajit Ray

4. Drought: Sarat Chand Chatterjee

5. A vision for 2020: A.P.J. Abdul Kalam

6. Elixir of Life: C.V. Raman

7. Photographs: Shama Futehally

8. The death of a Hero: Jai Nimbkar

- Questions based on the content from the prescribed text
- Objective/Multiple choice questions based on the content from the prescribed text
- Short answered questions from the same text

2) Basic language skills: Parts of speech, Determiners, Voice, Reported-Speech, Correct Verbs, Form of Modals, Phrasal Verbs, Prepositions

& Question Tags.

3) Writing Skills: Paragraph writing/C.V. Curriculum-Vitae, Letter Writing/ E-Mail/ Report Writing.

Book Suggested:

1. A Practical English Grammar by A.J. Thomson & A.V. Martinet

2. Oxford English Grammar Course by Michael Swan & Catherine Walter

3. Fundamentals of English Grammar by Betty Azar

4. Advanced English Grammar by Martin Hewings

5. Practical English Writing Skills by Mona Scheraga

6. CVs and Job Applications by Judith Leigh

7. How to Write a CV that Works by Paul McGee

8. Writing Effective Email by Nancy Flynn & Tom Flynn

EDL011-I: Childhood and Growing up

Objectives: After completing the course the students will be able:

1. To develop an understanding of the basic concepts, methods and principles of psychology.
2. To develop an understanding of the nature and process of development.
3. To understand the different periods of life with Psycho-Social Perspective.
4. To develop an understanding of the nature and process of learning in the context of various learning theories and factors.
5. To understand the critical role of learning Environment.
6. To acquaint them with various Psychological attribute of an individual.

University Campus: Alaniya, Kota 325 003, Rajasthan Ph: +91-80941-62999

City office: CP Tower (4th Floor), IPIA, Road No-1, Kota (Raj.) -324005 Ph: +91-744-3040045 Fax: +91-744-3040050

7. To reflect on the changing roles of children in contemporary society.

Unit-I

Role of psychology to understand the child

Psychology: Meaning, nature & branches of psychology,

Methods of psychology: case study and experimental, Edu. Psychology;
Meaning, nature, scope, educational implication of psychology in new Era,
Child psychology; meaning, concept

Unit-II

Multi-dimensional development

Growth and development-concept, stages principles, dimensions, Factors in influencing development-
genetic, biological, environmental and physical

Theories of development:

- a) Piaget's vgotsky cognitive development
- b) Freud's psycho- sexual development
- c) Erikson's psycho social development
- d) Linguistic development
- e) Kohlberys' gilligan's moral development
- f) Bandura's social developments
- g) Gessel's maturation theory

Unit-III

Child Growing up

Childhood: Meaning, concept and characteristics, effects of family, schools, neighbourhood and
community on development of a child

Adolescence: meaning, concept, characteristics, effects of family, school, pear group, social climate
and social media.

Personality: concept and nature, theories of personality, assessment of personality

Individual differences: concept, areas (With Special Educational needs Concept) and educational
implication.

Stress: meaning, types and coping strategies with special reference to personality of adolescent.

Unit-IV

Learning to Learn

Concept and beliefs about learning:-Defining misconception, Brain's role in learning

Memory and forget, Behaviouristic learning theories (Thorndike, Skinner, Pavlov),Gestalt, Cognitive
and Field theory, Information processing theory, Social Constructive approach, Types of learning by
Gagne.

Motivation:-Concept and Maslow's Hierarchy need theory, Creating and maintaining a productive
Classroom Environment:-Dealing with misbehaviour, Multi-Culturalism, Changing roles and
responsibilities in contemporary Indian society with regarding educational psychology.

Unit-V

Psychological Attributes of an individual

Intelligence - Meaning, Types of intelligence - Social, Emotional and Spiritual Intelligence, theory of
intelligence, Gardner's Multi intelligence theory, Measurement of intelligence, Creativity - Meaning,
Components, ways of enhancing creativity, relation with intelligence and other factors, Measurement
of creativity, Higher Level thinking skills - critical thinking, reasoning, problem solving, Decision making.

Socialization and Mental health: Process of Socialization - Group dynamics - Theory of Kurt Lewin's,
Leadership and its styles (Kimble young), social prejudice, Mental Health - Common problems related

University Campus: Alaniya, Kota 325 003, Rajasthan Ph: +91-80941-62999

City office: CP Tower (4th Floor), IPIA, Road No-1, Kota (Raj.) -324005 Ph: +91-744-3040045 Fax: +91-744-
3040050

to child -Attention deficit hyperactivity disorder (ADHD), depression, Learning disabilities, dealing with a problematic child.

- Project (Any one of the following) 10 Marks
- Comparative study of developing pattern's of children with reference to different in SES.
- Collecting and analyzing statistics on the girl child with reference to gender ratio.
- Administration of an experiment on learning, span of attention, memory
- Administration and interpretation of an individual group test of intelligence.

Book Suggested:

1. Agarwal, Reetu, Shukla Geeta (2014). Bal Vikas evam Manovigyan, Rakhi Prakashan, Agra
2. Aggarwal, J.C., (1981). Essential of Educational Psychology, Delhi, Doaba Book
3. Arora, Dr. Saroj, Bhargava, Rajshri (2014). Bal Manovigyan, Rakhi Prakashan, Agra
4. Bigge, M.L. (1982). Learning Theories for Teachers. New York: Harper and Row
5. B.P. (2000). Personality theories, Bosten: Allyn and Bacon House.
6. Chauhan, S.S. (2001). Adanaced educational psychology, New Delhi: Vikas Publishing House.
7. Diane E. Papalia, Sally Wendkos olds, Ruth Durkin Feldman, Ninth Edition, Human Development, Tata Mcgraw Hill Publishing company Limited, New Delhi.
8. Helen Bee Denise Boyd, First Indian Reprint 2004. The Developing Child, Published by Pearson Education Pre. Ltd. Indian Branch Delhi, India
9. Jack Snooman, Robert Biehler Ninth Edition. Psychology Applied to Teaching, Houghton Mifflin Company, Bosten New York (<http://www.coursewise.com>)
10. Ormrod Ellis Jenne, Third Edition, Educational Psychology Developing Learners Multimedia Edition (<http://www.prenhall.com/ormrod>)
11. Sarswat Kuldeep (2015). Bal Vikas evam Bachpan, Published by Rakhi Prakashan, Agra
12. Woolfolk, A. (2004). Educational Psychology published by Dorling Kindersley (India) Pvt. Ltd., Licensees of Pearson Education in South Asia.

EDL011-II: Contemporary India and Education

Objectives: After completing the course the students will be able to:

1. To promote reflective thinking among students about issues of education related to contemporary India.
2. To develop an understanding of the trends, issues and challenges faced by contemporary education in India.
3. To appreciate the developments in Indian education in the post independence era.
4. To understand the Commissions and committees on education constituted from time to time.
5. To understand issues and challenges of education and concern for the underprivileged section of the society.
6. To develop awareness about various innovation practices in education.
7. To develop and understanding of self teaching technical devices.
8. To understand the constitutional values and provisions for education. Course Content

Unit-I

Education as an Evolving Concept

Education: Meaning, concept and nature, Ancient to present education as an organized and institutionalized form, formal and state sponsored activities.

Aims of Education: Historicity of aims of Education, changing aims of education in the context of globalization, sources of aims of Education: Educational aims as derived from the constitution of India influence of aims of education on the curriculum and transactional strategies. Idea of educational thinkers such as Gandhi, Tagore, Aurobindo, Dewey Krishnamurthy, Friere and Illich.

Unit-II

University Campus: Alaniya, Kota 325 003, Rajasthan Ph: +91-80941-62999

City office: CP Tower (4th Floor), IPIA, Road No-1, Kota (Raj.) -324005 Ph: +91-744-3040045 Fax: +91-744-3040050

Issues and Challenges

Diversity, Inequality, Marginalization: Meaning, Concept, Levels with special reference to Individual, Region, Language, Caste, Gender.

Role of education in multicultural and multilingual society for Equalization and Improvement of Marginalization groups.

Hindrances of Education in India: Quality, Facilities, Access, Cost, Political unwillingness, Youth dissatisfaction, Moral Crisis.

UNIT-III

Constitution and Education

Study of the Preamble, fundamental rights and duties of citizens, Directive Principles for state and constitutional values of Indian Constitution.

Constitutional provisions for education and role of education in fulfillment of the constitutional promise of Freedom, Equality Justice, Fraternity.

Education and politics, Constitutional vision related to aims of education, Peace Education, Role of Education, School and Teachers as agents for Imparting Culture, Education and Development. Education and Industrialization.

Unit-IV

Programme and Policies

Overview the development of education system in India from 1948 to 2010 University Education Commission-1946-48, Secondary Education Commission-1952-53, Indian Education Commission- 1964-66, National Education Policy- 1986

Rammurthy Committee (1990), Yashpal Committee Report (1993) Revised National Education Policy (1992) NCF-2005, NKC-2006, NCFTE- 2009, RTE-2010.

SSA, MLL, RMSA, CCE, Navodaya Vidyalaya, Kasturba Gandhi Balika Vidyalaya, Model School.

Unit-V

Innovative Practices

Concept, Need of innovation in view of technological and social change, Obstacles in innovation, Role of Education in bringing innovations,

Education through interactive mode of teaching: Computer, Internet, Tally and Video-Conferencing, Eduset, Smart Class Room, Role of E- learning, E- content, E- magazines and E-journals, E- library.

Yoga Education, Life Skill Education, Education and Competence in life regarding Social inclusion.

- Debate or Organize a one day discussion on the topic related to the subject and submit a report.
- Critical appraisal on the report or recommendations of any commission and committee.
- Organize collage, Poster Making activity in your respective institution.
- Collection of at least three handouts of related topics of the subject.

Book Suggested:

1. Agnihotri, R. (1994) Adhunik Bhartiya Shiksha Samasyaye Aur Samadhan, Jaipur: Rajasthan Hindi Granth Academy
2. Agrawal, J.C: Land Marks in the History of Modern Indian Education, New Delhi
2. Brubecher, John.S: A History of the Problems of Education
3. Altekar, A. S.(1992) Education in Ancient India, Varanasi: Manohar Prakashan
4. Dev, A.,Dev, T.A.,Das,S. (1996) Human Rights a Source Book, New Delhi, NCERT, Pp. 233.
5. Dubey, S.C. (1994) Indian Society, New Delhi, NBT, Pp.
6. Education and National Development: Report of the Kothari Commission on Education, New Delhi, 1966

EDL011-III: Instructional System and Educational Evaluation

Objectives:

This course will enable the student teacher to:

Explain the need, importance and characteristics of educational evaluation.

University Campus: Alaniya, Kota 325 003, Rajasthan Ph: +91-80941-62999

City office: CP Tower (4th Floor), IPIA, Road No-1, Kota (Raj.) -324005 Ph: +91-744-3040045 Fax: +91-744-3040050

Describe the approaches to educational evaluation.

Discuss the role of educational evaluation in Teaching - Learning Process.

Explain the nature of tools and techniques of educational evaluation.

Describe the need and importance of psychological testing,

Explain the nature of learners' evaluation and need for continuous comprehensive educational evaluation in schools.

Unit-I

Instructional System

Educational Objectives and instructional objectives.

Relationship between educational objectives and instructional objectives Classification of educational objectives (Cognitive, affective and psycho motor)

Functioning of educational objectives

Usefulness of the taxonomical classification.

Unit-II

Need, importance and characteristics

Teaching Learning process and role of evaluation

Need and importance of Evaluation

Definition of Evaluation

Evaluation, Assessment and Measurement.

Characteristics of good evaluation.

Unit-III

Approaches to Evaluation

Formative evaluation and summative evaluation

Difference between summative and formative evaluation

External evaluation and internal evaluation, advantages and disadvantages,

Norm referenced evaluation

Criterion referenced evaluation.

Unit-IV

Role of Evaluation in Teaching-Learning Process.

The relationship between instructional objectives, entering behaviour, learning experiences and Performance assessment.

Diagnosis to over-come deficiency in learning.

University Campus: Alaniya, Kota 325 003, Rajasthan Ph: +91-80941-62999

City office: CP Tower (4th Floor), IPIA, Road No-1, Kota (Raj.) -324005 Ph: +91-744-3040045 Fax: +91-744-3040050

Importance of results of evaluation to students, teachers, institutions with special reference to help in determining the effectiveness of a course, programme and functioning of a school.

Unit-V

Nature of tools and techniques of evaluation

Nature of test and Purposes of testing with reference to:

a) Instructional purpose b) Guidance purpose c) Administrative purpose

Administration of Test and Interpreting test result.

Meaning of Norms, types of Norms, age, Grade, Percentile and standard score. 4. Norms and interpretation of test scores.

- Develop a portfolio for assessment of 2 school students
- Prepare an advanced tool for evaluation.
- Develop a tool for self-assessment.
- Develop an achievement test and its blue print.

Book Suggested:

1. Anastasi, Anne, (1976), Psychological Testing, 4m ed., New York; Macmilan Publishing Co. Inc.
2. Bertrand, Arthur and Cebula, Joseph P., (1980) : Tests, Measurement and Evaluation, A Developmental Approach, Addison-Wesley, U.S.A.
3. Bloom, Benjamin S., Et.al., (1971): Handbook on formative and Summative Evaluation in Student Learning, McGraw Hill, USA.
4. Ebel, Robert, L. (1996) : Measuring Educational Achievement, Prentice-Hall of India, New Delhi. 27
5. Ferguson, G A (1974), "Statistical Analysis in Psychology and Education", McGraw Hill Book Co., New York,
6. Freeman, Frank S.,(1962), Theory and Practice of Psychological Testing, New Delhi, Oxford and IBH Publishing Co.
7. Guilford, J.P.(1965), Fundamental Statistics in Psychology and Education, Me Graw Hill Book Company, New York.
8. Khan, Mohd, Arif, (1995): School Evaluation, Ashish Publishing House, New Delhi.
9. Noll, V .C (1957). Introduction to Educational Measurement, Houghton Mifflin Company, Boston.
10. Nunnally, Jume, (1964), Educational Measurement & Evaluation, New York.

CHL011-I: Inorganic Chemistry

Unit-I Atomic Structure

Idea of De Broglie matter wavs, Heisenberg uncertainty principle, atomic orbitals, Schrodinger wave equation, significance of ψ and ψ^2 , quantum numbers, radial and angular wave function 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. Periodic Properties Atomic and ionic radii, ionization energy, electron affinity and electronegativity-definition, methods of determination or evaluation, trends in periodic table and application in predicting and explaining the chemical behaviour.

University Campus: Alaniya, Kota 325 003, Rajasthan Ph: +91-80941-62999

City office: CP Tower (4th Floor), IPIA, Road No-1, Kota (Raj.) -324005 Ph: +91-744-3040045 Fax: +91-744-3040050

Unit –II Chemical Bonding

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 , H_3O^+ , SF_4 , ClF_3 , ICl_2 and H_2O .

MO Theory: Homonuclear and heteronuclear (CO and NO) diatomic molecules, multi-center bonding in electron deficient molecules, bond strength and bond energy, percentage ionic character from dipole moment and electronegativity difference.

Unit -III

Ionic Solids- Ionic Structures: radius ratio effect and coordination number, limitations of radius ratio rule, lattice defects, semiconductors, lattice energy and Born-Haber Cycle, solvation energy and solubility of ionic solids, polarizing power and polarizability of ions. Fajan's rule. Metallic bond -free electron, valence bond and band theories. Weak Interactions -Hydrogen bonding, vander waals forces

Unit -IV

s-Block Elements Comparative study, diagonal relationship, salient features of hydrides, solvation and complexation tendencies including their function in bio systems, an introduction to alkyls and aryls. Chemistry of Noble Gases Chemistry of the noble gases. Chemistry of xenon. Structure and bonding in xenon compounds. p-Block Elements Comparative study (including diagonal relationship) of groups, 13-17 elements compounds like hydrides, oxides, oxyacids and halides of groups 13-16.

Unit -V

Chemistry of the following compounds:

Hydrides of Boron -diborane and higher boranes, borazine, borazoles, fullerenes, carbides, fluorocarbons, silicates, structure principle, tetra sulphur tetranitride, basic properties of halogens, interhalogens and polyhalides.

Book Suggested:

1. Concise Inorganic Chemistry: J.D. Lee
2. General Inorganic Chemistry: J.A. Duffy, Longman (2nd Ed.)
3. Principles of Inorganic Chemistry: B.R. Puri and L.R. Sharma
4. Basic Inorganic Chemistry: F.A. Cotton and G. Wilkinson, Wiley Eastern
5. Molecular Geometry: R.J. Gillespie, Van Nostrand Reinhold

CHL011-II: Organic Chemistry

Unit –I

Structure and Bonding

Hybridization, bond lengths and bond angles. bond energy, localized and delocalized chemical bond, vander waals interactions, inclusion compounds, clathrates, charge transfer complexes, resonance, hyperconjugation, aromaticity, inductive and field effects, hydrogen bonding. Mechanism of Organic Reactions Curved arrow notation, drawing electron movements with arrows, half headed and double headed arrow, homolytic and heterolytic bond breaking. Types of reagents, electrophiles and nucleophiles. Types of organic reactions, Energy considerations. Reactive intermediates carbocations, carbanions, free radicals, carbenes, arynes and nitrenes (With examples). Assigning formal charges on intermediates and other ionic species. Methods of determination of reaction mechanism (product analysis, intermediates, isotope effects Kinetic and stereochemical studies.)

Unit-II

Stereochemistry of Organic Compounds

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

Geometric isomerism: determination of configuration of geometric isomers, E&Z systems of nomenclature, geometric isomerism in oximes and alicyclic compounds. Conformational isomerism: conformational analysis of ethane and n-butane. conformations of cyclohexane, axial and equatorial bond, conformation of mono

University Campus: Alaniya, Kota 325 003, Rajasthan Ph: +91-80941-62999

City office: CP Tower (4th Floor), IPIA, Road No-1, Kota (Raj.) -324005 Ph: +91-744-3040045 Fax: +91-744-3040050

substituted cyclohexane derivatives. Newmann projection and sawhorse formulae, Difference between configuration and conformation.

Unit-III

Alkanes and Cycloalkanes

IUPAC nomenclature of branched and unbranched alkanes, the alkyl group, classification of carbon atoms in alkanes. Isomerism in alkanes, sources, methods of formation (with special reference to Wurtz reaction, Kolbe reactions, Corey-House reaction and decarboxylation of carboxylic acids) Physical properties and chemical reaction of alkanes. Mechanism of free radical halogenation of alkanes: orientation, reactivity and selectivity. Cyclo-alkanes nomenclature, methods of formation, chemical reactions, Baeyer's strain theory and its limitations, Ring strains in small rings (cyclopropane and cyclobutane), theory of strainless rings. The case of cyclopropane ring: banana bonds.

Unit-IV

Alkenes, Cycloalkenes, Dienes and alkynes

Nomenclature of alkenes, methods of formation, mechanisms of dehydration of alcohols and dehydrohalogenation of alkyl halide, regioselectivity in alcohol dehydration The Saytzeff rule, Hofmann elimination, physical properties and relative stabilities of alkenes. Chemical reactions of alkenes-mechanisms involved in hydrogenation, electrophilic and free radical additions, Markownikof's rule, hydroboration-oxidation, oxymercuration-reduction. Epoxidation, ozonolysis, hydration, hydroxylation and oxidation with KMnO_4 Polymerization of alkenes. Substitution at the allylic and vinylic-positions of alkenes. Industrial applications of ethylene and propene. Methods of formation, conformation and chemical reactions of cycloalkenes. Nomenclature and classification of dienes: isolated, conjugated and cumulated dienes. Structure of allenes and butadiene, methods of formation, polymerization. Chemical reactions-1,2- and 1,4- additions, Diels-Alder reaction. Nomenclature, structure and bonding in alkynes.

Methods of formation. Chemical reactions of alkynes, acidity of alkynes. Mechanism of electrophilic and nucleophilic addition reactions, hydroboration-oxidation, metal ammonia reductions, oxidation and polymerizations.

Unit-V

Arenes, Aromaticity, Alkyl & Aryl Halides

Nomenclature of benzene derivatives. The aryl groups. Aromatic nucleus and side chain structure of benzene: molecular formula and Kekule structure Stability. Aromaticity: The Huckel's rule, aromatic ions. Aromatic electrophilic substitution-general pattern of the mechanism, role of σ and π complexes. Mechanism of nitration, halogenation, sulphonation, mercuriation and Friedel Crafts reaction, energy profile diagrams. Activating & deactivating substituents, orientation and ortho/para ratio. Side chain reactions of benzene derivatives. Birch reduction. Nomenclature and classes of alkyl halides, methods of formation, chemical reactions. Mechanism of nucleophilic substitution reactions of alkyl halides, $\text{S}_\text{N}2$ and $\text{S}_\text{N}1$ reactions with energy profile diagrams. Polyhalogen

compounds: chloroform, carbon tetrachloride. Methods of formation of aryl halides, nuclear and side chain reactions. The addition, elimination and the elimination-addition mechanism of nucleophilic aromatic substitution reactions. Relative reactivities of alkyl vs allyl, vinyl and aryl halides. Synthesis and use of D.D.T. and B.H.C

Book Suggested:

1. A Text Book of Organic Chemistry: K.S. Tiwari, S.N. Mehrotra and N.K. Vishnoi
2. Modern Principles of Organic Chemistry: M.K. Jain and S.C. Sharma
3. A Text Book of Organic Chemistry: (Vol. I&II) O.P. Agarwal
4. A Text Book of Organic Chemistry: P.L. Soni
5. Organic Chemistry: (Vol. I, II & III) S.M. Mukherji, S.P. Singh and R.P. Kapoor, Wiley Eastern Ltd.
6. Organic Chemistry: Morrison & Boyd, Prentice Hall

CHL011-III: Physical Chemistry

Unit-I

University Campus: Alaniya, Kota 325 003, Rajasthan Ph: +91-80941-62999

City office: CP Tower (4th Floor), IPIA, Road No-1, Kota (Raj.) -324005 Ph: +91-744-3040045 Fax: +91-744-3040050

Mathematical Concept and Computers

(a) Mathematical Concepts

Logarithmic relations, curve sketching, linear graphs and calculations of slopes differentiation of functions like $kx, ex, xn, \sin x, \log x$; maxima and minima, partial differentiation and reciprocity relations, integrations of some useful/relevant functions: Permutations and combinations. Factorials. Probability.

(b) Computers

General introduction to computers, different components of a computer, hardware and software input output devices; binary numbers and arithmetic; introduction to computer languages. Programming, operating systems.

Unit II

Gaseous States Postulates of kinetic theory of gases, deviation from ideal behaviour, vander waals equation of state. Critical Phenomena: PV isotherms of real gases, continuity of states, the isotherms of vander Waals equation, relationship between critical constants and vander waals constants, the law of corresponding states, reduced equation of state. Molecular Velocities: Root mean square, average and most probable velocities. Qualitative discussions of the Maxwell's distribution of molecular velocities, collision number, mean free path and collision diameter. Liquification of gases (based on Joule-Thomson effect.)

Unit III

Liquid state

Intermolecular forces, structure of liquids (a qualitative description). Structural differences between solids, liquids and gases

Liquid Crystals: Difference between liquid crystal, solid and liquid. Classification, structure of nematic and cholestric phases. Thermography and seven segment cell. Colloidal State Definition of colloids, classification of colloids. Solids in liquids (sols) properties- kinetic, optical and electrical, stability of colloids. Protective action, HardySchulze law, gold number. Liquids in liquids (emulsions): types of emulsions, preparation. Emulsifier. Liquids in solids (gels): classification, preparation and properties inhibition, general applications of colloids.

Unit IV

Solid State

Definition of space lattice, unit cell. Laws of crystallography- (i) Law of constancy of interfacial angles (ii) Law of rationality of indices (iii) Law of symmetry. Symmetry elements in crystals. X-ray diffraction by crystals. Derivation of Bragg's equation Determination of Crystal structure of NaCl and CsCl(Laue's method and powder method.)

Unit V

Chemical Kinetics and Catalysis

Chemical kinetics and its scope, rate of a reaction, factors influencing the rate of a reaction: concentration, temperature, pressure, solvent, light, catalyst, Concentration dependence of rates, mathematical characteristics of simple chemical reactions zero-order, first order, second order, pseudo order, half life and mean life period.

Determination of the order of reaction: differential method; method of integration, method of half life period and isolation method. Radioactive decay as a first order phenomenon. Experimental methods of chemical kinetics: conductometric, Potentiometric, optical methods, polarimetry and spectrophotometry.

Theories of chemical kinetics: effect of temperature on rate of reaction, Arrhenius concept of activation energy. Simple collision theory based on hard sphere model, transition state theory (equilibrium hypothesis). Expression for the rate constant based on equilibrium constant and thermodynamic aspects. Catalysis, characteristics of catalysed reactions, classification of catalysis, miscellaneous examples.

Book Suggested:

7. A Text Book of Organic Chemistry: K.S. Tiwari, S.N. Mehrotra and N.K. Vishnoi
8. Modern Principles of Organic Chemistry: M.K. Jain and S.C. Sharma
9. A Text Book of Organic Chemistry: (Vol. I&II) O.P. Agarwal
10. A Text Book of Organic Chemistry: P.L. Soni
11. Organic Chemistry: (Vol. I, II & III) S.M. Mukherji, S.P. Singh and R.P. Kapoor, Wiley Eastern Ltd.
12. Organic Chemistry: Morrison & Boyd, Prentice Hall

Chemistry Practical

Inorganic Chemistry:

University Campus: Alaniya, Kota 325 003, Rajasthan Ph: +91-80941-62999

City office: CP Tower (4th Floor), IPIA, Road No-1, Kota (Raj.) -324005 Ph: +91-744-3040045 Fax: +91-744-3040050

Semi-micro /macro-Analysis: Anion analysis (3 radicals).

Cation analysis: Separation and identification of ions from groups I, II, III, IV, V and VI (3 radicals). (Total 6 radicals).

Organic Chemistry:

Laboratory Techniques:

Section-A

- Determination of melting point
 - o Naphthalene 80-82°C, Benzoic acid 121.5-122 °C, Urea 132.5- 133°C, Succinic Acid 184.5-185°C, Cinnamic acid 132.5-133°C, Salicylic acid 157.5-158°C, Acetanilide 113.5-114 °C, m-Dinitrobenzene 90°C, p-Dichlorobenzene 52°C, Aspirin 135°C.
- Determination of boiling points
 - o Ethanol 78°C, Cyclohexane 81.4°C, Toluene 110.6°C, Benzene 80°C
- Determination of mixed melting point
 - o Urea-Cinnamic acid mixture of various compositions (1:4,1:1, 4:1)
- Distillation
 - o Simple distillation of ethanol-water, using water condenser
 - o Distillation of nitrobenzene and aniline using air condenser
- Crystallization
 - o Concept of induction of crystallization
 - o Phthalic acid from hot water (using fluted filter paper and stemless funnel)
 - o Acetanilide from boiling water.
- o Naphthalene from Ethanol.
 - o Benzoic acid from water.
- Decolorisation and crystallization using charcoal
 - o Decolorisation of brown sugar (sucrose) with animal charcoal using gravity filtration.
 - o Crystallization and decolorisation of impure naphthalene (100g of naphthalene mixed with 0.3g. of Congo Red using 1.0g decolorising carbon) from ethanol.
- Sublimation (Simple and vacuum)
 - o Camphor, Naphthalene, Phthalic acid and Succinic acid.

Section-B

• **Qualitative Analysis:**

Detection of extra elements (N, S and halogens) and functional groups (phenolic, carboxylic, carbonyl, ester, carbohydrates, amine, amide, nitro and anilide) in simple organic compounds.

Physical Chemistry:

Chemical Kinetics

- To determine the specific reaction rate of the hydrolysis of methyl acetate / ethyl acetate catalyzed by hydrogen ions at room temperature.
- To study the effect of acid strength on the hydrolysis of an ester.
- To compare the strengths of HCl and H₂SO₄ by studying the kinetics of hydrolysis of ethyl-acetate. • To study kinetically the reaction of decomposition of iodide by H₂O₂

Distribution Law

- To study the distribution of iodine between water and CCl₄
- To study the distribution of benzoic acid between benzene and water.

Colloids

- To prepare arsenious sulphide sol and compare the precipitating power of mono-, bi- and trivalent anions.

Viscosity, Surface Tension

- To determine the percentage composition of a given, mixture (non-interacting systems) by viscosity method.
- To determine the viscosity of Amyl alcohol in water at different concentrations and calculate the viscosity of these solutions.
- To determine the percentage composition of a given binary mixture by surface tension method (acetone & ethyl-ketone).

University Campus: Alaniya, Kota 325 003, Rajasthan Ph: +91-80941-62999

City office: CP Tower (4th Floor), IPIA, Road No-1, Kota (Raj.) -324005 Ph: +91-744-3040045 Fax: +91-744-3040050

PHL011-I: Mechanics

Unit-I

Physical Laws and Frame of References: Inertial & non-inertial frames, Galilean transformations and invariance of physical laws, fictitious force, uniformly rotating frames and transformation of displacement, velocity and acceleration, Coriolis force, motion relative to earth and its time period effect of rotation of earth on 'g', Foucault's pendulum.

Unit-II

Conservation Laws and Dynamics of Particles: Concept of centre of mass, Centre of mass of a system of particles, equation of motion, conservation of linear momentum, Relationship between (Lab and centre of Mass frames in 1-D and 2-D reference) elastic and inelastic collision, Motion of a system with varying mass, Motion in a central force field, conservation of angular momentum, trajectory of a particle under gravitational force, Kepler's laws, Rutherford's formula. Rigid body dynamics, equation of motion of a rotating body, Inertial coefficient, Moments of Inertia theorems, idea of principal axes and kinetic energy of rotation. Precessional motion of spinning top, spin precession in constant magnetic field, Larmor's frequency.

Unit-III

Properties of Matter: Elasticity, stress and strain, Hooke's Law, Elastic constants and their relations, theory of bending of beams and torsion of a cylinder, Cantilever, cantilever supported at both ends. Experimental determination of elastic constants by bending of beam and Searle's method, modulus of rigidity by static and dynamic method, Poisson's ratio for rubber.

Unit-IV

Oscillations: Qualitative idea of Oscillations in an arbitrary potential well, simple harmonic motion, Coupled oscillator, Equation of motion of two simple harmonic coupled oscillators and energy transfer normal modes, normal coordinates of two linear coupled oscillators, Damped harmonic oscillation-example of Ballistic galvanometer, vibration of molecules, forced harmonic oscillators, phase relations, power absorption, resonance, band width and quality factor, LCR series and parallel circuits.

Unit-V

Waves: General equation of one-dimensional wave equation and its solution, longitudinal and transverse waves, Plane progressive harmonic wave, its energy density, energy flux and intensity, pressure waves in gas. Equation of motion for one dimensional monatomic & diatomic lattice, acoustic and optical modes, dispersion relations, Concept of group & phase velocities.

PHL011-II: Electromagnetism

Unit-I

Scalar and Vector Fields: Scalar and Vector Fields, Gradient of a scalar field, relation between conservative field and Potential, line, surface and volume integral of vector fields, concept of flux, Divergence and Curl of a vector field and their physical significance, Gauss' divergence and Stokes curl theorem with proof, Del and Laplacian operator in Cartesian, Cylindrical and Spherical coordinates.

Unit-II

Electrostatics: Electric potential and field due to arbitrary charge distribution, Multipole Expansion, potential and field due to dipole & its interaction with electric field electrostatic energy of a uniformly charged sphere,

University Campus: Alaniya, Kota 325 003, Rajasthan Ph: +91-80941-62999

City office: CP Tower (4th Floor), IPIA, Road No-1, Kota (Raj.) -324005 Ph: +91-744-3040045 Fax: +91-744-3040050

classical radius of an electron. Atomic and molecular dipoles, induced dipole and polarizability, dielectrics and their electrical polarization, susceptibility and displacement vector, Capacity of a capacitor with partially and completely filled dielectrics, Gauss' law in integral and differential form, Lorentz local field and Clausius-Mossotti equation.

Unit-III

Electrostatic Field: Conductors is an electric field, boundary conditions for electrostatic field and potential at dielectric surface, uniqueness theorem, method of electrical images and its application for system of point charge near a grounded conducting plane. Poisson's and Laplace equation in Cartesian, cylindrical and spherical coordinates (without proof) solution of Laplace's equation in Cartesian coordinates, boundary conditions.

Unit-IV

Circuits: Rise and decay of current in LR and CR circuits, decay constants, transients in LCR circuits, self and mutual induction, Measurement of self -induction by Rayleigh's method, AC circuits and complex numbers and their application in solving AC circuit problems, complex impedance and reactance, series and parallel resonance. Quality factor, power consumed by an AC circuit, Power factor. Biot Savart law, Amperes circuital law in differential and integral form, Magnetization vector, Magnetizing field H, relation between B, H and M. uniform magnetization and surface current. Non – uniform magnetization, orbital and spin angular momentum & magnetic moment, orbital gyro magnetic ratio and Bohr Magneton, Magnetic susceptibility.

Unit-V

Time Varying Fields: Faraday's law of electromagnetic induction, its integral and differential form, Maxwell's equation in differential and integral form, Maxwell's displacement current, Wave equation for electric and magnetic field, Plane electromagnetic waves and their properties, transverse nature of EMW, energy density, Poynting Theorem, Poynting vector, propagation of EM Wave in conducting and isotropic dielectric medium.

PHL011-III: Optics

Unit-I

Geometrical Optics: Fermat's principle of extreme path, Aplanatic points of a spherical refracting surface, Cardinal points of an optical system, Newton's formula and other relations for coaxial lens system, thick lens & lens combination, Lagrange's law, Aberration in images, spherical aberration and methods of its reduction, chromatic aberration, achromatic combination of lenses placed in contact and placed at some distance, coma and astigmatism,

Eye pieces: Huygen's, Ramsden's and Gauss's eyepieces and their comparison.

Unit-II

Interference: Young's double slit experiment, temporal and spatial coherence, coherence length and time 'effect of size of slit and purity of spectral line, Interference in thin films, colour in thin films. Wedge shaped film, Newton's rings and determination of wavelength and refractive index of liquid by Newton ring, Hadingerand Fizeau fringes, Michelson Interferometer, Measurement of wavelength, wavelength difference between two close wavelengths and thickness of thin plate. Fabry-Perot interferometer, intensity distribution, coefficient of sharpness and half width, Measurement of wavelength and resolution of two close spectral lines.

University Campus: Alaniya, Kota 325 003, Rajasthan Ph: +91-80941-62999

City office: CP Tower (4th Floor), IPIA, Road No-1, Kota (Raj.) -324005 Ph: +91-744-3040045 Fax: +91-744-3040050

Unit-III

Diffraction: Fraunhofer diffraction at single slit, intensity distribution and width of central maxima, and determination of slit size, two slit diffraction and its intensity distribution with missing orders. Diffraction due to N slits with intensity distributions. Plane transmission grating its formation and intensity distribution, Dispersive power of grating, Angular width of principal maximum, Absent Spectra, Rayleigh's criterion, resolving power of plane transmission grating. Fresnel class of diffraction, half period zones, zone plate, diffraction due to circular obstacle and aperture, cylindrical wave front and its effect at an external point, Diffraction at straight edge, thin and thick wire, rectangular slit.

Unit-IV

Polarization: Polarization states of electromagnetic waves, Plane, Circularly and Elliptically Polarized Light, quarter and half wave plates, methods of production & detection of polarized light, Huygen's theory of double refraction using Fresnel's ellipsoidal surface, Crystal Optics, Optical activity, Specific rotation, Fresnel's law of optical rotation, Biquartz and Laurent's half shade polarimeters, Reflection and refraction of plane EMW at plane dielectric surface, boundary conditions, Fresnel's relations.

Unit-V

Lasers and Holography: Stimulated and spontaneous emission, stimulated absorption, Einstein's A and B coefficients, population inversion, conditions for laser action, meta stable states, Types of lasers, construction, working and energy level schemes of He-Ne and Ruby laser, Applications of Lasers, Basic concepts of holography, construction of a hologram and reconstruction of the image, important features of hologram and uses of holography

Book Suggested:

1. Mechanics by M.P.Saxena, S.S. Rawat and P.R. Singh College Book House.(Medium: Hindi/English)
2. Electromagnetism by M.P.Saxena, S.S. Rawat and P.R. Singh College Book House.(Medium: Hindi/English)
3. Optics by M.P.Saxena, S.S. Rawat and P.R. Singh College Book House.(Medium: Hindi/English)

Physics Practical

Section –A

1. Study of bending of a beam and determination of Young's modulus.
2. Modulus of rigidity by statical method and dynamical method.
3. Elastic constant by Searle's method.
4. Study of frequency of energy transfer as a function of coupling strength using coupled oscillator.
5. Determination of dispersive power of material of a prism using spectrometer.
6. Measurement of wavelength of monochromatic source of light by Newton's rings.
7. Measurement of wavelength of monochromatic source of light by plane transmission grating.
8. Measurement of wavelength of monochromatic source of light by biprism.
9. Study of specific rotation by polarimeter.
10. Determination of resolving power of a plane transmission grating.
11. Determination of resolving power of telescope.
12. Determination of the Poisson's ratio of rubber tube.

Section-B

1. Study of temperature variation of surface tension by Jeagger's method.

To determine the polarizing angle for the glass prism surface and

University Campus: Alaniya, Kota 325 003, Rajasthan Ph: +91-80941-62999

City office: CP Tower (4th Floor), IPIA, Road No-1, Kota (Raj.) -324005 Ph: +91-744-3040045 Fax: +91-744-3040050

to determine the refractive index of the material of prism using Brewster's law $\mu = \tan(ip)$.

2. Low resistance by Carey-Foster' bridge.
3. Variation of magnetic field along the axis of circular coil and hence determine the radius of coil.
4. To study the variation of charge and current in RC circuit for different time constants (using DC source).
5. To study the behaviour of RC circuit with varying resistance and capacitance using AC Mains as a power source and also determine the impedance and phase relations.
6. To study the rise and decay of current in LR circuit with a source of constant emf.
7. To study the voltage and current behaviour of LR circuit with a AC power source also determine power factor, impedance and phase relation.
8. To study resonance in a series LCR circuit and determine Q of the circuit.
9. Conversion of Galvanometer into Ammeter/Voltmeter.

MAL011-I: Abstract Algebra

Unit –I

Divisibility theory: Division algorithm, Greatest Common divisor(GCD) and its algorithm, Linear diophantine equations of two variables (using Euclid algorithm and Bhaskaracharya's Kuttaka method) Fundamental theorem of arithmetic, congruences, Chinese Remainder Theorem, Euler's ϕ -function, primitive roots. Binary operation. Addition and multiplication modulo operations. Definition of a group with examples and simple properties.

Unit –II

Permutation group, cycle, transpositions, even and odd permutations and alternating group. Order of an element of a group and its properties. Subgroups of a group with its properties, Cyclic groups and their properties, Cosets. Index of a subgroup, Lagrange's theorem and its applications.

Unit-III

Normal subgroups with properties. Simple groups, Quotient groups. Group homomorphism with its kernel and properties. Isomorphism, Cayle's theorem automorphism, Fundamental theorem of homomorphism.

Unit IV

Rings, Zero divisors, integral domains and fields. Characteristic of a ring, Subrings, subfield, prime field, ring homomorphism and isomorphism. Ideals and their properties.

Unit-V

University Campus: Alaniya, Kota 325 003, Rajasthan Ph: +91-80941-62999

City office: CP Tower (4th Floor), IPIA, Road No-1, Kota (Raj.) -324005 Ph: +91-744-3040045 Fax: +91-744-3040050

Principal ideals and principal ideal ring. Prime ideal. Maximal ideal. Fundamental theorem of ring homomorphism. Euclidean ring and its properties. Polynomial over a ring. Polynomial ring. Polynomial over an integral domain and over a field.

MAL011-II: Advanced Calculus

Unit-I

Polar coordinates, angle between radius vector and tangent, polar sub tangent and subnormal. Perpendicular from pole on tangent. Pedal equation of a curve. Derivative of length of an arc in cartesian and polar coordinates. Curvature, Radius of curvature and its formula in various forms. Centre of curvature, chord of curvature.

Unit-II

Partial differential coefficients of a function of two or more variables. Total differential coefficient. Composite function, Euler's theorem on homogeneous functions of two, three and m-variables. First and second differential coefficients of an implicit function. Taylor's theorem for a function of two variables. Jacobians with properties. Maxima, minima and saddle points of functions of two and three variables. Lagrange's method of undetermined multipliers.

Unit- III

Asymptotes, envelopes and evolutes. Test for points of inflexion and multiple points. Test for concavity and convexity. Tracing of curves in cartesian and polar coordinates.

Unit-IV

Quadrature, Rectification, Volumes and surfaces of solids of revolution. Differentiation under the sign of integration.

Unit V

Beta and Gamma functions. Double integrals and their evaluation by change of order and changing into polar coordinates. Triple integrals, Dirichlet's double and triple integrals with their Liouville's extension.

MAL011-III: Vector Calculus and Coordinate Geometry

Unit-I

Vector differentiation and integration, Problems based on Gradient, divergence and curl. Vector identities, Line and surface integrals. Theorems of Gauss, Green, Stokes (without proof) and problems based on these.

Unit- II

University Campus: Alaniya, Kota 325 003, Rajasthan Ph: +91-80941-62999

City office: CP Tower (4th Floor), IPIA, Road No-1, Kota (Raj.) -324005 Ph: +91-744-3040045 Fax: +91-744-3040050

Parabola: Standard equation, parametric co-ordinates, length of chord, tangent, normal and its properties, two tangents from a point, chord of contact, polar, pole, chord with a given middle point, diameter and three normals from a point.

Ellipse: standard equation, auxiliary circle, eccentric angle, tangent, normal, two tangents from point, chord of contact, pole, polar, chord whose mid-point given, diameter, conjugate diameters and four normals from a point.

Unit III

Hyperbola: Standard equation, parametric co-ordinates, asymptotes, equation referred to asymptotes as axes, conjugate diameters and rectangular hyperbola.

Polar Equation: Standard equation, directrix, tangent, normal, polar and asymptotes.

Unit –IV

Sphere: standard equations in various forms, plane section, sphere through the circle of intersection of two spheres, power of a point, tangent plane, polar plane, polar line, angle of intersection of two spheres, length of tangent, radical plane, radical axis, co-axial system of spheres and limiting points.

Cone: Homogeneous equation in x, y, z , cone with a given vertex and given base, enveloping cone, condition for the general equation to represent a cone, tangent plane, reciprocal cone, angle between the two lines, in which a plane cuts a cone, three mutually perpendicular generators and right circular cone. Cylinder : Right circular cylinder and enveloping cylinder.

Unit-V

Central Conicoids: Standard equation, tangent plane, condition of tangency, director sphere, polar plane, polar lines, section with a given center, enveloping cone, enveloping cylinder.

Ellipsoid: Normal, six normals from a point, cone through six normals, conjugate diameters and their properties.

Book Suggested:

1. Shanti Narain, A Test Book of vector calculus, S. Chand and Co., New Delhi.
2. Murray R. Spiegel, Vector Analysis, Schaum Publishing Company, New York.
3. J.N. Sharma & A.R. Vasishtha, Vector Calculus, Krishna Prakashan Mandir, Meerut.
4. S.L. Loney, the elements of Coordinate Geometry, Macmillan and Company, London.
5. Gorakh Prasad and H.C. Gupta, Text Book of Coordinate Geometry, Pothishala Pvt. Ltd. Allahabad.
6. R.J.T. Bell, Elementary Treatise on Coordinate Geometry of Three Dimensions Macmillan India Ltd., 1994
7. Shanti Narayan, Solid Geometry, S. Chand and Company, New Delhi
8. M. Ray & S.S. Seth, Differential calculus, Students, friends & Co. Agra.

University Campus: Alaniya, Kota 325 003, Rajasthan Ph: +91-80941-62999

City office: CP Tower (4th Floor), IPIA, Road No-1, Kota (Raj.) -324005 Ph: +91-744-3040045 Fax: +91-744-3040050

Mathematics Practical

1. form graph of polynomials of four or more degree
2. simplification of logical circuits using Boolean algebra
3. formation of truth table of Boolean functions.
4. Curve tracing of plane curves including polar curves.
5. Application of fundamental theorem on morphism of groups.
6. To form construction table of given Algebraic structure and prove it group.
7. Find roots of algebraic equation by graphical method.
8. Application of Lagrange's theorem
9. Problems related to permutations and permutation groups.
10. Problems related to ring.

CAREER POINT
UNIVERSITY

University Campus: Alaniya, Kota 325 003, Rajasthan Ph: +91-80941-62999

City office: CP Tower (4th Floor), IPIA, Road No-1, Kota (Raj.) -324005 Ph: +91-744-3040045 Fax: +91-744-3040050

Course Scheme of B.Sc. B.Ed. Part-II

Annual Course Scheme of B.Sc. B.Ed. Part-II				
Branch-Mathematics				
S.No.	Paper Code	Paper Name	Marks	
			Min. Marks	Max. Marks
1	HIN011	General Hindi*	36	100
2	EDL021-I	Knowledge and Curriculum	36	100
3	EDL021-II	Learning and Teaching	36	100
4	EDL021-III	Peace Education	36	100
5	1. Community Service 2. Survey (Based on social and educational events) 3. Co-Curricular Activities 4. Health and Social awareness programme (DISASTER MANAGEMENT AND CLEANINESS) (EDA021)	Open Air/SUPW Camp	36	100
6	CHL021-I	Inorganic Chemistry	18	50
7	CHL021-II	Organic Chemistry	18	50
8	CHL021-III	Physical Chemistry	18	50
9	CHP021	Chemistry Practical	18	50
10	MAL021-I	Real Analysis	24	66
11	MAL021-II	Differential Equations	16	44
12	MAL021-III	Statics and Dynamics	25	68
13	MAP021	Maths Practical	8	22
14	PHL021-I	Thermal & Statistical Physics	18	50
15	PHL021-II	Electronics	18	50
16	PHL021-III	Relativity & Mathematical Physics	18	50
17	PHP021	Physics Practical	18	50
				G.T.
				1000

University Campus: Alaniya, Kota 325 003, Rajasthan Ph: +91-80941-62999

City office: CP Tower (4th Floor), IPIA, Road No-1, Kota (Raj.) -324005 Ph: +91-744-3040045 Fax: +91-744-3040050

Course Scheme of B.Sc. B.Ed. Part-II

HIN011: General Hindi

पद्ध भाग

1. नर हो ना निराश करो मन को दृ मैथिलीशरण गुप्त
2. हिमालय के आंगन में. जय शंकर प्रसाद
3. जागो फिर एक बार (भाग 2). निराला
4. दिल्ली दिनकर
5. हम अनिकेत. बाल कृष्ण शर्मा नवीन
6. झांसी की रानी. सुभद्रा कुमारी चौहान
7. गीत फरोश. भवानी प्रसाद मिश्र
8. बादल को घिरते देखा है. नागार्जुन
9. पंद्रह अगस्त. गिरिजा कुमार माथुर
10. मैं हार नहीं मानूँगा. श्री अटल बिहारी वाजपेयी
11. शहीद की माँ. रघुराज सिंह हाड़ा

गद्य भाग

1. नाखून क्यों बड़ते हैं. हजारी प्रसाद द्विवेदी
2. राष्ट्र का स्वरूप. वासुदेव शरण अग्रवाल
3. गेहूँ बनाम गुलाब रामकृष्ण बेनीपुरी
4. भवानी शंकरो वन्दे दृ कुबरे नाथ राय
5. बड़े घर की बेटी. प्रेमचंद
6. अदम्य जीवन. रंगेय राघव
7. उत्सर्ग. राम कुमार वर्मा
8. गांधी जी से भेंट (आत्म कथा) दृ राजेंद्र प्रसाद
9. महाराजपुर से ग्वारी घाट (सौंदर्य की नदी नर्मदा से). अमृत लाल बेगड
10. भक्तिन. महादेवी वर्मा
11. हिंदी हमारी मातृ भाषा है. मनहर चौहान

व्याकरण भाग

1. संधि
2. समास
3. उपसर्ग
4. प्रत्यय
5. विलोम
6. पर्यायवाची
7. शुद्धिकरण शब्द एवं वाक्य
8. वाक्यांश
9. मुहावरे
10. कहावते
11. शब्द युग्म
12. अनेकाथी
13. परिभाषित शब्दावली

University Campus: Alaniya, Kota 325 003, Rajasthan Ph: +91-80941-62999

City office: CP Tower (4th Floor), IPIA, Road No-1, Kota (Raj.) -324005 Ph: +91-744-3040045 Fax: +91-744-3040050

- 14 तत्संम
- 15 तद्भव
- 16 देश

सहायक ग्रंथ आधार पुस्तक गद्य साहित्य और पद्य साहित्य

- 1 हिंदी व्याकरण कामना प्रसाद गुरु:किताब घर दिल्ली
- 2 हिंदी व्याकरण:डा.नरेंद्र भानावत
- 3 हिंदी व्याकरण:डा.वैकट

EDL021-I: Knowledge and Curriculum

Objectives

- To create excellence in the educational system for facing the knowledge of challenges of the twenty first century.
- To encourage the application of knowledge skills in the Indian educational institutions.
- To enhance the quality of pre-service and in-service teacher training.
- To realize the importance of curriculum modification.
- To provide awareness and understanding of social environment.
- To transform teacher- pupils in to a vibrant knowledge-based society.

Unit I

Concept of knowledge & Child's Construction of Knowledge

- Meaning and Nature of knowledge
- Sources of attainment of knowledge in schools with special references of Society, Culture and modernity.
- Distinctions between- Knowledge and Skill, Knowledge and information, Reason and belief.
- Sources of Knowledge: Empirical knowledge Vs Revealed knowledge ·
- Different kinds of knowledge: (a) Disciplinary knowledge: Concepts and Alternative Concepts (b) Course content knowledge: Criteria of Selection and Concerns (c) Indigenous knowledge Vs Global knowledge (d) Scientific knowledge Vs Religious knowledge
- Concepts of Belief, Information, Knowledge and Understanding

Unit II

Facts of Knowledge

Different facts of knowledge and relationship such as Local and Universal Concrete and Abstract Theoretical and Practical School and Out of School (With an emphasis on understanding special attributes of school knowledge)

Unit III

Concept of curriculum

- Meaning, Nature and Objectives of Curriculum, Need for curriculum in schools.
- Philosophical, Psychological, Sociological and Scientific basis of Education with reference of Gandhi, Tagore, Dewey and Plato.
- Difference between curriculum and syllabus.
- Factors Influencing curriculum.
- Various types of curriculum Subject centred, Experience centred, Activity centred, Child centred, and Craft centred.

Unit IV

Curriculum Planning and Transaction

- Construction of Curriculum

University Campus: Alaniya, Kota 325 003, Rajasthan Ph: +91-80941-62999

City office: CP Tower (4th Floor), IPIA, Road No-1, Kota (Raj.) -324005 Ph: +91-744-3040045 Fax: +91-744-3040050

- Models of Curriculum Development given by Franklin Bobbit, Ralph Tyler, Hilda Taba and Philip Jackson .
- Curriculum Transaction: Role of a teacher in knowledge Construction through Dialogue, Challenge and Feedback as a Critical Pedagogue.

Unit-V

School: The Site of Curriculum Engagement

- Role of School Philosophy, Administration (and organization) in creating a context for transacting the curriculum effectively.
- Role of Infrastructural support in Teaching and Learning: Classroom seating Arrangement, Library, Laboratory, Playground, Canteen etc.
- School Culture and Organizational ethos as the context for Teachers' Work.
- Teacher's role and Support is "Developing Curriculum, Transacting Curriculum and Researching Curriculum": Realities and expectations.

Project (Any one of the following) 10 Marks

- Seminar discussions, movie appraisals, group work, field works,
- Projects and the close reading of articles, policies, documents from key practitioners in the area of Curriculum Studies in Education.
- How does school knowledge get reflected in the form of curriculum, syllabus and textbooks?
- Review of a text book of any school subject.
- Prepare a children's literature handbook.

Books Suggested:

1. Aggrawal, J.C. (2008). Knowledge Commission -2006: Major Observation and Recommendations, Educational Reforms in India for the 21st Century. New Delhi, Shipra Publication.
2. Balsara, M (1999). Principles of Curriculum Reconstruction. New Delhi, Kanishka Publication.
3. Lal, R.B. and Palod S. (2015). Policy Framework and Issues in Education. New Delhi, R.Lal Book Depot.
4. Malareddy, M. and Ravishankar, S. (). Curriculum Development and Educational Technology. New Delhi, Sterling Publisher P. Ltd..
5. Mohanty, J. (2003). Modern Trends in Education Technology. (Reprint Addition 2013)
6. Prasad, Janardan and Kumar, Vijay (1997). Advanced Curriculum Construction. New Delhi, Kanishka Publication.
7. Ramesh Shukla (2005). Dictionary of Education (2005). New Delhi, A.P.H. Publishing Corporation.
8. Soti and Sharma, A. (2014). Eminent Educational Thinkers of India. Agra, R.S.A. International Publisher. Agra.

EDL021-II: Learning and Teaching

Objectives:

After completing the course the students will be able:-

- 1.To get acquainted with the concept, principles and nature of teaching and learning.
2. To understand the different learning styles based on the difference of learners.
3. To study the relationship between teaching and learning and the factors which influence learning
4. To make use of modern information and communication technology to improve teaching-learning process.
5. To understand learning as a process of communication and be aware of various resources available for making it effective.
6. To study and analyze the sociocultural factors influencing cognition and learning.
7. To study and understand learning in constructivist perspective.

University Campus: Alaniya, Kota 325 003, Rajasthan Ph: +91-80941-62999

City office: CP Tower (4th Floor), IPIA, Road No-1, Kota (Raj.) -324005 Ph: +91-744-3040045 Fax: +91-744-3040050

8. To get acquainted with professional ethics of teaching profession.
9. To study the new trends and innovations involved in teaching learning process with professional ethics.

Unit I

Learning and Teaching Process

- Teaching: Meaning, Nature, Principle, Levels, Phases and maxims of teaching. Difference of training and instruction from teaching.
- Learning: Meaning, Nature, Factors affecting learning and types of learning
- Relationship between teaching and learning, Resource and their development for promoting teaching – learning process.
- Tradition and changes in view of the learning process a shift from teaching and learning.

Unit II

Source of Effective Teaching Learning

- Effective teaching: Meaning, component and parameters of effective teaching, classroom instruction strategies, Teacher behavior and classroom climate. (Flander's interaction analysis system)
- Instructional objectives in terms of bloom's taxonomy.
- Programming Learning: Concept, principles and types of programme learning.
- Concept of micro teaching, various teaching skills.

Unit III

Educational Technology

- Educational Technology: Meaning, Importance and Approaches.
- Model of teaching: Meaning, Assumptions and Fundamental elements of a model of a teaching suchman's inquiry training model.
- Communication: Concept, Elements and Communication skills, Teaching Learning process as the communication.

Unit IV

New Trends in teaching learning due to technological innovation

- Analysis and organisation learning in diverse class room: Issues and concerns.
- Team Teaching, Panel discussion, Conference, Symposium, Workshop, Cooperative learning, Group discussion, Brain storming- issues and concerns with respect to organise teaching and learning process in a classroom such as study habits, self learning, learning skills, interest, ability, giftedness with respect to socio economic background.

Unit V

Teaching as profession:

- Ethics of teaching, professional growth of a teacher
- Teacher as a professional practitioner, identification of the performance, competency and commitment area for teacher.
- Need of Professional enrichment of teachers
- Professional ethics and its development

Assignment:-

Any One (10 MARKS)

- Preparation and practical implication of at least two technical learning resources (transparencies, Power Point Slides, Animated Videos)
- Identify the learning need of the learner in diverse class room with regard to their abilities, learning styles, socio cultural difference, learning difficulties and their implication for class room teaching.
- Identify the professional skills for teachers and report any two programmes for professional development of teaching organized by the school/ training college/ any other agencies.

University Campus: Alaniya, Kota 325 003, Rajasthan Ph: +91-80941-62999

City office: CP Tower (4th Floor), IPIA, Road No-1, Kota (Raj.) -324005 Ph: +91-744-3040045 Fax: +91-744-3040050

- Conduct and Interview of any two students with multilingual background and face the problems in teaching learning process.

Books Suggested:

1. Aggarwal J.C.(2004), " Educational Psychology", Vikas Publishing House Pvt. Ltd., New Delhi
2. Berk Laura (2007), " Child Development"; Prentice Hall of India, New Delhi.
3. Biehler Robert and Snowman Jack(1991), " psychology Applied to Teaching"; Houghton Mifflin company, Boston.
4. Buzan Tony (2003), "Brain Child"; Thorsons, An Imprint of Harper Collins, London.
5. Coleman Margaret (1996), " Emotional and Behavioral Disorders"; Allyn and Bacon, Boston.
6. Erickson Marian (1967), "The Mentally Retarded Child in the classroom"; The macmillan company
7. Goleman Daniel(1995). "Emotional Intelligence"; Bantam Books, N.Y.
8. Goleman Daniel (2007), " Social Intelligence"; Arrow Books, London.
9. Henson Kenneth (1999), "Educational Psychology For Effective Teaching"; Wadsworth Publishing Co. Belmont, California
10. KhandwalaPradip(1988), "Fourth Eye" ; A. H. Wheeler, Allahabad.
11. Mangal S.K. (1993), "Advanced Educational Psychology" Prentice Hall of India Pvt. Ltd., New Delhi
12. National Curriculum Framework 2005, N.C.E.R.T , New Delhi.
13. Osborn Alex (1971), "Your Creative Power"; Saint Paul Society, Allahabad, India.
14. Pringle M.K. and Varma V.P.(Ed) (1974), "Advances in Educational Psychology" University & London Press, London
15. Shaffer David(1999), "Social and Personality Development" Wadsworth Thomson Learning, U.S.A.
16. Sharma Tara Chand (2005), "Reading Problems of Learners "; Sarup and Sons, New Delhi.
17. Sousa David (2001), " How The Brain Learns"; Cowin Press, Inc. A Sage Publication Company, California.

EDL021-III-I: Peace Education

OBJECTIVES:-

The course will enable the student teachers to

- to understand the concept of peace education.
- to acquire the knowledge about peaceful mind makes peaceful world.
- To understand the theory and practice of peace education
- To understand the philosophical thoughts for peace.
- To promote awareness about the existence of Conflicting relationships between people, within and between nations and between nature and humanity.
- To create frameworks for achieving Peaceful and Nonviolent societies.

UNIT I

Concept of Peace

- Negative peace and Positive peace,
- Negative Peace - Peace as absence of war and abolition of war, as the minimization and elimination of violence, as removal of structural violence, Peace with Justice, Peace and Nonviolent liberation technique (Satyagraha) and Disarmament.
- Positive peace: Peace as Love, Mutual Aid, Positive Interpersonal relations, Peaceful resolution of Conflict, Peace and Development, Alternative defense, living with nature and preserving Life and Eco system and Holistic Inner and Outer Peace.

University Campus: Alaniya, Kota 325 003, Rajasthan Ph: +91-80941-62999

City office: CP Tower (4th Floor), IPIA, Road No-1, Kota (Raj.) -324005 Ph: +91-744-3040045 Fax: +91-744-3040050

Unit II

Introduction of Peace Education

- Meaning, Concept and need of Peace Education.
- As a universal value
- Aims and Objectives of Peace Education
- Role of Social Agencies: Family, Religion, Mass Media, Community, School, NGO's, Government Agencies in promoting peace education.
- Current Status of Peace Education at Global Scenario.

Unit II

Bases of Peace Education

- Becoming peace teacher-acquisition of knowledge, values and attitudes.
- Life Skills required for Peace Education (WHO)
- Areas of Peace Education: Conflict management, Conservation of Environment
- Challenges to Peace- Stress, Conflict, Crimes, Terrorism, Violence and Modernization.
- Strategies and Methods of teaching Peace Education- Meditation, Yoga, Dramatization, Debate and etc.

UNIT IV

Effective Teaching of Peace

- Peace Education for Life and Lifelong education, Peace Education and Removing the Bias towards Violence – Correcting Distortions.
- Model of integrated Learning – Transactional Modalities - Cooperative Learning, Group Discussion, Project Work, Role Play, Story Telling, Rational Analytic Method – Case Analysis and Situation analysis,
- Peace Research, International classroom, International Parliament, Peace Awards, Creating Models for Peace technology - development of new tools, techniques, mechanisms and institutions for building up peace and Engaging students in Peace Process.

Unit V

Transacting Peace Education & Role of Social Agencies:

- Integration of Peace Education through curricular and co-curricular activities
- Role of mass media in Peace Education
- Programmers' for Promoting Peace Education –UNESCO
- Addressing challenges to peace in Multicultural Society.
- Role of Religion in prorogation of Peace. Nelson Mandela Mother-Theresa, Vivekananda, Gandhian Philosophy in promoting Peace Education. Role of Great personalities in promoting Peace.

Assignment:-

Any One (10 MARKS)

- Prepare a Role Play of Great Personalities who worked/ contributed towards Peace.
- Organize an activity in schools to promote Peace.
- Write a report on Gandhi and Peace.
- Write about the contribution of any two Noble prize winners for Peace.
- Prepare an album of Indian Philosophers and write their thoughts on peace.

Books Suggested:

1. Adams.D (Ed) (1997) UNESCO and a culture of Peace: Promoting a Global Movement. Paris UNESCO.

University Campus: Alaniya, Kota 325 003, Rajasthan Ph: +91-80941-62999

City office: CP Tower (4th Floor), IPIA, Road No-1, Kota (Raj.) -324005 Ph: +91-744-3040045 Fax: +91-744-3040050

2. Aber, J.L. Brown, J.L.A. Henrich, C.C. (1999) Teaching Conflict Resolution: An effective.
3. Dr. Haseen Taj (2005) National Concerns and Education, Neelkamal Publications. pvt. Ltd
4. Dr. Haseen Taj (2005) Current challenges in Education, Neelkamal Publications. pvt. Ltd
5. Mahesh Bhargava and Haseen Taj (2006) Glimpses of Higher Education. Rakhi

CHL021-I: Inorganic Chemistry

Unit -I

Chemistry of Elements of first Transition Series: Characteristics properties of d-Block elements. Properties of the elements of the first transition series, their Binary Compounds and complexes. Illustrating relative stability of their oxidation states, Coordination number and geometry.

Unit -II

Chemistry of Elements of Second and Third Transition Series: General characteristics, comparative treatment with their 3d-analogues in respect of ionic Radii, Oxidation States, magnetic, behaviour, Spectral properties, Stereo-chemistry.

Unit -III

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 -IV

Chemistry of Lanthanide Elements: Electronic Structure, Oxidation States and ionic radii and lanthanide contraction, Complex formation, Occurrence and isolation, Lanthanide compounds.

Chemistry of Actinides: General features and chemistry of actinides, Chemistry of separation of Np, Pu and Am from U, Similarities between the later Actinides and later lanthanides.

Unit -V

Acids and Bases: Arrhenius, Bronsted -Lowry, the Lux -Flood, Solvent System and Lewis concept of Acids and Bases.

Non Aqueous Solvents: Physical properties of solvent, Type of solvents and their general characteristics, Reactions in liquid NH₃ and Liquid SO₂.

Oxidation and Reduction: Use of redox potential data - analysis of redox cycle, redox stability in water, Frost, Latimer and Pourbaix diagrams. Principles involved in the extraction of the elements.

University Campus: Alaniya, Kota 325 003, Rajasthan Ph: +91-80941-62999

City office: CP Tower (4th Floor), IPIA, Road No-1, Kota (Raj.) -324005 Ph: +91-744-3040045 Fax: +91-744-3040050

CHL021-II: Organic Chemistry

Unit-I

Absorption laws (Beer - Lambert law) molar absorptivity. presentation and analysis of UV spectra, types of electronic transition, Effect of conjugation. concept of chromophore and auxochrome, bathochromic, Hypsochromic, Hyperchromic and hypochromic shifts. UV spectra of conjugates and enones.

Infrared (IR) Absorption spectroscopy -Molecular vibrations. Hooks Law, Selection rules, Intensity and Position of IR bands, Measurement of IR spectrum, Finger print region, Characteristic absorptions of various functional groups and interpretation of IR spectra of simple organic compounds.

Unit-II

Alcohols

Classification and Nomenclature Monohydric alcohols – Nomenclature, Method of formation by Ketones, Carboxylic acids and esters, Hydrogen bonding. Acidic Dihydric Alcohols Nomenclature, methods Oxidative-Cleavage [Pb (OAc)₄ and HIO₄] and Trihydric Alcohols

Phenols: Nomenclature, Structure and bonding. Preparation of Phenols, Physical Properties and acidic character. Comparative acidic strengths of alcohols and phenols, Resonance stabilization of phenoxide ion. Reactions of phenols: electrophilic aromatic substitution, acylation and carboxylation. mechanism of Fries rearrangement, Claisen rearrangement, Gatterman synthesis. Hauben-Hoesch Reaction, Lederer-Manske reaction and Reimer-Tiemann Reaction.

Unit -III

Aldehydes And Ketones Nomenclature and structure of the carbonyl group. Synthesis of aldehydes and ketones with particular reference to the synthesis of aldehydes from acid chlorides, synthesis of aldehydes and ketones using 1,3 Dithianes synthesis of ketones from nitriles and from carboxylic acids. Physical properties

Mechanism of Nucleophilic additions to carbonyl, aldol, Perkin and Knoevenagel condensations. Condensation with ammonia and its Derivatives. Wittig reaction, Mannich reaction. Use of acetals as Protecting group. Oxidation of aldehydes, Baeyer-Villiger oxidation of ketone, Cannizzaro's reaction, MPV, Clemmensen, Wolff-Kishner, LiAlH₄ reductions, Halogenation of enolizable ketones. An introduction to HHH Unsaturated aldehydes and ketones.

Unit -IV

Ethers And Epoxides: Nomenclature of ethers and methods of formation, physical properties. Chemical reaction, cleavage and autoxidation, Ziesel's method of synthesis of epoxides. Acid and Base catalyzed ring opening, Reactions of Grignard and organolithium reagents with epoxides.

Carboxylic Acids: Nomenclature structure and bonding, Physical properties, Acidity of carboxylic acids, Effect of substituents on acid strength. preparation of carboxylic acids. Reactions of carboxylic acids, Hell-Volhard Zelinsky reaction. Synthesis of acid chlorides, Esters and amides. Reductions of carboxylic acids. Mechanism of decarboxylation. Methods of formation and chemical reactions of unsaturated mono carboxylic acids. Dicarboxylic Acids: Methods of Synthesis and effect of heat and dehydrating agents.

University Campus: Alaniya, Kota 325 003, Rajasthan Ph: +91-80941-62999

City office: CP Tower (4th Floor), IPIA, Road No-1, Kota (Raj.) -324005 Ph: +91-744-3040045 Fax: +91-744-3040050

Carboxylic Acid Derivatives: Structure and nomenclature of acid chlorides, Esters, Amides and acid-anhydrides. Relative stability and reactivity of acid derivatives. physical properties, Inter conversion of acid derivatives by nucleophilic acyl substitution. Preparation of carboxylic acid derivatives, chemical reactions. mechanism of esterification and hydrolysis (Acidic and Basic)

Unit -V

Organic Compounds of Nitrogen: Preparation of nitro alkanes and nitro arenes. Chemical Reactions of Nitro alkanes. Mechanism of nucleophilic substitution in nitro arenes and their reduction in acidic, neutral and alkaline media. Picric Acid.

Alkyl and aryl amines: Reactivity, Structure and nomenclature of amines, physical properties. stereo chemistry of amines, Separation of a mixture of primary, secondary and tertiary amines. Structural features, effecting basicity of amines. Amine salts as phase-transfer catalysts. preparation of alkyl and aryl amines (Reduction of nitro compounds, Nitriles) Reductive amination of aldehydic and ketonic compounds. Gabriel-Phthalimide reaction, Hofmann bromamide Reaction. Reactions of amines. Electrophilic Aromatic substitution in arylamines, Reactions of amines with nitrous acid. Synthetic transformations of aryl-diazonium salts, azo coupling.

CHL021-III: Physical Chemistry

Unit -I

Thermodynamics -I: Definition of thermodynamic terms: System, Surroundings etc. Types of systems, Intensive and extensive properties. state and path functions and their differentials. Thermodynamic process, concept of heat and work,

First Law of Thermodynamics: Statement, Definition of internal energy and enthalpy, heat capacity, heat capacities at constant volume and pressure and their relationship. Joule's law, Joule-Thomson coefficient. Calculation of w , q , dU & dH , for the expansion of Ideal gases under adiabatic conditions for reversible process.

Thermo Chemistry: Standard state, standard enthalpy of formation, Hess's law of heat summation and its applications. Heat of reaction at constant pressure and at constant volume. Enthalpy of neutralization. bond dissociation energy and its calculation from thermo-chemical data, Temperature dependence of enthalpy. Kirchhoff's equation.

Unit -II

Thermodynamics -II: Second law of Thermodynamics: Need for the Law, different statements of the law. Carnot cycle and its efficiency, Carnot-Theorem. Thermodynamic scale of temperature.

Concept of entropy: Entropy as a state function, entropy as a function of V & T , Entropy as a function of P & T , Entropy change in physical change, Clausius inequality and Entropy as a criteria of spontaneity and equilibrium. Entropy change in ideal gases and mixing of gases.

Third Law of Thermodynamics: Nernst heat theorem. Statement and concept of residual entropy, evaluation of absolute entropy from heat capacity data.

Gibbs and Helmholtz function's: Gibbs function (G) and Helmholtz function (A) as: Thermodynamic quantities. A & G as criteria for Thermodynamic equilibrium and spontaneity, Their advantage over entropy change. variation of G and A with P , V and T .

Unit- III

Chemical Equilibrium: Equilibrium constant and free energy. Thermodynamic derivation of law of Mass Action. Le chatelier's principle. Reaction Isotherm and reaction isochore-clapeyron equation and clausius-clapeyron equation, applications.

phase Equilibrium: Statement and meaning of the terms: phase, component and degree of freedom, derivation of Gibbs phase rule, phase equilibria of one component system - water, CO_2 and Sulphur systems. phase Equilibria of two component system- solid-liquid equilibria simple eutectic Bi -Cd, Pb-Ag systems,

University Campus: Alaniya, Kota 325 003, Rajasthan Ph: +91-80941-62999

City office: CP Tower (4th Floor), IPIA, Road No-1, Kota (Raj.) -324005 Ph: +91-744-3040045 Fax: +91-744-3040050

desilverization of lead. solid solutions-compound formation with. Congruent melting point (Mg- Zn) and incongruent melting point. (NaCl- H₂O) System. Freezing mixtures acetone- dry ice.

Liquid -Liquid mixtures - Ideal liquid mixtures Raoult's and Henry's law non ideal system- Azeotropes-HCl -H₂O and ethanol- water system. Partially miscible Liquids : phenol-water. Lower and upper consolute temperature. effect of impurity on consolute temperature. Nernst Distribution law - Thermodynamic derivation, applications.

Unit -IV

Electro Chemistry -I: Electrical Transport-conduction in metals and in electrolyte solutions, specific conductance and equivalent conductance, measurement of equivalent conductance, variation of equivalent and specific conductance with dilution, migration of ions and Kohlrausch law, Arrhenius theory of electrolyte dissociation and its limitations, weak and strong electrolytes, Ostwald dilution law, its uses and limitations. Debye- Huckle- Onsager's equation for strong electrolytes (Elementary Treatment Only). Transport number, definition and determination by Hittorf's method and moving boundary method.

Applications of conductivity measurements: Determination of degree of dissociation, determination of K_a of acids, determination of solubility product of a sparingly soluble salt, conductometric titrations.

Unit -V

Electro chemistry -II: Types of reversible electrodes - gas- metal ion, metal- metalion, metal - Insoluble salt-anion and redox electrodes, electrode reactions. Nernst equation, derivation of cell E.M.F. and single electrode potential, standard hydrogen electrode, reference electrodes, electrochemical series and its significance. Electrolyte and galvanic cells - Reversible and irreversible cells, conventional representation of electrochemical cells. E.M.F. of a cell and its measurements. Computation of cell EMF. Calculation of thermodynamic quantities of cell reactions (G, H and K), Polarization, over Potential and hydrogen-over-voltage. Concentration cell with and without transport, liquid-junction potential, application of concentration cells, valency of ions. Solubility product and activity coefficient, potentiometric Titrations. Definition of pH and pK_a Determination of pH Using hydrogen, quinhydrone and glass Electrodes, by potentiometric methods.

Books Suggested:

1. Principles of Physical Chemistry: B. R. Puri Sharma and M. S. Pathania
2. A Text Book of Physical Chemistry: A. S. Negi and S. C. Anand
3. A Text Book of Physical Chemistry: Kundu and Jain

Chemistry Practical

Inorganic Chemistry:

Section-A

Calibration of fractional weights, pipettes and burettes. Preparation of standard solution. Dilution-0.1M to 0.001M solutions.

Section-B

Quantitative Analysis:

Volumetric analysis

- Determination of acetic acid in commercial vinegar using NaOH
- Determination of alkali content in antacid tablet using HCl.
- Estimation of calcium content in chalk as calcium oxalate by permanganometry.
- Estimation of hardness of water by EDTA.
- Estimation of ferrous and ferric by dichromate method.
- Estimation of copper using thiosulphate.

Gravimetric analysis

Analysis of Cu as CuSCN and Ni as Nickel dimethylglyoxime.

University Campus: Alaniya, Kota 325 003, Rajasthan Ph: +91-80941-62999

City office: CP Tower (4th Floor), IPIA, Road No-1, Kota (Raj.) -324005 Ph: +91-744-3040045 Fax: +91-744-3040050

Organic Chemistry

Laboratory techniques:

A Thin Layer Chromatography: Determination of R_f values and identification of organic compounds.

- Separation of green leaf pigments (spinach leaves may be used)
- Preparation and separation of 2,4-Dinitrophenyl hydrazones of acetone, 2-butanone, hexan-2 and 3-one using toluene and light petroleum (40:60)
- Separation of a mixture of dyes using cyclohexane and ethyl acetate (8.5:1.5)

B Paper Chromatography-Ascending and Circular: Determination of values and Identification of organic compounds.

- Separation of a mixture of phenyl alanine and glycine. Alanine and aspartic acid. leucine and glutamic acid. Spray reagent-Ninhydrin.
- Separation of a mixture of D,L-alanine, glycine and L-leucine using n-butanol: acetic acid:water (4:1:5) Spray reagent-Ninhydrin.
- separation of mono saccharides-a mixture of D-galactose and D-fructose using n-butanol:acetone:water (4:5:1) spray reagent- Aniline hydrogen phthalate. Qualitative Analysis: Identification of an organic compound through the functional group analysis, determination of melting point and preparation of suitable derivatives.

Physical Chemistry:

Transition temperature:

- Determination of the transition temperature of the given substance by thermometric /dilatometric method (e.g. MnCl₂.4H₂O / SrBr₂.2H₂O)

Phase Equilibrium

- To study the effect of a solute (e.g. NaCl, succinic acid) on the critical solution temperature of two partially miscible liquids (e.g. phenol-water system)
- To construct the phase diagram of two component (e.g. diphenylbenzophenone) system by cooling curve method.

Thermochemistry:

- To determine the solubilities of benzoic acid at different temperatures and to determine ΔH of the dissolution process.
- To determine the enthalpy of neutralization of a weak acid weak base versus strong acid and strong base and determine the enthalpy of ionisation of the weak acid/weak base.
- To determine the enthalpy of solution of solid calcium chloride and calculate the lattice energy of calcium chloride from its enthalpy data using born haber cycle.

PHL021-I: Thermal and Statistical physics

Unit-I

General Thermodynamical interaction, Dependence of the number of states of external parameters, General relations in equilibrium, equilibrium conditions ($P=p_1, b=b_1$), infinitesimal quasistatic process, Entropy of an ideal gas, Equilibrium of an isolated system, Equilibrium of a system in contact with reservoir (Gibb's free energy), equilibrium between phases, Clausius-Clapeyron equation, Triple point, Vapour in equilibrium with liquid or solid, equilibrium conditions for a system of fixed volume in contact with heat reservoir (Helmholtz free energy), Equilibrium between phases and condition of chemical equilibrium and equilibrium condition for a system at constant pressure in contact with a heat reservoir (Enthalpy), Maxwell's relations.

Unit-II

Thermal interactions of macroscopic Systems, system in contact with a heat reservoir, first law of thermodynamics and infinitesimal general interaction, Concept of temperature and quantitative idea of temperature scale (thermodynamical parameter), Distribution of energy, second law of thermodynamics, Clausius and Kelvin's statements, partition function (Z), mean energy of an ideal gas and mean pressure, Heat engine and efficiency of the engine, Carnots cycle, thermodynamical scale as an absolute scale.

University Campus: Alaniya, Kota 325 003, Rajasthan Ph: +91-80941-62999

City office: CP Tower (4th Floor), IPIA, Road No-1, Kota (Raj.) -324005 Ph: +91-744-3040045 Fax: +91-744-3040050

Unit-III

Production of Low Temperatures and Application, Joule Thomson expansion and J.T. coefficients for ideal as well as Van-der Waal's gas, Temperature inversions, Regenerative cooling and cooling by adiabatic expansion and demagnetization, Liquid He, He-I and He-II, superfluidity, quest for absolute zero, Nernst heat theorem.

Unit-IV

Classical Statistics, Phase space, micro and macro states, Thermodynamic probability, Entropy and probability, Partition function (Z), The monatomic ideal gas, The principle of equipartition of energy, most probable, average and rms velocity, Specific heat capacity of diatomic gas, Specific heat capacity of solids.

The Distribution of Molecular Velocities, the energy distribution, Transport phenomenon. mean free path, distribution of free path, coefficients of viscosity, thermal conductivity diffusion.

Unit-V

Quantum Statistics, Black body radiation and failures of classical statistics, Postulates of quantum statistics, Indistinguishability, Wave function and exchange degeneracy, Priori probability, Bose-Einstein's Statistics, Planck's distribution law, Fermi-Dirac statistics, completely degenerate system, Bose-Einstein condensation, Thermionic Emission, specific heat anomaly of metals contact potential and Ortho and Para hydrogen.

PHL021-II: Electronics

Unit-I

Circuit Analysis, Network-some important definitions, loop and nodal equation, Kirchhoff Laws, driving point and transfer impedances, four terminal network parameters, Open circuit, short circuit and hybrid network theorems, Superposition, Thevenin, Norton, Reciprocity, Compensation and maximum power transfer.

Unit-II

Semiconductors, Intrinsic and extrinsic semiconductors, charge densities in N and P materials, conduction by drift and diffusion of charge, Formation of PN junction, PN diode equation, capacitance effect of diode. Rectification and power Supply, Half-wave and full wave rectifiers, calculation of Ripple factor, efficiency and regulation, bridge rectifier,

Filters: shunt capacitor, L and π filters, Voltage regulation and voltage stabilization, Zener diode, Voltage multiplier circuits

Unit-III

Transistor and Transistor Amplifiers, Notations and volt ampere relations for bipolar junction transistor, CB, CE, CC configurations, characteristic curves and their equivalent circuits, Biasing of transistors, Fixed and emitter bias, bias stability in transistor circuits, concept of load line and operating point, hybrid parameters, Field effect transistor (JFET and MOSFET) and its circuit characteristics, Analysis of transistor amplifiers using hybrid parameters and its frequency response.

Unit-IV

Amplifiers with feedback, Concept of feedback Positive and negative feedback advantage of negative feedback, stabilization of gain by negative feedback, Effect of feedback on output and input resistance, Reduction of nonlinear distortion by negative feedback, frequency response, Voltage and current feedback circuit.

Unit-V

Operational amplifier (OP-AMP), Differential amplifier, DC levels shifter, operational amplifier, input and Output impedances, input offset current, Application of OP-AMP, Unity gain buffer, Adder, Subtractor, Integrator and Differentiator, Comparator, Waveform generator, Voltage regulator using integrated amplifiers.

University Campus: Alaniya, Kota 325 003, Rajasthan Ph: +91-80941-62999

City office: CP Tower (4th Floor), IPIA, Road No-1, Kota (Raj.) -324005 Ph: +91-744-3040045 Fax: +91-744-3040050

Digital Circuits: Binary, Hexadecimal and Octal number systems, Binary arithmetic, Logic fundamentals, AND, OR, NOT, NOR., NAND, XOR gates, Boolean theorems, transistor as a switch, circuit realization of logic functions.

PHL021-III: Relativity and mathematical physics

Unit-I

Orthogonal Curvilinear coordinate system, scale factors, expression for gradient, divergence and curl and their applications to Cartesian, cylindrical and spherical polar coordinate systems, Coordinate transformation and Jacobian, Transformation of covariant, contravariant and mixed tensor, Addition, Multiplication and contraction of tensors, Quotient law, pseudo tensor, Metric tensor, transformation of Tensors.

Unit-II

Dirac-Delta Function and its properties, Fourier series, computation of Fourier coefficients, applications to simple periodic functions like square wave, sawtooth wave and rectifier output, Postulates of special theory of relativity and observational evidence, Lorentz transformation and rotation in space time, time like and space like vectors, length contraction, time dilation, worldline, mass-energy relation, energy-momentum relation.

Unit-III

Four vector formulation, energy-momentum four vectors, relativistic equation of motion, Orthogonality of four forces and four velocities, transformation of four wave vector, longitudinal and transverse Doppler's effect, Transformation between laboratory and center of mass systems, four momentum conservation, Kinematics of decay products of an unstable particle and reaction thresholds, pair production, inelastic collision of two particles, Compton effect. Electromagnetic field tensor, transformation of four potentials, four currents, electric and magnetic field between two inertial frames of reference, Lorentz force, equation of continuity, conservation of charge, tensor description of Maxwell's equations.

Unit-IV

The second order linear differential equation with variable coefficient and singular points, series solution method and its application in the Bessel's, Hermite's, Legendre's and Laguerre's differential equations, Basic properties like orthogonality, recurrence relations, graphical representation and generating function of Bessel, Hermite, Legendre Laguerre and Associated Legendre functions.

Unit-V

Technique of separation of variables and its application to following boundary value problems:

(i) Laplace equation in three-dimension Cartesian, Coordinate system-line charge between two earthed parallel plates, (ii) wave equation in spherical polar coordinates the vibration of circular membrane, (iii) Diffusion equation in two-dimensional Cartesian coordinate system-heat conduction in thin rectangular plate, (iv) Laplace equation in spherical coordinate system-Electric Potential about a spherical surface

Book Suggested:

1. Thermal & Statistical Physics by M.P.Saxena, S.S. Rawat and P.R. Singh College Book House.
2. Electronics by M.P.Saxena, S.S. Rawat and P.R. Singh College Book House. (Medium: Hindi/English)
3. Relativity and Mathematical Physics by M.P.Saxena, S.S. Rawat and P.R. Singh College Book House. (Medium: Hindi/English)

Physics Practical

Section –A

1. Study of dependence of velocity of wave propagation on line parameters using torsional wave apparatus.
2. Study of variation of reflection coefficient with nature of termination using torsional wave apparatus.
3. Using platinum resistance thermometer to find the melting point of a given substance.

University Campus: Alaniya, Kota 325 003, Rajasthan Ph: +91-80941-62999

City office: CP Tower (4th Floor), IPIA, Road No-1, Kota (Raj.) -324005 Ph: +91-744-3040045 Fax: +91-744-3040050

4. Using Michelson's interferometer:

Find out the wavelength of a given monochromatic source (sodium light); Determine difference in wave length of D1 and D2 lines.

5. Determine the thermodynamic constant ($r = C_p/C_v$) using Clement's and Desormes methods.

6. Determine Thermal conductivity of a bad conductor by Lee's method.

7. Determination of Ballistic constant of Ballistic galvanometer.

8. Determination of high resistance by method of leakage.

9. Study the variation of total thermal radiation with temperature.

Section-B

1. Plot thermo emf versus temperature and find the neutral temperature.

2. Study of power supply using two diodes/ bridge rectifier using various filter circuits.

3. Study of half wave rectifier using L and pi section filters.

4. Characteristics of given transistor PNP/ NPN (common emitter, common base and common collector configurations).

5. Determination of band gap using a junction diode.

6. Determination of power factor of a given coil using CRO.

7. Study of single stage transistor audio amplifier (variation of gain with frequency)

8. Study of diode as integrator with different voltage wave forms.

9. Determination of e/m of electron by Thomson's method.

10. Determination of velocity of sound using CRO, microphone and speaker by standing wave method.

11. Determination of self inductance of a coil by Anderson's bridge method.

12. Determination of unknown capacity by De'sauty-bridge method and to determine dielectric constant of a liquid.

MAL021-I: Real Analysis

Unit-I

The set of real numbers as a complete ordered field, incompleteness of \mathbb{Q} , Archimedean and denseness properties of \mathbb{R} , Modulus, Intervals, Definition of a sequence, Theorems on limit of sequence, bounded and monotonic sequences, nested interval theorem, Cauchy's sequence, Cauchy's convergence criterion.

Unit-II

Convergence of series of non-negative terms, their various tests (Comparison; D'Alembert's ratio, Cauchy's nth root, Raabe's, Gauss, Logarithmic, Demorgan and Bertand's, Cauchy's condensation, proof of tests not required) for convergence, Alternating series, Leibnitz's test, Series of arbitrary terms, absolute and conditional convergence, Abel's and Dirichlet's tests.

Unit -III

Equivalent sets. Finite and infinite sets denumerable sets, Countable and uncountable sets. Interior point of a set, open set, limit point of a set, Bolzano-Weierstrass theorem. Closed set. Dense in itself and perfect sets. Cantor's ternary set.

Unity-IV

Definition of limit of a function. Continuity of a function - Cauchy's and Heine's definitions with their equivalence. Types of discontinuities. Properties of continuous functions defined on closed intervals. Uniform continuity. Differentiability, Rolle's theorem, Lagrange's and Cauchy's mean value theorems and their geometrical interpretations. Taylor's theorem with various forms of remainders. Darboux's intermediate value theorem for derivatives.

Unit-V

University Campus: Alaniya, Kota 325 003, Rajasthan Ph: +91-80941-62999

City office: CP Tower (4th Floor), IPIA, Road No-1, Kota (Raj.) -324005 Ph: +91-744-3040045 Fax: +91-744-3040050

Darboux sums and their properties. Riemann integral, Integrability of continuous and monotonic functions. Mean value theorems of integral calculus, The fundamental theorem of integral calculus. Improper integrals and their convergence comparison tests. Abel's and Dirichlet's tests.

MAL021-II: DIFFERENTIAL EQUATIONS

Unit-I

Order and Degree of a differential equation. Differential equations of first order and first degree, variables separable, homogeneous equations. Linear equations and equations reducible to linear form. Exact differential equations and equations reducible to exact forms. Differential equations of first order but not of first degree. Solvable for x , y , p Clairaut's form, singular solutions. Geometrical meaning of a differential equation, orthogonal trajectories.

Unit-II

Linear differential equations with constant coefficients, Homogeneous linear differential equations, Total differential equations.

Unit-III

Linear differential equations of second order. Transformation by changing the dependent / independent variable. Method of variation of parameters, Exact differential equations and certain particular forms of equations.

Unit-IV

Partial differential equations of first order, Lagrange's solution. Charpit's general method of solution.

Unit-V

Partial differential equations of second and higher orders. Classification of linear partial differential equations of second order. Homogeneous and non-homogeneous equations with constant coefficients. Partial differential equations reducible to equations with constant coefficients. Monge's method.

MAL021-III: Statics and Dynamics

Unit-I

Analytical Conditions of equilibrium of a rigid body under coplanar forces. Friction.

Unit-II

Center of Gravity, Common Centenary.

Unit-III

Simple harmonic motion. Motion under repulsion varying as the distance from a point, motion under inverse square law. Motion under earth's attraction. Hooke's Law, Horizontal and vertical elastic strings Rectilinear motion in a resisting medium.

University Campus: Alaniya, Kota 325 003, Rajasthan Ph: +91-80941-62999

City office: CP Tower (4th Floor), IPIA, Road No-1, Kota (Raj.) -324005 Ph: +91-744-3040045 Fax: +91-744-3040050

Unit-IV

Velocity and acceleration along radial and transverse directions and along tangential and normal directions.
Projectiles: Motion horizontal and inclined planes.

Unit-V

Direct and oblique impact. Constrained Motion- Circular and Cycloidal.

Book Suggested:

1. Shanti Narayan: Elements of real analysis, S.Chand & company Ltd., New Delhi.
2. Shanti Narayan: A Course of Mathematical Analysis, S.Chand & Company Ltd. New Delhi.
3. S.C. Malik, Mathematical Analysis, Wiley Estern Ltd. New Delhi.
4. S.C. Malik, Principles of Real Analysis, New Age International Ltd., New Delhi.
5. Hari Kishan, Real Analysis, Pragati Prakashan Meerut.
6. J.N. Sharma & A.R. Vasistha, Mathematical Analysis, Krishna Prakashan Mandir, Meerut.
7. M. Ray, J.C. Chaturvedi & H.S. Sharma: A Text Book of Differential Equations, Students Friends & Company, Agra.
8. J.L. Bansal & H.S. Dhama : Differential Equations Vol. I & II, Jaipur Publishing House, Jaipur.
9. M.Ray & P.T. Chandi: Statics, Premier Publishing Company, Delhi.
10. M. Ray: A Text Book on Dynamics, Premier Publishing Company, Delhi.
11. S.M. Mathur: A New Text Book of Higher Statics, Atma Ram & sons, New Delhi

Mathematics Practical

1. Solution of differential equations using picard's method and comparison with exact solution.
2. Solution of differential equations using Euler's method and comparison with exact solution.
3. Formation of the ordinary differential equation.
4. Singular solution of differential equations.
5. Solution of differential equations using variation of parameters method.
6. Solution of partial differential equations using charpit's method.
7. Application of differential equations to solve LCR-circuits and harmonic motions.
8. Find convexity and concavity of the plane curves.
9. Find the singular points and their nature of the plane curves.
10. Formation of partial differential equations.

University Campus: Alaniya, Kota 325 003, Rajasthan Ph: +91-80941-62999

City office: CP Tower (4th Floor), IPIA, Road No-1, Kota (Raj.) -324005 Ph: +91-744-3040045 Fax: +91-744-3040050

Course Scheme of B.Sc. B.Ed. Part-III

Annual Course Scheme of B.Sc. B.Ed. Part-III				
Branch-Mathematics				
S.No.	Paper Code	Paper Name	Marks	
			Min. Marks	Max. Marks
1	CSL011	Elementary Computer Application*	36	100
2	EDL031-I	Language Across the Curriculum	36	100
3	EDL031-II	Guidance and Counseling in School	36	100
4	Practicum	Special Training Programme .Micro Teaching(5 Skills) 10 marks .Simulated Teaching(5 Lessons) 10 marks .Practice Lesson during Internship Teaching(4 Weeks 15 Lessons) 50 marks .Observation of Teaching of Peer Group(5) 5 marks .Technology Based Lessons(2 Lessons) 10 marks . Criticism Lesson 15 marks	36	100
5	EDP031-III	Pedagogy of a School Subject (part-1) , Ist & IInd Year(candidate shall be required to offer any two papers from the following for part-1 & other for part-2).1. General Science 2. Biology Physics3.Chemistry 4. Mathematics 5. Physics	36	100
Final Lesson			36	100
6	CHL031-I	Inorganic Chemistry	18	50
7	CHL031-II	Organic Chemistry	18	50
8	CHL031-III	Physical Chemistry	18	50
9	CHP031	Chemistry Practical	18	50
10	MAL031-I	Linear Algebra and Complex Analysis	24	66
11	MAL031-II	Mathematical Statistics and Linear Programming	24	66
12	MAL031-III	Numerical Analysis and C-Programming	17	46
13	MAP031	Maths Practical	8	22
14	PHL031-I	Solid State Physics	18	50
15	PHL031-II	Nuclear Physics	18	50
16	PHL031-III	Elementary Quantum Mechanics& Spectroscopy	18	50
17	PHP031	Physics Practical	18	50
				G.T.
				1100

University Campus: Alaniya, Kota 325 003, Rajasthan Ph: +91-80941-62999

City office: CP Tower (4th Floor), IPIA, Road No-1, Kota (Raj.) -324005 Ph: +91-744-3040045 Fax: +91-744-3040050

CSL011: Computer Fundamentals

1.Introduction to Information Technology: evolution and generation of computers, types of computers, micro, mini, mainframe and super computer, Architecture of a computer system: CPU, ALU, Memory (RAM, ROM families), cache memory, input/output devices, pointing devices. Development of Super Computers in India "PARAM": History, Characteristics, Strength, Weakness and basic Architecture.

2.Number system: Binary, octal, decimal and hexadecimal) and their inter-conversions, character codes (ASCII, EBCDIC and Unicode). Logic gates. Boolean Algebra, machine, assembly and high level language including 3 GL and 4GL

3.Concept of Operating system: types of operating systems, need of OS, batch processing, multiprocessing, Single user & Multi user OS, distributed and time sharing operating systems, Process and memory management concept, Introduction to Unix, Linux, Windows, Windows NT systems and their simple commands.

4.Internet: Concepts, email services, world wide web, web browsers, search engines. Exploring various Citizen-centric services of Govt. of India such as Income Tax Services, Passport Seva, ticket Booking (IRCTC & RSRTC), National Voters Service Portal, LPG service.

5.Word processing packages:

standard features like tool bar, word wrap, text formatting, paragraph formatting. Effects to text, Mail-merge.

6.Presentation packages: Slide creation, slide shows, adding graphics, formatting, customizing and printing custom and animation.

7.Computer networking: Type of networks, LAN, MAN and WAN, concept of bridges and routers, gateways and modems. ISDN and leased lines, Teleconferencing and videoconferencing.

8.Multimedia Technology: Introduction, framework for multimedia devices, image compression standards, JPEG, MPEG and MIDI formats.

9.Database Management Systems: Data, field and records, information database, creation of a database file, insertion, deletion and updating of records, modifying structure, editing and browsing of records, searching sorting and indexing of records, retrieving of records and report generation. Data processing in government organizations.

10.E-commerce: Concept of e-commerce, benefits and growth of e-commerce, security considerations and hazards of virus and other security risks, antivirus software, electronic payment system. E-Commerce: An Indian perspective, Digi locker, attendance gov.in, mygov.in, Swachh Bharat Mission, E-Hospital, National Scholarship portal, E-Sampark, UID, various modes of Digital payment of govt. of India

EDL031-I: LANGUAGE ACROSS THE CURRICULUM

Objectives:

The student teacher will be able:

- To understand children's language background for effective teaching and learning.
- To create sensitivity to the language diversity that exists in the classroom
- To be familiar with theoretical issues, and to develop competence in analyzing current school practices and coming up with appropriate alternatives.
- To enhance the theoretical understanding of multilingualism in the classroom.

University Campus: Alaniya, Kota 325 003, Rajasthan Ph: +91-80941-62999

City office: CP Tower (4th Floor), IPIA, Road No-1, Kota (Raj.) -324005 Ph: +91-744-3040045 Fax: +91-744-3040050

- To understand the nature of classroom discourse and develop strategies for using oral language in the classroom in a manner that promotes learning in the subject area.
- To understand the nature of reading comprehension in the content area and writing in specific content areas.
- To understand interplay of language and society.
- To understand function of language and how to use it as a tool.
- To understand language and speech disorder and make remedial measures too.

Unit-I

Language and Society:

1. Language – Introduction, types, components, linguistic skills and interrelationship between language and literacy.
2. Relationship of language and society: Identification, power and discrimination.
3. Nature of multilingualism: Managing multilingualism in classroom
4. Constitutional status of languages: Hindi, English, Regional languages
5. Language policy in Education

UnitII

Language development

1. Theories of language development and its implementation in teaching, psychological basis of language.
2. The home language and school language and teaching learning process, the power dynamics of the standard language as the school language Vs. home language on dialects.
3. Deficit theory and discontinuity theory of language and teaching – 6 learning process.

Unit-III

Language acquisition

1. Understanding Hindi alphabets & its logical & simple classification
2. Language acquisition and cognitive development, Learning languages with fun
3. Culture acquisition through language.

UnitIV

Classroom and Language:

1. Understanding the nature of classroom, discourse, strategies for using and language in the classroom to promote learning in the subject area.
2. Tools for learning: Dictionary, Discussion, Natural exposition, Word puzzles
3. The nature of questioning in the classroom, Types of questions and teacher control.

UnitV

Development of Reading and writing

1. Nature of reading comprehension in the content area (Informational reading), nature of expository texts vs. narrative texts, transactional texts vs reflective texts.
2. Scheme theory, text structures, knowhow of examining content area of texts books.
3. Strategies for reading text book, children, note making, summarizing, making reading writing connections.
4. Process writing: Analyse children's writing to understand their conception, writing with a sense of purpose, writing to learn and understand.

Practicum/Field Work

1. Narrate your first experience of first day for internship programme.
2. Collect a literary style poem of any language and critically analyse it diagnoses speech defects of primary level student and make a remedial strategy.
3. Prepare a list of at least 10 proverb of any language and interpret their cultural significance.
4. Collect a literary style poem of any language and analyse it.

University Campus: Alaniya, Kota 325 003, Rajasthan Ph: +91-80941-62999

City office: CP Tower (4th Floor), IPIA, Road No-1, Kota (Raj.) -324005 Ph: +91-744-3040045 Fax: +91-744-3040050

Books Suggested:

1. Agnihotri, R.K. (1995). Multilingualism as a classroom resource. In K. Heugh, A Siegruhn, & P. Pluddemann (Eds.) Multilingual education for South Africa 9pp. 3-&). Heinemann Educational Books.
2. Anderson, R.C. (1984). Role of the Reader's Schema in comprehension, learning and memory. In R. C. Anderson, J. Osborn, & R.J. Tierney (Eds.), Learning to read in American Schools: Basad readers and Content texts. Psychology Press.
3. Eller, R.G. (1989). Johnny can't talk, either: The perpetuation of the deficit theory in classrooms. The Reaing Teacher, 670-674.
4. Erlwanger, S. H. (1973). Benny's conception of rules and answers in IPI Mathematics. Journal of children's Mathematical Behavior, 1(2), 7- 26 University of Kota, Kota 30
5. Grellet, f. (1981). Developing reading skills: A practical Gude to reading comprehension exercises. Cambridge University Press.
6. Ladson-Billings. G. (1995). Toward a Theory of Culturally Relevant Pedagogy. American Educational research journal. 32(3), 465-491.
7. NCERT. (2006d) Position Paper National Focus Group on teaching of Indian language (NCF- 2005). New Delhi: NCERT.
8. Sankhla, Arjun Singh, (2013) Hindi Bhasha Shikshan aur Praveenta, Arihant Shiksha Prakashan Jaipur.
9. Thwaite, A. & Rivalland, J.(2009) How can analysis of classroom Taks help teachers reflect on their practices? Australian Journal of Language and Literacy, the 32(1) 38

EDL031-II: GUIDANCE AND COUNSELLING IN SCHOOL**OBJECTIVES:**

The course will enable the student teachers to

- Understand the concept, need and meaning of guidance.
- Get acquainted with the principles, issues, problems and procedure of guidance.
- Develop understanding about the role of school in guidance.
- Understand the various areas, tools and techniques in guidance.
- Understand the concept, need and meaning of counselling.
- Get acquainted with the principles and process of counselling.
- Understand the tools and techniques in counselling.

Unit I**GUIDANCE IN SCHOOL**

- Concept, Need and Meaning of Guidance.
- Principles of Guidance.
- Procedure of Guidance (steps).
- Issues and problems of Guidance.
- Role of school in Guidance.

Unit II**AREAS, TOOLS AND TECHNIQUES IN GUIDANCE.**

- Personal, Educational and vocational Guidance.

University Campus: Alaniya, Kota 325 003, Rajasthan Ph: +91-80941-62999

City office: CP Tower (4th Floor), IPIA, Road No-1, Kota (Raj.) -324005 Ph: +91-744-3040045 Fax: +91-744-3040050

- Tools: Records of students.
- Rating scale.
- Psychological tests.
- Questionnaire and Inventories.
- Techniques in Guidance (a) Observation, (b) Interview, (c) Sociometry.

Unit III

COUNSELLING IN SCHOOL

- Concept, Need and Meaning of Counselling.
- Principles of Counselling.
- Counselling Process and Role.
- Directive, Non-Directive and Eclectic counselling.
- Qualities and role of a school counselor

Unit IV

TOOLS AND TECHNIQUES IN COUNSELING

- Individual counselling and Group counselling.
- Lectures, discussions and Dramatics as techniques in counselling.
- Importance of follow-up in counselling.
- Counselling for the children with special needs.
- Counselling for parents.

Unit V

GUIDANCE AND COUNSELING FOR SPECIAL NEEDS POPULATION GUIDANCE OF CHILDREN WITH SPECIAL NEEDS

- Problems and needs.
- Guidance of the gifted and creative students.
- Guidance of under achiever.
- Slow learning and firstgeneration learners.
- Guidance of learning disabled, Drug addicts and alcoholics.
- De addiction centers, Career resource centre.
- Evaluation of counselling, Need for research and reforms in guidance and counselling.

Assignment:

Any One (10 MARKS)

- Interview of a school counselor.
- Visit to a guidance or counselling centre and write a report.
- Administration of an individual test and preparing a report.

Books Suggested:

1. Anastasi A, Differential Psychology, New Youk: Macmillan Co, 1996
2. Arbuckle Dugland, Guidance and Counselling in the classroom, Allyn & Bacon Inco, 1985.
3. Baqrki. B.G., Mukhopadhyaya. B., Guidance and Counselling; A Manual, New Delhi: Stanley Publishers, 1990.
4. Crow & Crow, An introduction to Guidance, New Delhi: Eurasia Publishing House, 1992.
5. Freeman E.S., Theory and Practice of Psychological Testing, New Delhi: Henry Holt 1992.
6. Jones. A.J., Principles of Guidance, New Delhi: McGrew Hills Publishers, 1970.

University Campus: Alaniya, Kota 325 003, Rajasthan Ph: +91-80941-62999

City office: CP Tower (4th Floor), IPIA, Road No-1, Kota (Raj.) -324005 Ph: +91-744-3040045 Fax: +91-744-3040050

7. Kochhar S.K., Educational and vocational Guidance in secondary schools, New Delhi, sterling publishers Pvt. Ltd., 1990.

8. Kolher. S.K., Educational and Vocational Guidance, New Delhi: Practice Hall India Ltd., 1995.

9. NCERT, Guidance and Counseling in Indian Education, New Delhi: NCERT, 1978.

PEDAGOGY OF GENERAL SCIENCE

Objectives

1. Student-teachers will be able to
2. Understand General Science as an interdisciplinary area of learning.
3. Understands aims and objectives of teaching General Science at different levels.
4. Explore different ways of creating learning situations for different concepts of science:
5. Formulate meaningful inquiry episodes, problem-solving situations, investigatory and discovery learning projects based on upper primary, secondary and higher secondary stages.
6. Facilitate development of scientific attitudes in learners.
7. Examine different pedagogical issues in learning science.
8. Stimulate curiosity, inventiveness and creativity in science.
9. Develop ability to use science concepts for life skills.
10. Develop competencies for teaching, learning of science through different measures.
11. Construct appropriate assessment tools for evaluating learning of science.
12. Understands the CCE pattern of Evaluation.

Unit I

Nature of General Science as a Discipline

Meaning, Concept, Needs of General science teaching. Nature and scope of General science teaching Main discoveries and development of science (special reference to ancient India) Science as a domain of enquiry, as a dynamic and expanding body of knowledge, science as a process of constructing knowledge. Science as an interdisciplinary area of learning (Physics, chemistry, biology etc.); science for environment, health, peace & equity, science and society. fact, concept, principles, laws and theories- their characteristics in context of general science.

Constructivist approach in learning General Science.

Unit II

General science as a school subject Importance of General science in school curriculum. Aims & objectives of teaching General science at secondary level. Writing objectives in behavioural terms. Bloom's taxonomy (revised). Correlation of General Science with other School Subjects Changing trends and goals of teaching General Science with reference to N.C.F. 2005. Concept mapping of themes related to General Science.

Unit III

Methodology of Teaching and learning of General science Methods and devices of teaching General science at secondary level – Lecture-cum Demonstration, Project, Problem solving, Heuristic, Laboratory method. Techniques of teaching General Science

Unit IV

University Campus: Alaniya, Kota 325 003, Rajasthan Ph: +91-80941-62999

City office: CP Tower (4th Floor), IPIA, Road No-1, Kota (Raj.) -324005 Ph: +91-744-3040045 Fax: +91-744-3040050

Pedagogical Analysis and mode of learning Engagement Pedagogical analysis of the Units with reference to concepts, learning outcomes, activities and learning experiences and evaluation techniques of following content at secondary level Physics –light, Electricity, magnetism, Gravitation, Work and Energy, Sound Chemistry– Atom And molecules, Chemical Reactions, Acid ,Bases and Salt, Carbon and Its Compounds, metal and non-metals Biology –Cell and its Structure, Life processes, Diversity in living organisms, Environmental Science– Our Environment , natural resources and its management Modes of learning engagement in General Science Providing opportunities for group activities and observations. Group/Individual Presentation Providing opportunities for sharing ideas Teaching aids and activities in laboratory work Reflective written assignment

Unit V

Assessment & Evaluation of General Science learning Meaning, concept and construction of Achievement test, diagnostic test and remedial teaching. Blue print: Meaning, concept, need and construction. Open-book tests: Strengths and limitations Continuous and Comprehensive Evaluation (CCE) in Sciences. Difficulties Faced by the teacher in evaluation process and suggestive measures to overcome them.

Practicum/Field Work

Any two of the following

Visit Ayurveda college/ science labs to address lauding their working process and draft a report on their contribution to prosperity.

Prepare a concept map on any theme of General Science and explain its importance for Teaching and learning.

Collect Information about Indian Cultural traditions and find out the scientific basis or hidden concern for life and preservation of environment.

Being a Science teacher how you will remove superstitions from the Society. Report your Strategic planning.

Prepare a diagnostic test and apply it in school, after discussion with concerning teacher and give remedial measures.

1. Sood, J.K. (1987): Teaching Life Sciences, Kohli Publishers, Chandigarh.
2. Sharma, L.M. (1977): Teaching of Science and Life Sciences, Dhanpat Rai & Sons, Delhi.
3. Kulshreshtha, S.P. (1988): Teaching of Biology, Loyal Book Depot, Merrut
4. Yadav, K. (1993): Teaching of Life Science Anmol Publishers, Daryaganj, Delhi.
5. Yadav, M.S. (2000): Modern Methods of Teaching Sciences, Anmol Publishers, Delhi
6. Singh, U.K. & Nayab, A.K. (2003) : Science Education Commonwealth
7. Venkataih, S. (2001): Science Education in 21st Century, Anmol Publishers, Delhi.
8. Yadav, M.S. (Ed.) (2000): Teaching Science at Higher Level, Anmol Publishers, Delhi.
9. Edger, Marlow & Rao, D.B. (2003): Teaching Science Successfully, Discovery
10. Mangal, S.K. (1996): Teaching of Science, Arya Book Depot, and New Delhi.
11. Dave, R.H.: (1969): Taxonomy of Educational Objectives and Achievement
12. Testing, London University Press, London. 12. Sood. J.K. (1989): New Directions in Science Teaching, Kohli Publishers, Chandigarh.

PEDAGOGY OF CHEMISTRY

Objectives-

Student-teachers will be able to:

- Gain insight on the meaning and nature of chemistry for determining aims and strategies of teaching-learning. Appreciate that chemistry is a dynamic and expanding body of knowledge.

University Campus: Alaniya, Kota 325 003, Rajasthan Ph: +91-80941-62999

City office: CP Tower (4th Floor), IPIA, Road No-1, Kota (Raj.) -324005 Ph: +91-744-3040045 Fax: +91-744-3040050

- Appreciate the fact that every child possesses curiosity about his/her natural surroundings.
- Identify and relate everyday experiences with learning chemistry.
- Trace historical background of Chemistry.
- Appreciate various approaches of teaching-learning of chemistry.
- Analyze the contents of Chemistry with respect to Content, process, skills, knowledge organization and other critical issues.
- Perform Pedagogical analysis of various topics in Chemistry.
- Use effectively different activities/ demonstration/laboratory experiences for teaching-learning of chemistry.
- Integrate chemistry knowledge with other school subjects.
- To understand meaning, concept and various types of assessment.

Unit I

Nature of Chemistry as a Discipline Concept, Nature and Needs of Chemistry and Chemistry teaching. Scope of Chemistry teaching. Historical Background of Chemistry with special reference to India. Constructivist approach in learning Chemistry.

Unit II

Chemistry as a school subject

Importance of Chemistry in school curriculum. Aims & objectives of teaching Chemistry at school level. Writing objectives in behavioural terms. Bloom's taxonomy (revised). Correlation of Chemistry with other School Subjects Changing trends and goals of teaching Chemistry.

Unit III

Methodology of Teaching and learning of Chemistry Scientific attitude and scientific temper: Nurture the natural curiosity, aesthetic senses and creativity in Chemistry: essential skills, methods and process that lead to exploration: Generalization and validation of scientific knowledge in Chemistry. Lecture –cum Demonstration, Team teaching, project method, problem solving method, Heuristic method, Group discussion, programmed instruction, Inductive- Deductive, investigatory approach, Concept mapping, Collaborative learning, and Experiential learning in chemistry: Facilitating learners for self-study.

Unit IV

Pedagogical Analysis and mode of learning Engagement Pedagogical analysis of the Units with reference to concepts, learning outcomes, activities and learning experiences and evaluation techniques of following content at secondary and Senior secondary level-Solutions, colloids, chemical equilibrium, electrochemistry, mechanical and thermal properties of matter, chemical bonding and molecular structure, periodic table, Atom and molecules, Chemical Reactions, Acid, Bases and Salt, Carbon and Its Compounds, metal and non-metal setc) Modes of learning engagement in Chemistry.

- Observations and experiments in Chemistry: interdisciplinary linkages,
- Relating knowledge to students,, daily life situations.
- Providing opportunities for group activities and idea Sharing
- Group/Individual Presentation
- Teaching aids and activities in laboratory work
- Reflective written assignment

Unit V

Assessment & Evaluation of Chemistry learning Meaning, concept and construction of Achievement test, Diagnostic testing and remedial teaching Blue print: Meaning, concept, need and construction. Open-book tests: Strengths and limitations Continuous and Comprehensive Evaluation (CCE) in Sciences. Assessment of

University Campus: Alaniya, Kota 325 003, Rajasthan Ph: +91-80941-62999

City office: CP Tower (4th Floor), IPIA, Road No-1, Kota (Raj.) -324005 Ph: +91-744-3040045 Fax: +91-744-3040050

project work in work in Chemistry(both in the laboratory and in the field) Performance-based assessment; learner's record of observations, field diary, Oral presentation of learners work, portfolio; Developing assessment framework in Chemistry; assessment of experimental work in Chemistry.

Practicum/FieldWork

Any two of the following –

1. Perform Some Simple Experiment to clarify any Concept in Chemistry and to develop Observation Skills. Prepare a report of entire activity.
2. Organization of exploratory activities to develop scientific attitude and temper. Report your Experiences
3. Plan an innovation method of teaching chemistry so as to facilitate the correlation of content with other subjects/ day to day life. Teach that lesson in class and report complete activity with your experiences.
4. Write a reflective journal on some innovative trends in Chemistry teaching and their importance in Achieving aims of teaching chemistry at different level.
5. Prepare a diagnostic test and apply it in school, after discussion with concerning teacher and give remedial measures.

Books Suggested:

1. adav, M.S.1995, Teaching of Chemistry, Anmol Publication, New Delhi.
2. Megi, J.S. & Negi, Rasuita, 2001, Teaching of Chemistry.
3. Yadav, M.S. 2000: Teaching Science at Higher level, Anmol Publications, New Delhi.
4. Misra, D.C. : Chemistry Teaching, Sahitya Preparation, Agra
5. Khirwadbar, Anjab 2003: Teaching of Chemistry by Modern Method, Sarup & Sons. New delhi.
6. Das, R.C., 1985: Science Teaching in Schools, Sterling publishers Pvt. Limited. New Delhi
7. Venkataih, S., 2001: Science Education in 21st Century, Anmol Publishers, New Delhi.
8. Rao, D.B., 2001 : World conference on Science Education Discovery publishing work, New Delhi.
9. Singh, U.K. & Nayab, A.K. : 2003 : Science Education, Commonwealth Publishers, Daryaganj, New Delhi.
10. Singh, Y.K. & Sharma Archnesh, 2003 : Modern Methods of Teaching Chemistry A.P.H. Publishing corporation, Daryaganj, New Delhi

PEDAGOGY OF MATHEMATICS

Objectives:

The students will be able to-

- Gain insight into the meaning, nature, scope and objectives of mathematics
- Appreciate mathematics as a tool to engage the mind of every student.
- Understand the process of developing the concepts related to Mathematics.
- Appreciate the role of mathematics in day to day life.
- Learn important mathematics: mathematics more than formulas and mechanical procedures.
- Pose and solve meaningful problems.
- Construct appropriate assessment tools for evaluation mathematics learning.
- Understand methods and techniques of teaching mathematics.
- Perform pedagogical analysis of various Topics in mathematics at secondary level.
- Understand an use I.C.T. in teaching of mathematics.
- Understand and use continuous and comprehensive evaluation, diagnostic testing and remedial teaching in Mathematics.

Unit I

Nature of Mathematics as a Discipline Mathematics is not merely subject of computations skill, it is much more, it has a logical structure. Nature of mathematics – building blocks of mathematics (Concept, objectives,

University Campus: Alaniya, Kota 325 003, Rajasthan Ph: +91-80941-62999

City office: CP Tower (4th Floor), IPIA, Road No-1, Kota (Raj.) -324005 Ph: +91-744-3040045 Fax: +91-744-3040050

variables, function & relation, symbolization) Important processes of mathematics-estimation, approximation, understanding or visualizing pattern representation, reasoning & proof, making connections, mathematical communication. Historical development of mathematics as a discipline Contribution of Indian and western mathematicians like Ramanujan, Aryabhata, Bhaskaracharya, Pythagoras and Euclid. Constructivist approach in learning mathematics.

Unit II

Mathematics as a School Subject Importance of mathematics in school curriculum

Aims and objectives of teaching mathematics at secondary level. Writing objectives in behavioural terms. Bloo's taxonomy (revised) Correlation of mathematics with other school subjects. Changing trends and goals of teaching mathematics with reference of NCF 2005 Concept mapping of themes related to mathematics.

Unit III

Mathematics as a School Subject Nature of concept, concept formation and concept assimilation.

Methods of teaching mathematics at secondary level –

- a. Lecture cum demonstration
- b. Inductive-Deductive
- c. Problem Solving
- d. Project
- e. Heuristic
- f. Analytic & Synthetic Techniques of teaching mathematics
- g. Oral work
- h. Written work
- i. Drill work
- j. Home assignment

Unit IV

Pedagogical analysis and mode of learning engagement

Pedagogical analysis of the Units with reference to concepts, learning outcomes, activities and learning experiences and evaluation techniques of following content at secondary level

- k. Number system
- l. Measures of central tendency
- m. Congruency and similarity
- n. Trigonometrical ratios and identities
- o. Area and Volume
- p. Profit, loss and partnership
- q. Compound interest
- r. Graphical representation data Modes of learning engagement in mathematics
- s. Providing opportunities for group activities
- t. Group/Individual Presentation
- u. Providing opportunities for sharing ideas
- v. Designing different Working Models for concept formation

(e) Teaching aids and activities in laboratory work (f) Reflective written assignments

Unit V

University Campus: Alaniya, Kota 325 003, Rajasthan Ph: +91-80941-62999

City office: CP Tower (4th Floor), IPIA, Road No-1, Kota (Raj.) -324005 Ph: +91-744-3040045 Fax: +91-744-3040050

Assessment & Evaluation of Mathematics learning Assessment of critical thinking, logical reasoning and to discourage mechanical manipulation and rote learning

w. Planning of evaluation mathematics

x. Formative, Summative and predictive evaluation in mathematics

y. Continuous and compressive evaluation (CCE) in mathematics at secondary level

z. Diagnostic Testing, Remedial Teaching and enrichment programme for:

i. Gifted Learners

ii. Slow Learners

iii. Learners with Dyslaxica

iv. Difficulties Faced by the Teacher in Teaching of Mathematics and Suggestive Measure to overcome them.

Construction of achievement test/question paper in mathematics

Practicum/Field Work

Any two of the following

Prepare a Concept map related to any theme of Mathematics and Explain how it facilitates teaching and learning.

Prepare a project related to Mathematics and report your steps.

Prepare a power point presentation on brief history and contribution of two mathematicians.

Conduct a group activity on any topic of mathematics and report your Experiences. Observation of Mathematics class-room teaching in any secondary school and prepare a list of errors committed by students.

Books Suggested:

1. Mangal, S.K. Sadharan Ganit Shikshan, Arya Book Depot, New Delhi.
2. Bhatnagar A.B. New Dimensions in the teaching of Maths, Modern Publishers, Meerut.
3. Jain S.L.: Ganit Shikshan Sansthan, Rajsthan Hindi Granth Academy ,Jaipur.
4. Agrawal S.M. Teaching of Modern Mathematics Dhanpat Rai & Sons, Delhi.
5. Jagadguru Swami: Vedic Mathematics, Moti Lal Banarasidas Publisher, Delhi
6. Kapur J.N. Modern Mathematics for Teachers, Arya Book Depot, New Delhi

PEDAGOGY OF PHYSICS

Objectives

Student-teachers will be able to:

1. Gain insight on the meaning, nature and scope of physics for determining aims and strategies of teaching-learning.
2. Appreciate that science is a dynamic and expanding body of knowledge;
3. Trace historical background of physics.
4. Identify and relate everyday experiences with learning physics;
5. Appreciate various approaches of teaching-learning of physics;
6. Perform Pedagogical analysis of various topics in physics.
7. Analyze the contents of physics with respect to Content, process, skills, knowledge organization and other critical issues.
8. Use effectively different activities/demonstrations/laboratory experiences for teachinglearning of physics; 9. Integrate physics knowledge with other school subjects.

University Campus: Alaniya, Kota 325 003, Rajasthan Ph: +91-80941-62999

City office: CP Tower (4th Floor), IPIA, Road No-1, Kota (Raj.) -324005 Ph: +91-744-3040045 Fax: +91-744-3040050

10. To understand meaning, concept and various types of assessment.

Unit I

Nature of physics as a Discipline

Concept, Nature and Needs of Physics teaching. Scope of Physics teaching. Historical Background physics with special reference to India. Contribution of C.V. Raman, M.N. Saha, K.S.Krishnan, J.C. Bose, H.JBhabha, S. Chandra Shekhar and A.P.J. Abdul Kalam in the field of Physics

a. Science as a domain of enquiry, as a dynamic and expanding body of knowledge; Science as a process of constructing knowledge; physics as interdisciplinary area of learning

Unit II

Physics as a school subject Importance of Physics in school curriculum. Aims & objectives of teaching Physics at school level. Writing objectives in behavioural terms. Bloom's taxonomy (revised). Correlation of Physics with other School Subjects

Unit III

Methodology of Teaching and learning of Physics - Scientific attitude and scientific temper: essential skills, methods and process that lead to exploration: Generalization and validation of scientific knowledge in Physics. Lecture –cum -Demonstration, Team teaching, project method, problem solving method, Group discussion, Programmed instruction, Inductive- Deductive, Investigatory approach, Concept mapping, Collaborative learning, and Experiential learning in Physics: Facilitating learners for self-study.

Unit IV

Pedagogical Analysis and mode of learning Engagement Pedagogical analysis of the Units with reference to concepts, learning outcomes, activities and learning experiences and evaluation techniques of following content at secondary and Senior secondary level-light, Electricity, magnetism, Gravitation, Laws of motion, Work and Energy, Sound Modes of learning engagement in Physics

b. Observations and experiments in Physics: interdisciplinary linkages,

c. Relating knowledge to students daily life situations.

d. Providing opportunities for group activities and idea Sharing

e. Group/Individual Presentation

f. Designing different working Models for concept formation 74

g. Teaching aids and activities in laboratory work

h. Reflective written assignment Unit V: Assessment & Evaluation of Physics learning Meaning, concept and construction of Achievement test,

Blue print: Meaning, concept, need and construction. Open-book tests: Strengths and limitations Formative and Summative Assessment in physics. Continuous and Comprehensive Evaluation (CCE) Assessment of project work in Physics (both in the laboratory and in the field) Performance-based assessment; learner's record of observations, Oral presentation of learners work, portfolio; Developing assessment framework in Physics; assessment of experimental work in Physics.

Practicum/Field Work

Any two of the following

1. Prepare a concept map on any topic and explain how it Facilitates Students,, Learning.

2. Description and Design of an Improvised Apparatus

3. Write a reflective journal on _Radiations and Human Health,,. Planning an out of class activity to use local resources to teach Physics and report your experiences.

4. Prepare a plan to assess Students,, Practical work in Physics.

University Campus: Alaniya, Kota 325 003, Rajasthan Ph: +91-80941-62999

City office: CP Tower (4th Floor), IPIA, Road No-1, Kota (Raj.) -324005 Ph: +91-744-3040045 Fax: +91-744-3040050

Books Suggested:

1. Heiss, Oburn and Hoffman: Modern Science, the Macmillan Company, New York 1961.
2. Thurber W. and A. Collette: Teaching Science in Today's Secondary schools, Boston Allyn and Bacon Inc., New York, 1959.
3. Vaidya, N. "The Impact of Science Teaching", Oxford and IBH Publishing Company, New Delhi, 1971.
4. Richardson, S.: "Science Teaching in Secondary Schools", Prentice Hall, USA, 1957.
5. Sharma, R.C. and Sukla: "Modern Science Teaching" Dhanpat Rai and Sons, Delhi, 2002.
6. Ravi Kumar S.K., "Teaching of Science", Mangal deep Publications 2000.
7. Rao Aman : Teaching of Physics, Anmol Publications, New Delhi, 1993.
8. Wadhwa Shalini : Modern Methods of Teaching Physics, Sarup and Sons, New Delhi, 2001.
9. Gupta S.K.: Teaching Physics Sciences in Secondary Schools, Sterling Publishers (P) Ltd., New Delhi, 1989

CHL031-I: Inorganic Chemistry**Unit-I**

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.

Unit-II

Metal-Ligand Bonding in Transition Metal complexes: Limitations of valence bond theory, an elementary idea of crystal field theory, crystal field splitting in octahedral, tetrahedral and square planar complexes, factors affecting the crystal-field parameters.

Magnetic Properties of Transition Metal Complexes: Types of magnetic behaviour, methods of determining magnetic susceptibility, spin-only formula. L-S coupling, correlation of s and d values, orbital contribution to magnetic moments, application of magnetic moment data for 3d metal complexes.

Unit-III

Electronic Spectra of Transition Metal Complexes: Types of electronic transitions, selection rules for $d-d$ transitions, spectroscopic ground states, spectrochemical series, Orgel-energy level diagram for d^1 and d^9 states, discussion of the electronic spectrum of $[(Ti(H_2O)_6)_3]^{3+}$ complex.

Thermodynamic and Kinetic Aspects of Metal Complexes: A brief outline of thermodynamic stability of metal complexes and factors affecting the stability, substitution reactions of square planar complexes.

Unit-IV

Organometallic Chemistry: Definition, nomenclature and classification of organometallic compounds. Preparation, properties, bonding and applications of alkyl and aryls of Li, Al, Hg, Sn and Ti, a brief account of metal ethylenic complexes and homogeneous hydrogenation, mononuclear carbonyls and the nature of bonding in metal carbonyls.

Unit-V

Bioinorganic Chemistry: Essential and trace elements in biological processes, metalloporphyrins with special reference to haemoglobin and myoglobin. Biological role of alkali and alkaline earth metal ions with special reference to Ca^{+2} , Mg^{+2} Nitrogen fixation.

University Campus: Alaniya, Kota 325 003, Rajasthan Ph: +91-80941-62999

City office: CP Tower (4th Floor), IPIA, Road No-1, Kota (Raj.) -324005 Ph: +91-744-3040045 Fax: +91-744-3040050

CHL031-II Organic Chemistry

Unit-I

Spectroscopy: Nuclear magnetic resonance (NMR) spectroscopy. (Proton Magnetic Resonance (HNMR) spectroscopy, nuclear shielding and deshielding, chemical shift and molecular structure, spin-spin splitting and coupling constant, areas of signals, interpretation of PMR spectra of simple organic molecules such as ethyl bromide, ethanol, acetaldehyde, 1,1,2 - tribromoethane, ethyl acetate, toluene and acetophenone, Problems pertaining to the structure elucidation of simple organic compounds using UV, IR and PMR spectroscopic techniques.

Unit-II

Organometallic Compounds: Organometallic Compounds: The Grignard reagents-formation, structure and chemical reactions.

Organozinc Compounds: Formation and chemical reactions.

Organolithium compounds: Formation and chemical reactions. Organosulphur compounds Nomenclature, structural features, Methods of formation and chemical reactions of thiols, thioethers, sulphonic acids, sulphonamides and sulphguanidine.

Unit-III

Heterocyclic Compounds:

Introduction: Molecular orbital picture and aromatic characteristics of pyrrole, furan, thiophene and pyridine. Methods of synthesis and chemical reactions, with particular emphasis on the mechanism of electrophilic substitution. Mechanism of nucleophilic substitution reactions in pyridine derivatives. Comparison of basicity of pyridine, piperidine and pyrrole. Introduction to condensed five and six-membered heterocycles. Preparation and reactions of indole, quinuclidine and isoquinoline with special reference to Fisher Indole synthesis, Skraup's synthesis and Bischler-Napieralski synthesis. Mechanism of electrophilic substitution reactions of indole, quinoline and isoquinoline.

Unit-IV

Organic Synthesis via Enolates: Acidity of α Hydrogens, alkylation of diethyl malonate and ethylacetoacetate. Synthesis of ethyl acetoacetate: the Claisen condensation. Keto-enol tautomerism of ethyl acetoacetate. Alkylation of 1, 3 - dithianes. Alkylation and Acylation of enamines

Carbohydrates: Classification and nomenclature monosaccharides, mechanism of osazone formation, interconversion of glucose and fructose, chain lengthening and chain shortening. of aldoses. Configuration of monosaccharides. Erythro and threo diastereomers. Conversion of glucose into mannose. Formation of glycosides, ethers and esters. Determination of ring size of monosaccharides. Cyclic structure of D(+) glucose. Mechanism of mutarotation. Structure of ribose and deoxyribose. An introduction to disaccharides (maltose, sucrose and lactose) and polysaccharides (starch and cellulose) without involving structure determination.

Unit-V

Amino Acids, Peptides, Proteins and Nucleic Acids: Classification, structure and stereochemistry of amino acids. Acid-base behaviour, isoelectric point and electrophoresis. Preparation and reactions of α - amino acids. Structure and nomenclature of peptides and proteins. Classification of proteins. Peptide structure determination, end group analysis, selective hydrolysis of peptides. Classical peptide synthesis, solid-phase peptide synthesis. Structures of peptides and proteins. Levels of protein structure. Protein denaturation/renaturation.

Nucleic acids: Introduction. constituents of nucleic acids. Ribonucleosides and ribonucleotides. The double helical structure of DNA.

Fats, Oils and Detergents: Natural fats, edible and industrial oils of vegetable origin, common fatty acids, glycerides, hydrogenation of unsaturated oils. Saponification value, iodine value, acid value, Soaps, synthetic detergents, alkyl and aryl sulphonates.

Synthetic Polymers: Addition or chain-growth polymerization. Free radical vinyl polymerization, ionic vinyl

University Campus: Alaniya, Kota 325 003, Rajasthan Ph: +91-80941-62999

City office: CP Tower (4th Floor), IPIA, Road No-1, Kota (Raj.) -324005 Ph: +91-744-3040045 Fax: +91-744-3040050

polymerization, Ziegler-Natta polymerization and vinyl polymers.

Condensation or step growth polymerization. Polyesters, polyamides, phenol formaldehyde resins, urea formaldehyde resins, epoxy resins and polyurethanes. Natural and synthetic rubbers.

Synthetic Dyes: Colour and constitution (electronic concept). Classification of dyes.

Synthesis of Methyl orange. Congo red. Malachite green. Crystal violet, Phenolphthalein. Fluorescein. Alizarin and Indigo

CHL031-III: Physical Chemistry

Unit-I

Elementary quantum Mechanics: Black-body, radiation, Planck's radiation law, photoelectric effect, heat capacity of solids, Bohr's model of hydrogen atom (no derivation) and its defects. Compton effect. Louis De Broglie hypothesis Heisenberg's uncertainty principle, Sinusoidal wave equation, Hamiltonian operator, Schrodinger wave equation and its importance, physical interpretation of the wave function, postulates of quantum mechanics, particle in a one dimensional box.

Schrodinger wave equation for H-atom; separation into three equations (without derivation), quantum numbers and their importance, hydrogen like wave functions, radial wave functions, angular wave functions.

Unit-II

Molecular orbital theory: Basic ideas-criteria for forming M.O. from A.O. construction of M.O's by LCAO. H₂⁺ ion calculation of energy level from wave functions, physical picture of bonding and antibonding wave functions, concept of σ , σ^* , π , π^* orbitals and their characteristics. Hybrid orbitals - sp, sp², sp³, calculation of coefficients of A. O's used in these hybrid orbitals. Introduction to valence bond model of H₂, comparison of M.O. and V.B. models.

Unit-III

Spectroscopy: Introduction: Electromagnetic radiation, spectrum, basic features of different spectrometers, statement of the Born-Openheimer approximation, degrees of freedom.

Diatomic molecules, Energy levels of a rigid rotator (semi-classical principles), selection rules, spectral intensity, using population distribution (Maxwell-Boltzmann distribution) determination of bond length, qualitative description of non-rigid rotator, isotope effect

Vibrational Spectrum: Infrared spectrum: Energy levels of simple harmonic oscillator, selection rules, pure vibrational spectrum, intensity, determination of force constant and qualitative relation of force constant and bond energies, effect of anharmonic motion and isotope on the spectrum, idea of vibrational frequencies of different functional groups.

Raman Spectrum: concept of polarizability, pure rotational and pure vibrational Raman Spectra of diatomic molecules, selection rules.

Electronic Spectrum: Concept of Potential Energy curves for bonding and antibonding molecular orbitals, qualitative description of selection rules and Frank Condon principle. qualitative description of σ , π and n M.O. their energy levels and the respective transitions.

Unit-IV

Photochemistry: Interaction of radiation with matter, difference between thermal and photochemical processes. Laws of photochemistry: Grothus-Draper law, Stark -Einstein law, Jablonski diagram depicting various processes occurring in the excited state, qualitative description of fluorescence, phosphorescence, non-radiative processes (internal conversion, intersystem crossing), quantum yield, photosensitized reactions-energy transfer processes (simple examples)

Unit-V

Physical Properties and Molecular Structure: Optical activity, polarization -(Cauchy- Mossotti equation), orientation of dipoles in an electric field, dipole moment, induced dipole moment, measurement of dipole moment temperature method and refractivity method, dipole moment and structure of molecules, magnetic

University Campus: Alaniya, Kota 325 003, Rajasthan Ph: +91-80941-62999

City office: CP Tower (4th Floor), IPIA, Road No-1, Kota (Raj.) -324005 Ph: +91-744-3040045 Fax: +91-744-3040050

properties paramagnetism, diamagnetism and ferromagnetics.

Solutions, Dilute Solutions and Colligative Properties: Ideal and non-ideal solutions, methods of expressing concentrations of solutions, activity and activity coefficient.

Dilute solution: colligative properties, Raoult's law, relative lowering of vapour pressure, molecular weight determination. Osmosis, law of osmotic pressure and its measurement, determination of molecular weight from osmotic pressure. Elevation of boiling point and depression in freezing point. Experimental methods for determining various colligative properties. Abnormal molar mass, degree of dissociation and association of solutes.

Books Suggested:

1. Basic Inorganic Chemistry F.A. Cotton. G. Wilkinson and P.L. Gaus. Wiley.
2. Concise Inorganic Chemistry, J.D. Lee ELBS.
3. Concepts of Models Inorganic Chemistry B. Douglas. D.McDaniel and J. Alexander, John Wiley.
4. Inorganic Chemistry. D.E. Shriver P.W. Atkins and C.H. Langfor, Oxford.
5. Inorganic Chemistry, W.W. Porterfield Addison Wesley.
6. Inorganic Chemistry, A.G. Sharpe. ELBS.
7. Inorganic Chemistry, G.L. Miessler and D.A. Tarr, Prentice Hall.
8. Group Theory and Its Chemical Applications: P. K. Bhattacharya
9. Inorganic Chemistry: J. E. Huysse, Principles of Structure & Reactivity, 3rd Ed.
10. Selected Topics in Inorganic Chemistry: W. U. Malik, G. D. Tuli and R. Madan
11. Principles of Inorganic chemistry: D. Banerje
12. Modern Aspect of Inorganic Chemistry: H. J. Emeleus and A. G. Sharpe
13. Organic Chemistry, Morrison and Boyd, Prentice Hall.
14. Organic Chemistry, L.G. Wade Jr. Prentice Hall.
15. Fundamentals of Organic Chemistry, Solomons, John Wiley.
16. Organic Chemistry Vol. I, II, III S.M. Mukerji, S.P. Singh and RP. Kappor, Wiley Eastern Ltd. (New Age International)
17. Organic Chemistry, F.A. Carey, McGraw Hill, Inc.
18. Introduction to Organic Chemistry. Streitwieser, Heathcock and Kosover. Macmilan.
19. Organic Chemistry (Vol. I & II): S. M. Mukherji, S. P. Singh and R. P. Kapoor, Wiley Eastern Ltd.
20. A Text Book of Organic Chemistry (Vol. I & II): K. S. Tiwari, S. N. Mehrotra & N. K. Vishnoi
21. Organic Chemistry: M. K. Jain and S. Sharma
22. A Text Book of Organic Chemistry (Vol. I & II): O. P. Agarwal
23. A Text Book of Organic Chemistry: R. K. Bansal
24. Organic Chemistry (Vol. I & II): I. L. Finar
25. Organic Reaction and Their Mechanisms: P. S. Kalsi
26. Introduction of Petrochemicals: Sukumar Maiti,
27. Organic Chemistry: P. L. Soni
28. A Text Book of Organic Chemistry: V. K. Ahluwalia and Maduri Foyal, Narosa Publishing House Pvt. Ltd.
29. Physical Chemistry, G.M. Barrow. International Student Edition, McGraw Hill.
30. Basic Programming with Application, V.K. Jain. Tata McGraw Hill.
31. Computers and Common Sense. R Hunt and Shelly, Prentice Hall.
32. University General Chemistry, C.N.R Rao, Mac Millan.
33. Physical Chemistry, RA. Alberty, Wiley Eastern Ltd.
34. The elements of Physical Chemistry, P.W. Atkins, Oxford.
35. Physical Chemistry Through problems, S.K. Dogra and S. Dogra, Wiley Eastern Ltd.
39. Principles of Physical Chemistry: B. R. Puri Sharma and M. S. Pathania
40. A Text Book of Physical Chemistry: A. S. Negi and S. C. Anand
41. A Text Book of Physical Chemistry: Kundu and Jain

Chemistry Practical

University Campus: Alaniya, Kota 325 003, Rajasthan Ph: +91-80941-62999

City office: CP Tower (4th Floor), IPIA, Road No-1, Kota (Raj.) -324005 Ph: +91-744-3040045 Fax: +91-744-3040050

Inorganic Chemistry

Synthesis and Analysis

- Preparation of sodium tri oxalate ferrate (III) $\text{Na}_3[\text{Fe}(\text{C}_2\text{O}_4)_3]$ and determination of its composition by permagnometry.
- Preparation of Ni-DMG complex $[\text{Ni}(\text{DMG})_2]$.
- Preparation of copper tetraammine complex $[\text{Cu}(\text{NH}_3)_4]\text{SO}_4$.
- Preparation of cis-and trans-bisoxalatodiaquachromate (III) ion. Instrumentation
- Colorimetry - Job's method and Mole-ratio method.
- Adulteration - Food stuff.
- Effluent analysis - water analysis.
- Solvent Extraction - Separation and estimation of $\text{Mg}(\text{II})$ and $\text{Fe}(\text{II})$
- Ion Exchange Method - Separation and estimation of $\text{Mg}(\text{II})$ and $\text{Zn}(\text{II})$ Volumetric Analysis
- Iodimetric & Iodometric titrations.

Organic Chemistry

Section-A

Laboratory Techniques:

(i) Steam Distillation:

- Naphthalene from its suspension in water.
- Clove oil from Clove
- Separation of o-and p-nitrophenols

(ii) Column Chromatography:

- Separation of fluorescein and methylene blue.
- Separation of leaf pigments from spinach leaves.
- Resolution of racemic mixture of (Z)-mandelic acid.

Qualitative Analysis:

Analysis of an organic mixture containing two solid components using water, NaHCO_3 , NaOH for separation and preparation of suitable derivatives.

Section-B

Synthesis of Organic Compounds

- Acetylation: Salicylic acid, aniline, glucose and hydroquinone.
- Benzoylation: Aniline and phenol.
- Aliphatic Electrophilic Substitution: Preparation of Iodoform from ethanol and acetone.
- Aromatic Electrophilic Substitution:

o Nitration:

Preparation of m-dinitrobenzene,

Preparation of p-nitroacetanilide o Halogenation:

Preparation of p-bromoacetanilide Preparation of 2,4,6-tribromophenol.

- Diazotization/coupling:

Preparation of methyl orange and methyl red.

- Oxidation: Preparation of benzoic acid from toluene.
- Reduction: Preparation of aniline from nitrobenzene and m-nitroaniline from m-dinitrobenzene. Stereo-chemical study of Organic Compounds via Models
- R and S configuration of optical isomers.

University Campus: Alaniya, Kota 325 003, Rajasthan Ph: +91-80941-62999

City office: CP Tower (4th Floor), IPIA, Road No-1, Kota (Raj.) -324005 Ph: +91-744-3040045 Fax: +91-744-3040050

- E and Z configuration of geometrical isomers.
- Conformational analysis of cyclohexanes and substituted cyclohexanes.

Section-C

Organic estimation:

Amino group, phenolic group, carboxylic acid group and glucose.

Physical Chemistry

Electrochemistry

- To determine the strength of the given acid conductometrically using standard alkali solution.
- To determine the solubility and solubility product of a sparingly soluble electrolyte conductometrically.
- To study the saponification of ethyl acetate conductometrically.
- To determine the ionization constant of a weak acid conductometrically.
- To titrate potentiometrically the given ferrous ammonium sulphate solution using KMnO_4 / $\text{K}_2\text{Cr}_2\text{O}_7$ as titrant and calculate the redox potential of $\text{Fe}^{2+}/\text{Fe}^{3+}$ system on the hydrogen scale. Refractometry and Polarimetry
- To verify law of refraction of mixtures for e.g. of glycerol and water) using Abbe's refractometer.
- To determine the specific rotation of a given optically active compound. Molecular Weight Determination
- Determination of molecular weight of a non-volatile solute by Rast method / Beckmann freezing point method.
- Determination of the apparent degree of dissociation of an electrolyte (e.g. NaCl) in aqueous solution at different concentrations by ebulliscopy. Colorimetry
- To verify Beer-Lambert law KMnO_4 / $\text{K}_2\text{Cr}_2\text{O}_7$ and determined the concentration of the given solution of the substance.

PHL031-I: Solid State Physics

Unit-I

Crystal Binding and Crystal Structure: Crystal bonding, ionic bond, binding energy of ionic crystal, determination of the repulsive exponent, covalent bonding, metallic bonding, molecular or Vander Waal's bonding, hydrogen bonding, Space lattice and Crystal structure, reciprocal lattice, Bravais lattice, Miller indices and crystal structure, Spacing of planes in Crystal Lattice, Atomic Packing, Simple cubic structure, Face centered cubic structure, Hexagonal closed packed structure, Perovskite structure, X-ray diffraction and Bragg's law, Laue pattern.

Unit-II

Thermal Properties of Solids, Concepts of Thermal Energy and Phonons, Internal Energy and Specific Heat, The Various theories of Lattice specific Heat of Solids, The Einstein Model, Vibrational Modes of Continuous Medium, Debye Model, Electronic Contribution of the internal Energy to the Specific Heat of Metals, Thermal Conductivity of the Lattice.

Unit-III

Band Theory of Solids, Formation of bands, a Periodic Lattice and Bloch Theorem, Periodic Potential of a solid, Wave function in Number of States in the Band, Kronig Penny model, Velocity of the Bloch electrons and Dynamical effective mass, Momentum, Crystal Momentum and Physical Origin of the Effective Mass, Negative Effective Mass and Holes, The distinction between metals, insulators and intrinsic semiconductors.

Unit-IV

University Campus: Alaniya, Kota 325 003, Rajasthan Ph: +91-80941-62999

City office: CP Tower (4th Floor), IPIA, Road No-1, Kota (Raj.) -324005 Ph: +91-744-3040045 Fax: +91-744-3040050

Electrical Conductivity, Drude-Lorentz Theory of Electrical Conductivity, Boltzmann Transport Equation, Sommerfeld Theory of Electrical Conductivity, Matthiessen's Rule, Thermal Conductivity and Wiedemann-Franz's Law, The Hall Effect.

Superconductivity, Introduction, Meissner's effect, The Isotope Effect and Electron-Phonon Interaction, The Effect of the Superconductivity Transition on properties, Special Features of Superconducting Materials, London's equation, Flux Quantization, Qualitative discussion of BCS Theory of Superconductivity, Cooper Pairs, Applications of Superconductors, Josephson Junction.

Unit-V

Magnetic Properties, Origin of Atomic Magnetism, Dynamic of Classical Dipole in Magnetic field, Magnetic Susceptibility, Phenomenon of Diamagnetism, Paramagnetism, Paramagnetism of Ionic Crystal, Ferromagnetism, Temperature Dependence of saturation of Spontaneous Magnetization, The Paramagnetic Region, The nature of ferromagnetism, Nature and Origin of Weiss Molecular Field, Heisenberg's Exchange Interaction, Quantum Theory of Ferromagnetism, Relation between J_0 (Exchange Integral) and I (Weiss Constant), Ferromagnetism Domain.

PHL031-II: Nuclear Physics

Unit-I

Nuclear Properties: Rutherford's theory of a particle scattering, Properties of Nuclei, Nuclear Magnetic Moment and Nuclear Ellipticity, Quadrupole Moment and Nuclear spin, Parity and Orbital angular momentum, Parity and its conservation, Nuclear Mass and Mass Spectroscopy, Nuclear Energy, Discovery of neutron and proton-neutron hypothesis, Neutron to proton Ratio (n/z), The nuclear potential, Nuclear mass, Atomic Mass Unit (amu), Mass Defect and Binding energy, Nuclear forces, Theory of Nuclear forces, The Liquid Drop Model.

Unit-II

Nuclear Fission: The Discovery of Nuclear Fission, The Energy Release in Fission, The Fission products mass distribution of fission products, Charge distribution of fission products, ionic charge of fission products, Fission cross Section and threshold, Neutron emission in fission, The prompt neutron and delayed neutrons, Mechanism for the emission of delayed neutrons.

Energy of fission Neutrons, Theory of nuclear fission and Liquid Drop Model, Barrier Penetration-Theory of Spontaneous fission, Nuclear Energy Sources, Nuclear Fission as a source of Energy, The Nuclear Chain Reaction, condition of controlled chain Reaction, The principal of Nuclear Reactors, classification of Reactors, Typical Reactors, Power of Nuclear Reactor, Critical size of Thermal Reactors, The Breeder Reactor, Reprocessing of the Spent Fuel, Radiation Damages and Fission Product Poisoning, Uses of Atomic Energy.

Unit-III

Nuclear Fusion: The sources of stellar Energy, The Plasma-Fourth State of the Matter, fusion Reaction, Energy Balance and Lawson Criterion, Magnetic Confinement of Plasma. Classical plasma Losses from the Magnetic Container, Anomalous Losses, Turbulence and plasma Instabilities, The Laser fusion Problem, fusion Reactor:

Elementary particles: Classification of Elementary Particles, Quantum Numbers, Fundamental Interactions, Unified approach (Basic ideas), The conservation Laws, Quarks basic idea of color and quark confinement.

Unit-IV

Accelerators: Ion sources, Cock-Craft-Walton High Voltage Generators, Van De- Graff Generators, Drift Tube Linear Accelerators, Wave Guide Accelerator, Magnetic Focussing In cyclotron, Synchrocyclotron, Betatron, the Electromagnetic Induction Accelerator, Electron Synchrotron, Proton Synchrotron.

Unit-V

University Campus: Alaniya, Kota 325 003, Rajasthan Ph: +91-80941-62999

City office: CP Tower (4th Floor), IPIA, Road No-1, Kota (Raj.) -324005 Ph: +91-744-3040045 Fax: +91-744-3040050

Particle and Radiation Detectors: Ionisation Chamber, Region of Multiplicative Operation, Proportional Counter, Geiger-Muller Counter, Cloud Chamber.

Cosmic Rays: Discovery of Cosmic Rays, Nature of Cosmic Rays, soft and hard component variation in cosmic rays- (1) Latitude Effect (2) East-West Asymmetry Directional Effect Altitude Effect. Detection of cosmic Ray particles, Origin of Cosmic Rays

PHL031-III: Elementary Quantum mechanics and Spectroscopy

Unit-I

Experimental Evidence of Quantum Theory: limitations of classical theory to explain and specific heat of solids, Black Body Radiation, Planck's quantum hypothesis and qualitative discussion of radiation law, photoelectric effect, Compton effect, Matter Waves, De Broglie relation, Davison Germer experiment, electron interference experiment, Uncertainty principle (i) Position & moments (ii) Energy & Time (iii) Angular displacement and momentum. its application such as (i) Non existence of electron in nucleus, (ii) Ground state energy of H-atom, (iii) Ground state energy of harmonic oscillator (iv) Natural width of spectral lines.

Unit-II

Schrodinger's Wave Mechanics: Schrodinger's equation, Its need and justification, time dependent and time independent forms, physical significance of the wave function and its interpretation, probability current density. Operators in quantum mechanics, Definition of an operator, linear and Hermitian operators, State function, Expectation value of dynamical variables, position momentum and energy, Fundamental postulates of quantum mechanics, Eigenfunction and eigen values Degenracy. Orthogonality of eigen function, Commutation relations, Ehrenfest's theorem and complementary wave packet, group and phase velocities, Principle of superposition, construction of one dimensional wave packet, its momentum representation, (Fourier transform), Gaussian wave packet its momentum representation (Fourier transform) Gaussian wave packet, Diffraction at a single slit, Uncertainty principle.

UNIT – III

Simple solution of Schrodinger's Equation: Time independent Schrodinger equation and stationary state solution, Boundary and continuity conditions on the wave function, particle in one dimensional box, Eigen function and eigen values, discrete energy levels, generalisation to three dimensions and Degenracy of levels. Potential steps and rectangular potential barrier, calculation of reflection and transmission coefficient. Qualitative discussion of the application to alpha decay, Square well potential problem calculation of transmission coefficient and resonant scattering (Ramsaur–Townsent effect).

Unit-IV

Bound state problems: Particle in one dimensional infinite potential well and finite depth potentialwell–energy eigen–values and eigenfunction, transcendental equation and its solution, Simple harmonic oscillator (one dimensional case) and qualitative discussion of its eigenfunctions, energy eigenvalues. Zero point energy, parity symmetric and antisymmetric wave function's with graphical representation. Schrodinger equation for a spherically symmetric potential, Schrodinger equation for a one electron atom in spherically coordinates, separation of variables, Orbital angular momentum and quantization spherical harmonics, energy levels of H–atom, Shapes of $n = 1$ and $n = 2$ wave functions, Average value of radius of H–atom.

Unit-V

Applications of Quantum Theory to Atomic Spectroscopy: Quantum features of spectra of oneelectron atoms, Frank–Hertz experiment and discrete energy states, Stern and Gerlach experiment, spin and magnetic moment, Spin orbit coupling and qualitative explanation of fine structure, Atoms in magnetic field Zeeman splitting of state Effect.

Molecular Spectroscopy: Qualitative features of molecular spectra, Rigid rotator discussion ofenergy, eigenvalues and eigenfunction, rotational energy levels of diatomic molecules, Rotational spectra, vibrational energy levels of diatomic molecules, vibrational spectra, vibrational rotational spectra.

University Campus: Alaniya, Kota 325 003, Rajasthan Ph: +91-80941-62999

City office: CP Tower (4th Floor), IPIA, Road No-1, Kota (Raj.) -324005 Ph: +91-744-3040045 Fax: +91-744-3040050

Books Suggested:

- 1.Solid State Physics by M.P.Saxena, S.S. Rawat and P.R. Singh College Book House.(Medium: Hindi/English)
- 2.Nuclear Physics by M.P.Saxena, S.S. Rawat and P.R. Singh College Book House.(Medium: Hindi/English)
- 3.Elementary Quantum Mechanics& Spectroscopy by M.P.Saxena, S.S. Rawat and P.R. Singh College Book House.(Medium: Hindi/English)

Physics Practical

Section –A

1. Determination of Planck's constant by photo cell (retarding potential method using optical filters, preferably five filters).
2. Determination of Planck's constant using solar cell.
3. Determination of Stefan's constant.
4. Study of the temperature dependence of resistance of semiconductor (four probe method).
5. Study of Iodine spectrum with the help of grating and spectrometer using ordinary bulb light.
6. Study of the characteristics of a GM counter and verification of inverse square law for the same strength of a radioactive source.
7. Study of β - absorption in a foil using GM counter.
8. To find the magnetic susceptibility of a paramagnetic solution using Quinck's method. Also find the ionic molecular susceptibility of the ion and magnetic moment of the ion in terms of Bohr magneton.
9. Determination of coefficient of rigidity as a function of temperature using torsional oscillators (resonance method).
10. Study of polarization by reflection from a glass plate with the help of Nicol prism and photo cell and verification of Brewster's law of Malus.
11. e/m measurement by Helical method.
12. Measurement of magnetic field using ballistic galvanometer and search coil study of variation of magnetic field of an electromagnet with current.
13. Measurement of electronic charge by Millikan's oil drop method.

Section-B

1. Study of a R-C transmission line at 50 Hz.
2. Study of a L-C transmission line (i) at fixed frequency (ii) at variable frequency.
3. Study of resonance in an LCR circuit (using air core inductance and damping by metal plate).
(i) at fixed frequency by varying C and (ii) by varying frequency.
4. (i) Recovery time of a junction diode and point contact diode. (ii) Recovery time as a function of frequency of operation and switching.
5. Design a Zener regulated power supply and study the regulation with various loads.
6. Study the characteristic of field effect transistor (FET) and design and study amplifier of finite gain.
7. Study the frequency response of transistor amplifier and measure the input and output impedances (frequency response with change of value of R and C components).
8. Design and study of an R-C phase shift oscillator.
9. Study voltage multiplier circuit to generate high voltage D.C. from A.C.
10. Using discrete components, study OR, AND, NOT logic gates compare with TTL integrated circuits IC's.
11. Applications of operational amplifier as (minimum two of the following exercises):
(i) Inverter (ii) Non-Inverter (iii) Differentiator (iv) Integrator.

University Campus: Alaniya, Kota 325 003, Rajasthan Ph: +91-80941-62999

City office: CP Tower (4th Floor), IPIA, Road No-1, Kota (Raj.) -324005 Ph: +91-744-3040045 Fax: +91-744-3040050

MAL031-I: Linear Algebra and Complex

Unit-I

Definition and examples of a vector space, Subspace of a vector space, Linear combination and Linear span, Linear dependence and independence of vectors, direct sums of subspaces.

Unit-II

Basis and dimension of finitely generated spaces. Quotient space, Linear transformation, Rank and nullity of linear transformation.

Unit-III

Characteristic values and characteristic vectors of matrices, Eigenvalues and eigenvectors, Cayley-Hamilton theorem, Algebra of matrices, rank and determinant of matrices, linear equations.

Unit-IV

Complex numbers as ordered pairs. Geometric representation of complex numbers. Stereographic projection, Limit, Continuity and differentiability of a complex valued function. Analytic functions. Cauchy-Riemann equations. Harmonic functions. Determination of conjugate function.

Unit-V

Mapping or Transformation, Isogonal and conformal mappings necessary and sufficient conditions for a conformal mapping. Mobius Transformation, Fixed points, Cross ratio, Inverse points, Mapping.

MAL031-II: Mathematical Statistics and Linear programming

Unit-I

Central moments, first four central moments in terms of raw moments and vice-versa. Karl-Pearson's Beta and Gamma coefficients. Measure of skewness and kurtosis. Random experiment. Sample space, Event, Types of events, Probability and Conditional probability of an event. Independent events, Theorems of compound and total probabilities, Baye's Theorem and its simple applications.

Unit-II

Random variable, discrete and continuous random variables, Probability distribution of a discrete random variable, Probability density function of a continuous random variable. Distribution functions, Mathematical expectation of a random variable and of a function of random variable, Moments and Moment generating function, Cumulant generating function and cumulants, Characteristic functions.

Unit-III

Discrete and continuous distributions with properties: Bernouli, Binomial, Poisson and Normal.

Unit-IV

University Campus: Alaniya, Kota 325 003, Rajasthan Ph: +91-80941-62999

City office: CP Tower (4th Floor), IPIA, Road No-1, Kota (Raj.) -324005 Ph: +91-744-3040045 Fax: +91-744-3040050

Linear programming, Variables, Objective function, Constraints and Mathematical form of a LPP. Graphical method of solution of two variable linear programming problems. Line and line segment in the Euclidean space R^n , Convex set, Hyperplane convex combination, convex polyhedron, Extreme point of a convex set. Basic solution of a system of linear equations. Slack and surplus variables. Standard form of a LPP. Feasible solution, BFS and optimal BFS of a LPP. Replacement of basis vector. Improved BFS. Unbounded solutions, Conditions of optimality. Simplex algorithm, Artificial variable, Charne's Big M-method.

Unit-V

Dual and primal. Problem Standard form of a primal problem. Formation of dual of a standard primal problem. Fundamental theorem of duality. Solution of a LPP by solving its dual by simplex method. Assignment problems.

MAL03-III: Numerical and C- Programming

Unit-I

Principles of C Programming: Algorithms, Flowcharts, Constants, Variables, Data type, Declaration of storage class, assigning values of variables, symbolic constant. Operators and Expressions. Common I/O operators decision making, branching and loops: if, if-else, Nested if-else, WHILE, DO, for loop, while statement, switch-case statement. Array: One dimensional, Two dimensional. Initialization of two dimensional arrays.

Unit-II

User defined function in C: function declaration, calling a function, Category of function, nesting of functions recursion, Pointers.

Operators: forward difference, backward difference, Shift E, Inverse shift E-1, Differentiation D, Central - Difference, mean difference, Central sum, Divided difference, Inter relation between various operators, Forward and backward difference table. factorials notation.

Unit-III

Interpolation with equal and unequal intervals, Central difference interpolation, inverse interpolation.

Unit-IV

Numerical differentiation and Numerical –Integration: Gauss quadrature formula –Trapezoidal rule, Weddle rule, Simpson's 1/3 rules, Simpson's 3/8 rule, Boole's rule.

Unit-V

Solution of equations: Bisection method, regula-falsi method and Newton- Raphson method Solution of ordinary differential equations: Picard's method and Euler's method.

Books Suggested:

1. Linear Algebra by Dr. D.C. Gokhroo, Navkar Prakashan.(Medium: Hindi/English)
2. Complex Analysis by Dr. D.C. Gokhroo, Navkar Prakashan.(Medium: Hindi/English)
3. Mathematical Statistics by Dr. D.C. Gokhroo, Navkar Prakashan.(Medium: Hindi/English)
4. Statistics by Dr. D.C. Gokhroo, Navkar Prakashan.(Medium: Hindi/English)

University Campus: Alaniya, Kota 325 003, Rajasthan Ph: +91-80941-62999

City office: CP Tower (4th Floor), IPIA, Road No-1, Kota (Raj.) -324005 Ph: +91-744-3040045 Fax: +91-744-3040050

5. Numerical Analysis by Dr. D.C. Gokhroo, Navkar Prakashan.(Medium: Hindi/English)
6. C- Programming by Dr. D.C. Gokhroo, Navkar Prakashan.(Medium: Hindi/English)

Mathematics Practical

1. To find the sum of HARMONIC SERIES.
2. To solve the quadratic Equation.
3. Evaluation of Binomial Coefficients Using do and while loops
4. To print a grouped frequency table using switch case statements.
5. To find minimum cost of operation which consists two components using Break and continue statements.
6. To Calculate the average of numbers.
7. To show a matrix using array.
8. To sort a list and calculate its median using array, If - then - else.
9. To find the Area of curve using trapezoidal rule.
10. To copy one string into another string.
11. Writing a string using % format.
12. To form a grouped frequency table using array and for loop.
13. To calculate the standard deviation of given data using array, If and break statements.
14. to open a file and appending using pointers.

University Campus: Alaniya, Kota 325 003, Rajasthan Ph: +91-80941-62999

City office: CP Tower (4th Floor), IPIA, Road No-1, Kota (Raj.) -324005 Ph: +91-744-3040045 Fax: +91-744-3040050

Course Scheme of B.Sc. B.Ed. Part-IV

Annual Course Scheme of B.Ed. Part-IV				
Branch-Mathematics				
S.No.	Paper Code	Paper Name	Marks	
			Min. Marks	Max. Marks
1	ENL041	Environmental Studies*	36	100
2	EDL041-I	Creating an inclusive school	36	100
3	EDL041-II	Understanding Disciplines and Subject	36	100
4	EDL041-III	Physical Education & Yoga	36	100
5	EDL041-IV	Gender, School and Society	36	100
6	EDL041-V	Assessment for Learning	36	100
7	EDL041-VI	Pedagogy of a School Subject (part-1) , 1st & IInd Year (candidate shall be required to offer any two papers from the following for part-1 & other for part-2). 1. General Science 2. Biology Physics 3. Chemistry 4. Mathematics 5. Physics	36	100
8	Practicum	1. Micro Teaching, 2. Internship (Practice teaching 2. Block Teaching (Participation in School Activities Social Participation in Group) 3. Report of any feature of School /case study/ action research)		100
9		4. Final Lesson		100
				G.T. 800

University Campus: Alaniya, Kota 325 003, Rajasthan Ph: +91-80941-62999

City office: CP Tower (4th Floor), IPIA, Road No-1, Kota (Raj.) -324005 Ph: +91-744-3040045 Fax: +91-744-3040050

Syllabus of B.Sc. B.Ed. Maths Part IV

ENL041: Environmental Studies

Unit-I

Introduction: the multidisciplinary nature of environmental, studies: Definition, scope and important need for public awareness

Unit-II

Natural Resources: Renewable and non-renewable resources, natural resources and associated problems.

Forest resources: use and overexploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forest, and tribal people

Water resources: use and overutilization of surface and groundwater, floods, drought, conflicts over water, dams-benefits and problems.

Mineral resources: use and exploitation, environmental effects of extracting and using mineral resources, case studies.

Food resources: world food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer pesticide problems, water logging, salinity, case studies.

Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources, case studies.

Land resources: land as a resource, land degradation, man induced landslides, soil erosion and desertification. Role of an individual

in conservation of natural sources. Equitable use of resources for sustainable lifestyles.

Unit-III

Concept of an eco-system: Structure and function of an ecosystem. Producers, consumers and decomposers. Energy flow in the ecosystem Ecological succession Food chains, food webs and ecological pyramids Introduction, type, characteristic, features, structure and function of the following ecosystem: a. Forest eco system grassland eco system desert ecosystem Aquatic ecosystems (ponds, streams, lakes)

Unit- IV

Bio diversity and its conservation Introduction definition: genetic, species and ecosystem diversity.

Bio Geographically classification

of India. Value of biodiversity: Consumptive use, productive use, social, ethical, aseptic and option values Biodiversity at global, National and local levels. India as a megadiversity nation Hot-spots of biodiversity. Threats to biodiversity: habitat loss, poaching of wildlife, man- wildlife conflicts Endangered and endemic species of India Conservation of biodiversity: in-situ and Ex-situ conservation of biodiversity.

Unit-V

Disaster Management & Environmental Pollution Disaster: Types – Natural and Manmade; Detailed study of the following –Earthquakes, Volcanic eruption, Landslides, Flood, Drought, Fire, Nuclear and Chemical disaster and their management. Causes, effects and control measures of Air pollution Water pollution Soil Pollution Marine pollution Noise pollution Thermal pollution Radioactive Pollution

Unit- VI

Social Issues and the Environment from Unsustainable to sustainable development Urban problems related to energy Water conservation, rain water harvesting, watershed management Resettlement and rehabilitation of people; its problems and concerns, case studies.

Environmental ethics: issues and possible solutions. Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies Wasteland reclamation. Consumerism and waste products. Environmental protection Act. Air (Prevention and Control of Pollution) Act. Water (Prevention and Control of Pollution) Act. Wild life protection Act. Forest conservation Act. Issues involved in enforcement of environmental legislation. Public awareness. Road and safety measures.

Unit-VII

University Campus: Alaniya, Kota 325 003, Rajasthan Ph: +91-80941-62999

City office: CP Tower (4th Floor), IPIA, Road No-1, Kota (Raj.) -324005 Ph: +91-744-3040045 Fax: +91-744-3040050

Human Population and the Environment Population growth, variation among nations. Population explosion family welfare programme. Environment and human health Human rights Value education. HIV/AIDS. Women and child welfare. Role of information technology in environment and human health Case studies

EDL041-I: Creating and inclusive school

Objectives

The Course will enable the student teachers to-

- To demonstrate knowledge of different perspectives in the area of education of children with disabilities.
- To reformulate attitudes towards children with special needs.
- TO use specific strategies involving skills in teaching special need children in inclusive classrooms.
- To modify appropriate learner – friendly evaluation procedures.
- To incorporate innovative practices to respond to education of children with special needs.
- To contribute to the formulation of policy.
- To implement laws pertaining to education of children with special needs.

Unit-I

PARADIGMS IN EDUCATION OF CHILDREN SPECIAL NEEDS

- Historical perspectives and contemporary trends approaches of viewing disabilities:
- The charity model, the bio centric model, functional model and the human rights model.
- Concept of special education, integrated education and inclusive education; Philosophy of inclusive education.

Unit- II

LEGAL AND POLICY PERSPECTIVES RTE Act, 2009.

- National Policy – Education of students with Disabilities in the National Policy on Education, 1968, 1986.
- POA (1992); Education in the National Policy on Disabilities, 2006.

Unit-III

SCHEME OF INCLUSIVE EDUCATION

- Education of Special Focus Groups under the sarva Shiksha Abhiyan (SSA, 2000);
- MHRD, 2005, Scheme of Inclusive Education for the Disabled at Secondary School (IEDSS, 2009), National Trust and NGOs.
- Community-based education.

Unit- IV

CLASS ROOM MANAGEMENT

- Class Room management – meaning and approaches
- School's readiness for addressing learning difficulties
- Technological advancement and its application – ICT, adaptive and assistive devices, equipments and other technologies for different disabilities.

Unit-V

INCLUSIVE PRACTICES IN CLASSROOMS FOR ALL

- Pedagogical strategies to respond to individual needs of students: Cooperative Learning strategies in the classroom, peer tutoring, social learning, buddy system, reflective teaching multisensory teaching, etc.
- Documentation, record keeping and maintenance.

University Campus: Alaniya, Kota 325 003, Rajasthan Ph: +91-80941-62999

City office: CP Tower (4th Floor), IPIA, Road No-1, Kota (Raj.) -324005 Ph: +91-744-3040045 Fax: +91-744-3040050

- Teacher role in classroom management

Any one of the following –

- Case study of a Learner with Special needs.
- Making a Report of Visit to a resource room of SSA.
- Interviewing a teacher working in an Inclusive School.

Books Suggested:

1. Dunn., L & Bay, D.M. (ed.) Exceptional Children in the Schools, New York Holt, Rinehart, Winston.
2. Hallahar, D.P. & Kauffman, J.M., Exceptional Children: Introduction to Special Education, Allyn & Bacon, Massachusetts, 1991
3. Hewett, Frank M. & Foreness Steven R., Education of Exceptional Learners, Allyn & Bacon, Massachusetts, 1984.
4. Kirk, S.A & Gallagher J.J., Education of Exceptional Children ; Houghton mifflin Co., Boston, 1989.
5. Magnifico, L.X.: Education of the Exceptional Child, New York, Longman.
6. Shanker Udey: Exceptional Children, Jullundur : Sterling Publications.
7. Singh, N.N. and Beale, I.L. (eds.) Learning Disabilities – Nature, Theory and Treatment Spring-Verlag, New Yourk, Inc: 1992.

EDL041-II: Understanding Disciplines and Subjects

Objectives

After Completing the Course the students will be able:

- To develop an understanding of the nature of disciplinary knowledge in the school curriculum.
- To acquire a conceptual understanding of the impact of school subjects on disciplines.
- To develop interest, attitudes and knowledge about the content in respect of framing the syllabus.
- To build up a professional, disciplinary and curriculum programme.

Unit-I

Meaning and concept of disciplinary knowledge

- The Nature and role of disciplinary knowledge in the school curriculum.
- Relationship of Disciplinary areas with school subject.
- Difference between disciplines & Interdisciplinary Subject.

Unit-II

School Subjects on Disciplines Impact of Social science Subject on Disciplines:

- Social Science: Method: Lecture method, Project method, Supervised study, Story, telling, Biographical, Source Method, Brain-Storming Dramatization, Experimental Learning.

Unit-III

Impact of science and maths subject on disciplines.

- Science: Methods & Techniques of Teaching Science: Brain Storing, Laboratory, Demonstration, Project & Field visit, Constructive Learning, Concept Mapping, Heuristic Learning & Problem Solving, Group Discussion & Panel Discussion
- Maths: Methods of teaching mathematics: Lecture, Inductive, Analytic, Synthetic, Heuristic, Project, Problem solving, and Laboratory methods & techniques of Teaching Mathematics: Questioning, Brain Storming, Role playing, Simulation, non-formal techniques of learning Mathematics.

Unit-IV

Impact of Language subject on disciplines

University Campus: Alaniya, Kota 325 003, Rajasthan Ph: +91-80941-62999

City office: CP Tower (4th Floor), IPIA, Road No-1, Kota (Raj.) -324005 Ph: +91-744-3040045 Fax: +91-744-3040050

- Language: Story Novel, Poetry, Personal Essay, Pen Portrait. Travelogue, Self-Narration Memories.
- Redefinition of the school Subject with concern to social Justice
- Meaning of Social Cultural perspective in context of Universal education

Unit-V

Process and framing of disciplines and subjects

- Recognized the theory of content, Principles and process of preparing the syllabus and content
- Practical Knowledge, Community & Co-curricular activity Knowledge with reference to Disciplinarily and Relation with school Curriculum
- Creativity development of learning through horticulture and hospitality

Any one of the following –

- Prepare charts with related language (Hindi, English, or Sanskrit)
- Preparation of a talk with related social justice.
- Collection of newspapers cutting related with horticulture and hospitality.
- Prepare a lab with science and maths tools and their operation
- Life sketch and contribution of two Indian Scientists and socialistic.
- Study of any one aspect of social and prepare a report
- Preparation of Five (5) word cards, 5 picture cards and word puzzles (Language)
- 5 Microteaching skills & 5 micro-teaching (based on different innovative methods)

Books Suggested:

1. Apply: M.W. (2008) can school contribute to a more just society education citizenship and social justice, 3 (3) 239-261
2. Brantom F.K.: The teaching of social studies in changing world
3. Chash, S.C. (2007) history of education in India, NCERT (2005) National Curriculum frame work NCERT
4. Clinton Golding of the centre study of higher Integrating of Disciplines.
5. Daman.c Howard, Rastman, Meil (1965) "the uses of language "New yark.Holt Rinchyart and winstan. Inc.
6. Dengz. Z 92013) School subject and academic discipline in a luke a woods, B.K. weir (Eds) curriculum, syllabus design and equity: A priner and model Rutledge
7. Egen, Marlow & Rao, D.B. 2003 Teaching Successfully, Discvery Pub. House New Delhi
8. Freeman Diane-Larsen (2000) Technigues and Principles in language teaching oxford:049.
9. Sharma L.M. 1977 (Teaching of Science & Life Science Dhanpat Rai & Sans. Delhi.)
10. Westey, Edgar Brose: Social Studies for School.

EDL041-III: Physical Education and Yoga

Objectives

After Completing the course the students will be able:

- To enable them to understand the need & importance of Physical Education.
- To acquaint them to allied areas in Physical Education.
- To sensitize the student teacher towards physical fitness & its importance.
- To make them aware of the benefits of physical fitness & activities for its development.
- To help them acquire the skills for assessment of physical fitness.
- To introduce them to the philosophical bases of yoga.
- To introduce them to types of Yoga & its importance.
- To motivate them to resort to physical activity for the fitness development.
- To help them understand the procedure of healthrelated fitness evaluation.

University Campus: Alaniya, Kota 325 003, Rajasthan Ph: +91-80941-62999

City office: CP Tower (4th Floor), IPIA, Road No-1, Kota (Raj.) -324005 Ph: +91-744-3040045 Fax: +91-744-3040050

Unit-I

PHYSICAL EDUCATION

- Introduction, Definition and Meaning of physical education
- Objectives of physical education
- Scope of physical education & allied areas in Physical Education

Unit-II

PHYSICAL EDUCATION AND METHODS

- Need & Importance of physical education in different levels or school (sec. and sr. sec. level)
- **Training methods:**Development of components of physical fitness and motor fitness through following training methods (continuous method, interval method, circuit method, fartlek/speed play and weight training)
- Development of Techniques and Tactics.

Unit- III PHYSICAL FITNESS

- Definition, Meaning, Types and factors of physical fitness
- Factors affecting physical fitness • Benefits Physical Fitness

Unit-IV

PHYSICAL FITNESS AND YOGA ACTIVITIES

- Need of physical activities at school level
- Importance of physical activities at schools level
- Assessment of physical fitness
- Introduction, Meaning and mis-concepts of Yoga
- Ashtang Yoga (8 stages of Yoga)
- Types of Yoga
- Importance of Yogasanas, Pranayama and Shudhikriya
- Importance of Meditation in school

Unit-V

Human abilities and Yoga in Indian Context

- Education and Yoga – Promotion of intelligence, awareness and creativity through yoga, yoga in Classrooms (Primary, Secondary and Higher education levels).
- Stress and Yoga:Stress – Definition, Causes, Symptoms complications in life; Yogic management of stress related disorders – Anxiety, Depression and suicidal tendencies.
- Learning and performing of basic yogic activities
- Health and physical education relationship with other subject areas like science, social science and languages.
- Fundamental skill of games/sports and yoga

Books Suggested:

- Kunalayananda, Swami, Pranayama, (1983), Popular Prakashan Bombay.
- Kunalayananda, Swami, Asanas, (1983) Popular Prakashan Bombay English/Hindi.
- Lal, Raman Bihari. (2008). Siksha Ke Daarshnik Evam Samajshastriye Sidhant Meerut, Rastogi Publications.
- Nagendra, H.R. (1993). Yoga in Education. Bangalore, Vivekananda Kendra.
- Niranjananada, Swami. (1998). Yoga Darshan, Deoghar, Panchadashanam Paramahansa Alakh Bara.
- Rai, Lajpat Sawhney, R.C. and Sevvamurthy, W. Selvamurthy (1998). Meditation Techniques, their Scientific Evaluation. Gurgaon, Anubhav Rai Publication.
- Raju, P.T. (1982). The Philosophy Tradition of Delhi. Moti Lal Banarsi Dass.
- Ram, Swami. (1999). A Practical Guide to Holistic Health, Pennsylvania, Himalayan Institute of Yoga.

University Campus: Alaniya, Kota 325 003, Rajasthan Ph: +91-80941-62999

City office: CP Tower (4th Floor), IPIA, Road No-1, Kota (Raj.) -324005 Ph: +91-744-3040045 Fax: +91-744-3040050

- Reyna, Ruth. (1971). Introduction to India Philosophy New Delhi, Tata McGraw Hill Publishing Co. Ltd

EDL041-IV: Gender, School and Society

Objectives

After Completing the course the students will be able:

- To develop basic understanding familiarity with key concepts-gender bias, gender stereotype, empowerment, gender parity, equity and equality, patriarchy and feminism and transgender,
- To understand some important landmarks in connection with growth of women's education in historical and contemporary periods.
- To learn about gender issues in school, curriculum, textual materials across disciplines, pedagogical processes and its intersection with class, caste, religion and region;
- To understand the need to address gender based violence in all social spaces and evolves strategies for addressing.

Unit-I

Gender Issues: Key Concepts

- Gender, Sexuality, Patriarchy, Masculinity and Feminist
- Gender Bias, Gender Stereotyping and Empowerment
- Equity and Equality in Relation with caste, Class Religion, Ethnicity, Disability and Region. • Issues and Concerns of Transgender

Unit-II

Socialization Processes in India: Family, School and Society

- Gender Identities and Socialization Practices in different types of families in India.
- Gender Issues in Curriculum-Gender, Culture and Institution: Intersection of Class, Caste, Religion and Region – Construction of Gender in Curriculum Frameworks since Independence: An Analysis-Gender and the hidden curriculum – Gender in text and classroom processes – Teacher as an agent or change-Life skill and sexuality.
- Sites of Conflict: Understanding the Importance of addressing sexual abuse in family, Neighbourhood and School and in other formal and informal institutions.

Unit-III

Gender Issues in Curriculum Gender, Culture and Institution:

Intersection of class caste, Religion and Region – Construction of gender in curriculum Framework since Independence: An Analysis – Gender and the hidden curriculum – Gender in Text and classroom processes – Teacher as an agent of change – Life skills and sexuality.

Unit-IV

Gender Studies:

Historical Perspectives on Education Historical Backdrop: Some Landmarks in Socio-Economic and education upliftment of Girls and Women.

Unit-V

Constitutional Commitments

- Report of Commissions and Committees, Policy initiatives.
- Schemes and Programmes on Girls Education and overall Development of women for Addressing Gender Discrimination in Society

Any one of the following –

- Preparation of Project on Key Concepts and its operational definitions relating it with the Social Context of the teachers and students.
- Analyses Textual Materials from the Perspective of Gender Bias and Stereotype.
- Organize Debates on Equity and Equality cutting across Gender, Class, Caste, Religion, Ethnicity Disability and Region.

University Campus: Alaniya, Kota 325 003, Rajasthan Ph: +91-80941-62999

City office: CP Tower (4th Floor), IPIA, Road No-1, Kota (Raj.) -324005 Ph: +91-744-3040045 Fax: +91-744-3040050

- Prepare a project on Issues and Concerns of Transgender.
- Project on analyzing the growing up of Boys and Girls in different types of family in India.

Books Suggested:

- Desai, Neera and Thakkar, Usha. (2001). Women in Indian society. National Book Trust, New Delhi.
- Dunne, M. et al. (2003) Gender and Violence in Schools. UNESCO.
- Kirk Jackie e.d., (2008). Women Teaching in south Asia, SAGE, New Delhi
- Leach, Fiona. (2003). Practising Gender Analysis in Education, Oxfam
- National Curriculum Framework 2005: Position Paper, National Focus Group on Gender Issues in Education, 3.2, NCERT, 2006.
- Nayar, Sushila and Mankekar Kamla (ed.) 2007, 'Women Pioneers in India's Renaissance, National Book Trust, New Delhi, India.
- Sherwani, Azim. (1998.). the girls child in crisis. Indian Social Institute, New Delhi.
- Srivastava Gouri, (2012), Gender and Peace in Textbooks and Schooling Processes, Concept Publishing Company Pvt. Ltd. New Delhi
- UNICEF (2005 and Beyond – Accelerating Girls' Education in South Asia. Meeting Report.
- Unterhalter, Elaine. (2007) Gender, Schooling and Global Social Justice, Routledge.
- Srivastava Gouri, (2012), Gender and Peace in textbooks and Schooling Processes, Concept Publishing Company Pvt. Ltd, New Delhi
- UNICEF (2005). 2005 and Beyond –Accelerating Girls' Education in South Asia Meeting Report.
- Unterhalter, Elaine (2007). Gender, Schooling and Global Social Justice, Routledge.

EDL041-V: Assessment for Learning

Objectives

After Completing the course the students will be able:

- Understand the process of evaluation
- Develop the skill in preparing, administering and interpreting the achievement test.
- Understand and use different techniques and tools of evaluation for learning.
- Comprehend the process of assessment for learning.
- Develop skill necessary to compute basic statistical measures to assess the learning

Unit-I

Basic Concepts and Overview

- Basic Concepts: assessment, evaluation, measurement, test examination, formative and summative evaluation, continuous and comprehensive assessment mandated under RTE, and grading.
- Purpose of assessment in different paradigms: (a) behaviourist (with its limited view on learning as behaviour), (b) constructivist paradigm and (c) socio-culturalist paradigm; distinction between 'assessment of learning' and assessment for learning; assessment as a basis for taking pedagogic decisions.
- Self-assessment and peer assessment

Unit-II

Analysis of Existing Practices of Assessment

- Records used in Assessment:
 - a) Profiles: Meaning steps involved and criteria for developing and maintaining a comprehensive learner profile.
 - b) Evaluation rubric: Meaning, Construction and Uses
 - c) Cumulative records: Meaning, Significance.
- Ethical Principles of Assessment Examination Reforms
 - a. Continuous and Comprehensive Evaluation (CCE)
 - b. Choice Based Credit System (CBCS)
 - c. open Book Examination.

Unit-III

University Campus: Alaniya, Kota 325 003, Rajasthan Ph: +91-80941-62999

City office: CP Tower (4th Floor), IPIA, Road No-1, Kota (Raj.) -324005 Ph: +91-744-3040045 Fax: +91-744-3040050

Assessment in the Classroom and Record Keeping

- Expanding notice of learning in a constructivist perspective.
- Ability to develop indicators for assessment.
- Task for assessment: Projects, assignments.
- Formulating task and questions that engage the learner and demonstrate the process of thinking.
- Scope for original responses, observation of learning processes by self, by peers, by teacher.
- Organizing and planning for student portfolios and developing rubrics for portfolio assessment, teacher' diaries and group activities for assessment.

Unit-IV

INTERPRETING TEST SCORES

- Presentation and organization of data: Frequency distribution
- Graphical Presentation of data: Frequency p.....
- Measures of Central Tendency : Mean, Median, Mode
- Measures of Variability : Quartile Deviation, Standard Deviation
- Percentile and Percentile Rank
- Rank difference method by spearman's Co-efficient of correlation, Types of Correlation • Normal Probability Curve : Properties, Uses

Unit-V

Feedback

- Feedback: meaning, importance and types
- Feedback as an essential component of assessment; types' of teacher feedback (Written and oral).
- Feedback to students and feedback to parents; peers' feedback, scores, grades and qualitative descriptions, developing and maintaining a comprehensive learner profile.
- Challenges of assessments.

Any one of the following –

- Developing an achievement test with its Blue Print, Answer Key and Marks Distribution.
- Developing a Portfolio/Profile/Evaluation Rubric (format).
- Evolution of available Unit test and reformation of the same.
- Designing Questionnaire/Interview Schedule on a given topic
- Preparing any four evaluation tools for Formative Assessment.

Books Suggested:

- Deshpande, J.V. Examining the Examination System Economic & Political Weekly, April 17, 2004 Vol XXXIX, No. 16. Nawani, D (2015).
- Re-thinking Assessments in School, Economic & Political Weekly, Jan 17, Vol, No.
- Nawani, D (2012) Continuously and comprehensively evaluating children, Economic & Political Weekly, Vol. XLVIII, Jan 12, 2013
- NCERT (2007) National Focus Group Paper on Examination Reforms S.K. (1994).
- Applied Statistics for Education, Mittal Publications.
- Garrett, H.E. (2008). Statistics in Psychology and Education Delhi: Surjeet Publication.
- Mrunalini, T. (2013). Educational Evaluation. Hyderabad: Neelkamal Publication Pvt. Ltd

University Campus: Alaniya, Kota 325 003, Rajasthan Ph: +91-80941-62999

City office: CP Tower (4th Floor), IPIA, Road No-1, Kota (Raj.) -324005 Ph: +91-744-3040045 Fax: +91-744-3040050