Scheme & Syllabus

For

B.Sc.B.Ed (4 Years Integrated Course)

1st To 8th SEMESTER

Syllabi Applicable For Admissions in 2017-18 Onwards

TABLE OF CONTENTS

SECTION 1
VISION & MISSION OF THE UNIVERSITY

VISION

To become one of the most preferred learning place a centre of excellence to promote and nurture future leaders who would facilitate in desired change in the society.

MISSION

- To impart teaching and learning through cutting edge technologies supported by the world class infrastructure
- To empower and transform young minds into capable leaders and responsible citizens of India instilled with high ethical and moral values
- To develop human potential to its fullest extent and make them emerge as world class leaders in their professions and enthuse them towards their social responsibilities.

SECTION 2
VISION & MISSION OF THE DEPARTMENT

VISION

To enable the teacher trainees discover their special talent and develop self confidence for better adjustment

To aspire teacher trainees to contribute in Nation building

To help them to become ethical, civic minded and committed leaders

To enable them to become catalysts in the never ending process of education.

MISSION

- To enable teacher trainees to be exemplary teachers, leaders and models for the society who are caring, committed, competent, efficient and resilient teachers. The institution also instills in them confidence and will to serve the cause of teaching and humanity.

SECTION 3
ABOUT THE PROGRAM

The course is of four years duration. During the course of this program the student is required to study the subjects related to Arts/Science along with the subjects related to Education. The student gets training in pedagogical subjects and gets familiar with different aspects of teaching methodology.

SECTION 4

Program Educational Objectives(PEOs)
Program Outcomes(Pos) and
Program Specific Outcomes(PSOs)

PROGRAM EDUCATION OBJECTIVES (PEOs)

PEO1	Understand basic concepts and ideas of educational theory.
PEO2	Build understanding and perspective on the nature of the learner, diversity and learning.
PEO3	Analyze the structure of knowledge as reflected in disciplinary streams and subjects.
PE04	Develop an understanding of the concept of assessment and its practices.

PROGRAM OUTCOMES (POs)

PO 1	**Teaching competency:** Know, select and use of learner-centred teaching methods, understanding of paradigm shift in conceptualizing disciplinary knowledge in school curriculum, necessary competencies for organizing learning experiences, select and use of appropriate assessment strategies for facilitating learning.
PO 2	**Pedagogical skills:** Applying teaching skills and dealing with classroom problems.
PO 3	**Teaching Through Nonconventional Modes:** Evolving a system of education which enhances the potential of every learners to acquire, retain and transform knowledge leading to wisdom society through creative, experiential and joyful modes of learning.
PO 4	**Critical Thinking:** Analysis of Curriculum, construction of blue print, selecting appropriate teaching strategies according to needs of students and conducting action research to solve classroom problems.
PO 5	**Effective Communication:** Presenting seminar before peer students and teachers and practicing communication skills through various linguistic activities and applying it for better classroom communication.
PO 6	**Self-directed Learning:** Preparing scripts for seminars, lesson plans and online content.
PO 7	**Team Work:** Enable to work as a member or leader in diverse teams and in multi-disciplinary settings by following the principles of collaborative learning, cooperative learning and team teaching.
PO 8	**Inclusive learning Environment:** Design and establish a conductive and inclusive learning environment for diverse learners.
PO 9	**Understand and examine different trends** and issues in assessment as well as the various methods of evaluation in teaching learning process.

PO 10	**Work respectfully and collaboratively** with colleagues and community to ensure quality instructional programs for schools.

PROGRAM SPECIFIC OUTCOMES (PSOs)

PSO 1	Enable to comprehend the development in physical, cognitive, social and emotional areas, contemporary issues and educational policies of education system in India, teaching-learning methods, strategies, epistemological basis of education, school management, professional ethics and observation of school activities by school internship.
PSO 2	Understand the individual differences among students, measuring the attainment, evaluating progress, and assessing learning abilities, guidance programmes and administering psychological tools, ICT based Communication and teaching and lesson planning.
PSO 3	Interactive processes wherein group reflection, critical thinking and Meaning making will be encouraged

SECTION 6
Detailed Syllabus with Course Outcomes
SECTION 5
Curriculum / Scheme with Examination Grading Scheme

Sr.No	Name of School	Course	Branch	Batch onwards	Pass%	Minimum Requirement	Grade Table			
							Marks Range	Grade	Grade Point	Qualitative Meaning
1	School of Education	B.Sc.B.Ed	Education	2017	35 %	25%	80-100	O	10	OUTSTANDING
							70-79	A+	9	EXCELLENT
							60-69	A	8	VERY GOOD
							55-59	B+	7	GOOD
							50-54	B	6	ABOVE AVERAGE
							45-49	C	5	AVERAGE
							40-44	P	4	PASS
							0-39	F	0	FAIL
								AB	0	Absent

Program Name: B.Sc.B.Ed(Non-Medical)
Program Code: ED-1303

SYLLABUS

SEMESTER-I

Program Name: B.Sc.B.Ed(Non-Medical)
Program Code: ED-1303

SYLLABUS & STUDY SCHEME (2019 Batch Onwards)

B.Sc.B.Ed (4 Years Integrated Course)

First Semester:

COURSE		Contact Hours/Week			Credit	% of Total Marks					Exam Duration (Hours)
Code	Course Title	L	T	P		CWA	LWA	MTE	ETE	Total	
BPHY 1121	Mechanics	4	0	0	4	16	-	24	60	100	3
BPHY-1122	Physics Lab-I	0	0	2	1	-	60	-	40	100	3
BMAT 1121	Calculus-1	3	0	0	3	16	-	24	60	100	3
BMAT-1122	Algebra	3	0	0	3	16	-	24	60	100	3
BCHE-1123	Organic Chemistry-I	2	0	0	2	16	-	24	60	100	3
BCHE-1124	Physical Chemistry-I	4	0	0	4	16	-	24	60	100	3
BCHE-1125	Chemistry Lab-I	0	0	2	1	-	60	-	40	100	3
BHUM-1101	Communication Skills	2	0	0	2	16	-	24	60	100	3
BHUM-1102	Communication Skills Lab	0	0	2	1	-	60	-	40	100	3
Total		**22**	**0**	**6**	**25**						

Semester-I

SUBJECT TITLE: MECHANICS (BPHY-1121)
SUBJECT CODE: BPHY-1121
SEMESTER: I
CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
4	0	0	4

Internal Assessment: 40
End Term Exam: 60
Duration of Exam: 3 Hrs

Objective and outcome of Course: The purpose of the course is to train the students in the Newtonian Mechanics and Special Theory of Relativity formalisms to an extent that they can use these in the modern branches of Physics.

Contents of Syllabus:

Sr. No	Contents	Contact Hours
UNIT-I	Vector algebra, Scalar and vector products, Derivatives of a vector with respect to a parameter, Cartesian and spherical polar co–ordinate systems, area, volume, velocity and Acceleration in these systems, Solid angle, Relationship of conservation laws and symmetries of space and time. Centre of Mass, equivalent one body problem, central forces, Motion of a particle in a central force field (motion is in a plane, angular momentum is conserved, areal velocity is constant), equation of orbit & turning points, Kepler's Laws, Satellite in circular orbit and applications, Geosynchronous orbits, Weightlessness, Basic idea of global positioning system (GPS).	15
UNIT-II	Elastic collision in Lab and C.M system, velocities, angles and energies in these system, cross-section of elastic scattering, Rutherford scattering, Rotational motion: Angular velocity and angular momentum, Torque, Conservation of angular momentum, principal moments and Axes, Euler's equations, precession and elementary gyroscope.	15
UNIT-III	Frame of reference, Inertial frame of reference, Galilean transformation and Invariance, Non Inertial frames, coriolis force and its applications, Variation of acceleration due to gravity with latitude, Focault pendulum. Special Theory of Relativity: Concept of Ether and Michelson–Morley experiment, Constancy of speed of light, Postulates of Special Theory of Relativity, Lorentz transformations, Length contraction, Time dilation, Relativistic addition of velocities, Relativistic Doppler effect, Variation of Mass with velocity, Mass-energy relation, Relativistic momentum & energy, Transformation of momentum and energy, Concept of Minkowski space	15
UNIT-IV	Elasticity: Hooke's law - Stress-strain diagram - Elastic moduli-Relation between elastic constants - Poisson's Ratio-Expression for Poisson's ratio in terms of elastic constants - Work done in stretching and work done in twisting a wire - Twisting couple on a cylinder - Determination of Rigidity modulus by static torsion ,Torsional pendulum, Determination of Rigidity modulus and moment of inertia - q, η and V by Searles method.	15

Books Recommended:

1. Mechanics, Berkeley Physics, vol.1, C.Kittel, W.Knight, et.al., Tata McGraw-Hill, 2007
2. Physics, Resnick, Halliday and Walker, John Wiley, 2008
3. Mechanics, D.S. Mathur, S. Chand and Company Limited, 2000
4. The Special Theory of Relativity, S. Banerji& A. Banerji, Prentice Hall India, 2012

Instructions to Question Paper Setter: The question paper consist of three sections A, B & C. Section-A is compulsory consisting of short answer type questions (1 or 2 marks) from the whole syllabus. It should be of 12 Marks. Section-B consists of 8 questions and students will attempt any six questions. Each question carries 4 Marks. Section-C consists of 4 questions and Students will attempt any three questions. Each question carries 8 Marks.

SUBJECT TITLE:PHYSICS LABORATORY-I
SUBJECT CODE: BPHY-1122
SEMESTER: I
CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
0	0	4	2

Internal Assessment: 60
End Term Exam: 40
Duration of Exam: 3 Hrs

Objective and outcome of course : The laboratory exercises have been so designed that the students learn to verify some of the concepts learnt in the theory courses. They are trained in carrying out precise measurements and handling sensitive equipments.

Note: Students will be required to perform at least 10 experiments from the given list of experiments:

1. Measurements of length (or diameter) using vernier caliper, screw gauge and Travelling microscope.
2. To study the random error in observations.
3. To determine the height of a building using a Sextant.
4. To study the Motion of Spring and calculate (a) Spring constant, (b) g and (c) Modulus of rigidity.
5. To determine the Moment of Inertia of a Flywheel.
6. To establish relationship between torque and angular acceleration using flywheel.
7. To determine Coefficient of Viscosity of water by Capillary Flow Method (Poiseuille's method).
8. To determine the Young Modulus of a Wire by bending of beam Method
9. To determine the Modulus of Rigidity of a Wire by Maxwell's needle.
10. To determine the elastic Constants of a wire by Searle's method.
11. To determine the value of g using Bar Pendulum.
12. To determine the value of g using Kater's Pendulum.

Books Recommended:

1. A Text Book of Practical Physics, I.Prakash& Ramakrishna, KitabMahal, 2011
2. B.Sc Practical Physics, C L Arora, S. Chand & Company, 2010

SUBJECT TITLE: CACULUS-I
SUBJECT CODE: BMAT-1121
SEMESTER: I
CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
3	1	0	4

Internal Assessment: 40
End Term Exam: 60
Duration of Exam: 3 Hrs

Objective and outcome of course:
The objective of this course is to introduce the fundamental ideas of the differential and integral calculus of functions of one variable, Limits and continuity, Integrals, Fundamental Theorem, Techniques of Integration, Definite integrals.

Contents of Syllabus:

Sr. No	Contents	Contact Hours
UNIT-I	Real number system and its properties, lub, glb of sets of real numbers, Functions , limit of a function, Basic properties of limits, Continuous functions and classification of discontinuities, Uniform continuities	**10**
UNIT-II	Differentiation of hyperbolic functions, Successive differentiation, Leibnitz theorem and its applications, Taylor's and Maclaurin's theorem with various forms of remainders, Indeterminate forms Functions	**10**
UNIT-III	Reduction formulae, derivations and illustrations of reduction formulae of the type $\sin^n x\,dx$, $\int\cos^n x\,dx$, $\int\tan^n x\,dx$, $\int \sec^n x\,dx$, $\int(\log x)^n dx$, $\int \sin^n x \cos^m x\,dx$ and its other application for different examples. Convexity and Cancavity, Asymptotes ,Curve tracing: Tracing of Standard Cartesian; Parametric and Polar curves; Curvature of Cartesian, Parametric and Polar curves.	**15**
UNIT-IV	Rectification of standard curves; Areas bounded by standard curves; Volumes and surfaces of revolution of curves; Applications of integral calculus to find centre of gravity and moment of inertia	**10**

Recommended Books:
1. Thomes, G.B, Finney, R.L. Calculus and Analytic Geometry, 6th Edition, 1998, Narosa Publication.
2. N. Piskunov: Differential and Integral Calculus, Peace Publishers, Moscow.

Instruction of Question Paper setter
The paper setter is required to set question paper in three sections A , B and C . Section A consists of 12 MCQs of 1 mark each , Section B consists of 6 Questions with 3 internal choices of 4 marks each and section C consists of 3 questions with 1 internal choice of 8 marks each.

SUBJECT TITLE: Algebra
SUBJECT CODE: BMAT-1122
SEMESTER: I
CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
3	1	0	4

Internal Assessment: 40
End Term Exam: 60
Duration of Exam: 3 Hrs

Objective and outcome of course:
This course will enhance ability of research, inquiry and analytical thinking in mathematical Problems and better understanding of De-Moivre's theorem and its applications, Transformation of equation and rank of a matrix.

Contents of Syllabus:

Sr. No	Contents	Contact Hours
UNIT-I	De-Moivre's Theorem and its applications. Real and Imaginary parts of Exponential, logarithmic, circular, inverse circular, hyperbolic, inverse hyperbolic functions of complex variables. Summation of Trigonometric series, (C+iS method).	**15**
UNIT-II	Relations between Roots and Coefficients of a general Polynomial, Transformation of equation. Descartes' rule of signs, Solution of cubic equations, Bi- quadratic equations and their solution.	**10**
UNIT-III	Rank of a matrix, Elementary transformations, Linear independence and dependence of vectors, Gauss-Jordan method to find inverse of a matrix, reduction to normal form, Consistency and solution of linear algebraic equations	**10**
UNIT-IV	Linear transformations, Orthogonal transformations, Eigen values, Eigen vectors, Cayley-Hamilton Theorem, Reduction to diagonal form, orthogonal, unitary, Hermitian and similar matrices.	**10**

Recommended Books:

1. Linear Algebra by Schamoutline Series.
2. Trigonometry by S.L. Loney, Arihant, 2011.
3. Text Book on Algebra and theory of Equations by Dr.Chandrika Prasad, Pothushala Pub. 2011
4. A basic course in Abstract Algebra, R. K. Sharma, S. K. Shah and AshaGauri Sharma,2011.

Instruction of Question Paper setter
The paper setter is required to set question paper in three sections A , B and C . Section A consists of 12 MCQs of 1 mark each , Section B consists of 6 Questions with 3 internal choices of 4 marks each and section C consists of 3 questions with 1 internal choice of 8 marks each.

COURSE TITLE: COMMUNICATION SKILLS
SUBJECT CODE: BHUM-1101
SEMESTER: I
CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
2	0	0	2

Internal Assessment: 40
End Term Exam: 60
Duration of Exam; 3 Hrs

Objective and outcome: The purpose of the course is to train the students to express their views freely and have fluency in the language.

Sr.No	Contents	Contact Hours
UNIT I	Comprehension exercises on the following selective readings: • The Voice of God • The Portrait of a Lady • Kabuliwala • A Service of Love • Green Parrots in A Cage	**7**
UNIT II	**Communication:** Introduction, Meaning, Definition, Elements, Process of communication, Features/Characteristics of communication, Types of communication, Principles/Essentials of Effective communication, Importance of communication	**5**
UNIT III	**Listening Skills**- Introduction, Difference between Listening and Hearing, Essential skills for listening, Barriers to listening,Tips for improving Listening skills **Personality Development**: Introduction, Meaning, Definitions of Personality, Determinants of Human Personality, Traits of an effective Personality, Steps for Personality Development, Self Esteem	**8**
UNIT IV	Vocabulary and Grammar:Parts of Speech, Tenses, One word substitution, Antonyms, Prefixes and Suffixes, Punctuation, Letter Writing(Personal), Essay Writing, Comprehension(Unseen Passage)	**10**

PRESCRIBED BOOK
• Prose Parables by Orient Blackswan (For Unit I)

RECOMMENDED BOOKS:
1. Fluency in English- Part II, Oxford University, 2006
2. Business English, Pearson, 2008
3. Language, Literature and Creativity, Orient Blackswan, 2013
4. Language through Literature(forthcoming) ed. Dr. Gauri Mishra, DrRanjanaKaul, DrBrati Biswas 2016
5. English for Effective Communication by Navjot S.Deol 2007.
7. An Approach to Communication Skills by Indrajit Bhattacharya 2012.
8. Business Communication by Varinder Kumar and Bodh Raj 2001.
9. Personality Development and soft Skills by Achhru Singh and Dharminder Singh Ubha 2004.

Instructions to Question Paper Setter*: The question paper consist of three sections A, B & C. Section-A is compulsory consisting of short answer type questions (1 or 2 marks) from the whole syllabus. It should*

be of 12 Marks. Section-B consists of 8 questions and students will attempt any six questions. Each question carries 4 Marks. Section-C consists of 4 questions and Students will attempt any three questions. Each question carries 8 Marks.

SUBJECT TITLE: ORGANIC CHEMISTRY-I
SUBJECT CODE: BCHE-1123
SEMESTER: I
CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
2	0	0	2

Internal Assessment: 40
End Term Exam: 60
Duration of Exam: 3 Hrs

Objective and outcome of course: To impart knowledge of basics of organic chemistry & Stereochemistry of organic compounds.

Contents of Syllabus:

Sr. No	Contents	Contact Hours
UNIT-I	**Basics of organic chemistry:** Hybridization, shapes of molecules, bond lengths and bond angles, bond energy, localized and delocalized chemical bond, van der Waals interactions, resonance, hyperconjugation, aromaticity, inductive and field effects, hydrogen bonding(applications of all these effects);organic acids & bases, and their relative strengths; dipole moment.	5
UNIT-II	Curved arrow notation, drawing electron movements with arrows, half-headed and double headed arrows, homolytic and heterolytic bond breaking. Types of reagents-electrophiles and nucleophiles.Nucleophilicity& basicity; Types of organic reactions & their mechanisms, Energy considerations. Reactive intermediates-carbocations, carbanions, free radicals, carbenes, and nitrenes (their types, shapes & relative stability). Methods of determination of reaction mechanism (product analysis, intermediates, isotope effects, kinetic and stereochemical studies).	5
UNIT-III	**Stereochemistry-I:** Concept of isomerism.Types of isomerism. Optical isomerism - elements of symmetry, molecular chirality, enantiomers, stereogenic center, optical activity, specific rotation, properties of enantiomers, Chiral and achiral molecules with two stereogenic centers, diastereomers, threo and erythrodiastereomers, meso compounds, resolution of enatiomers, inversion, retention and racemization. Relative and absolute configuration, sequence rules, D & L and R & S systems of nomenclature.	10
UNIT-IV	Geometric isomerism - determination of configuration of geometric isomers.Syn-anti & E & Z notations with C.I.P. rules, geometric isomerism in oximes and alicyclic compounds. Optical isomerism, Conformational isomerism - conformational analysis of ethane and n-butane; conformations of cyclohexane, axial and equatorial bonds, conformation of mono substituted cyclohexane derivatives. Difference between conformation and configuration, Fischer and flying wedge formulae Newman projection and Sawhorse formulae & their interconversion.	10

Books Recommended:

1. Robert Thornton Morrison and Robert Neilson Boyd, Organic Chemsitry, Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).
2. I.L. Organic Chemistry (Volume I), Darling Kindersley (India) Pvt. Ltd.(Pearson Education).
3. I.L. Finar, Organic Chemistry (Volume II): Stereochemistry & the chemistry of natural products, Darling Kindersley (India) Pvt. Ltd. (Pearson Education).

Instruction of Question Paper setter: The question paper consist of three sections A, B & C.

1. Section-A is compulsory consisting of 6 short answer type questions (2 marks) from the whole syllabus. Total marks to this section are 12. There will be no choice in this section.

2. Section-B consists of 8 questions. Students will attempt any six questions. Each question carries 4 Marks.
3. Section-C consists of 4 questions. Students will attempt any three questions. Each question carries 8 Marks.

SUBJECT TITLE: PHYSICAL CHEMISTRY-I
SUBJECT CODE: BCHE-1124
SEMESTER: I
CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
4	0	0	4

Internal Assessment: 40
End Term Exam: 60
Duration of Exam: 3 Hrs

Objective and outcome of course: To impart knowledge of basics of physical chemistry.

Contents of Syllabus:

Sr. No	Contents	Contact Hours
UNIT-I	**Mathematical Concepts:** Logarithmic relations, differentiation of functions like Kx, e^x, x^n, sin x, log x, maxima and minima, partial differentiation and reciprocity relations.Integration of some useful relevant functions. **Liquid State:** Intermolecular forces, differences between solids, liquids and gases states, Physical properties of liquid-vapour pressure, surface tension, surface active agents, viscosity, effects of temperature on viscosity, Liquid crystals: Difference between liquid crystal, LCDs & the seven segment cell, Classification of thermotropic, liquid crystal, semetic liquid crystal, nematic liquid crystals, cholestric liquid crystal, disc shaped liquid crystals, polymer liquid crystals.	15
UNIT-II	**Gaseous State:**The kinetic molecular theory of gases, deviation from ideal behaviour, van der Waals equation of states, kinetic energy & temperature, Maxwell distribution of molecular velocities & energies, types of molecular velocities, collision parameters (diameter, cross section, number frequency), mean free path , the critical phenomena P-V isotherm of CO2, the vander Waal's equation of critical state, principal of corresponding states, reduced equation of state, molar masses & density of real gases, liquefaction of gases, viscosity, diffusion. **Chemical Equilibrium:** Irreversible & reversible reactions, chemical equilibrium, law of mass action, thermodynamic treatment of law of mass action, Van't Hoff reaction isotherm, relation between Kp, Kc&Kx, homogenous &heterogenouseuilibria, Le Chatelier's principle, applications of Le Chatelier's principle, Clausius-Claperyron equation.	15
UNIT-III	**Chemical Kinetics-I** Rate of a reaction, rate law & rate constant, factors influencing the rate of a reaction, Units of rate constant, integration of rate exoressions, order &molecularity of reactions, zero order, first order, second order & third order reactions, pseudo order reactions, half life time of a reaction, methods of determining order of a reaction,Radioactive decay as a first order phenomenon, kinetics of complex reactions: opposing, consecutive & chain reactions.	7
UNIT-IV	**Chemical Kinetics-II** Erying equation, Lindnann theory unimolecular gaseous reactions, effect of temperature & pressure on reaction rate, theories of reaction rates. Catalysis Introduction, Homogeneous &heterogenous catalysis, enzyme catalysis, kinetics	8

	of enzyme catalyzed reaction- MichaelisMenten equation.	

Books Recommended:

1. Physical Chemistry by Gurdeep Raj; Krishna Prakashan Media (P) Ltd.
2. Physical Chemistry by Puri Sharma Pathania; Vishal Publishing Co.
3. Physical Chemistry by Atkins; W.H. Freeman & Company, New York.
4. Advanced Physical Chemistry by Gurthu; PraghatiPrakashan.
5. Physical Chemistry by K L kapoor; Rajiv Beri for Macmillan india Ltd.

Instruction of Question Paper setter: The question paper consist of three sections A, B & C.

1. Section-A is compulsory consisting of 6 short answer type questions (2 marks) from the whole syllabus. Total marks to this section are 12. There will be no choice in this section.
2. Section-B consists of 8 questions.Students will attempt any six questions. Each question carries 4 Marks.
3. Section-C consists of 4 questions. Students will attempt any three questions. Each question carries 8 Marks.

SUBJECT TITLE: CHEMISTRY LABORTARY-I
SUBJECT CODE: BCHE-1125
SEMESTER: I
CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
0	0	6	3

Internal Assessment: 40
End Term Exam: 60
Duration of Exam: 3 Hrs

Objective and outcome of course: To impart knowledge of basics principles of chemistry phenomenons.

List of Experiments:

INORGANIC

1. Semi-micro analysis: Cation analysis, separation and identification of Groups I, II, III, IV, V and VI. Anion analysis (2 cation and 2 anion with no interference).

ORGANIC

2. (a) Determination of melting point of following solids: naphthalene, benzoic acid, acetanilide & urea.

(b) Determination of boiling point of following liquids: ethanol, cyclohexane, propanol, toluene.

3. Purification of organic compounds by crystallization:

(a) Phthalic acid from hot water.

(b) Acetanilide from boiling water.

(c) Benzoic acid from water.

Books Recommended:

1.Vogel's book on Inorganic Qualitative Analysis
2.Vogel's book on Organic Qualitative Analysis

SYLLABUS

SEMESTER-II

Second Semester

COURSE		Contact Hours/Week			Credit	% of Total Marks					Exam Duration (Hours)
Code	**Course Title**	**L**	**T**	**P**		**CWA**	**LWA**	**MTE**	**ETE**	**Total**	
BPHY-1221	Electricity & Magnetism	4	0	0	4	16	-	24	60	100	3
BPHY-1222	Physics Lab-II	0	0	2	1	-	60	-	40	100	3
BMAT-1221	Calculus-II	3	0	0	3	16	-	24	60	100	3
BMAT-1222	Modern Algebra	3	0	0	3	16	-	24	60	100	3
BCHE-1223	Organic Chemistry-II	2	0	0	2	16	-	24	60	100	3
BCHE-1224	Inorganic-Chemistry-I	4	0	0	4	16	-	24	60	100	3
BCHE-1225	Chemistry Lab-II	0	0	2	1	-	60	-	40	100	3
BEVS-1201	Environmental Science	2	0	0	2	16	-	24	60	100	3
Total		**22**	**0**	**4**	**24**						

Semester-II

SUBJECT TITLE: ELECTRICITY & MAGNETISM
SUBJECT CODE: BPHY-1221
SEMESTER: II
CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
4	0	0	4

Internal Assessment: 40
End Term Exam: 60
Duration of Exam: 3 Hrs

Objective and outcome of course: The student is exposed to Electrostatics and Magneto statics including Boundary value problems, Maxwell equations and their applications and analysis of Alternating current circuits

Contents of Syllabus:

Sr. No	Contents	Contact Hours
UNIT I	**Electrostatics:** Scalar and vector product, Gradient, divergence, Curl and their significance, Vector Integration, Line, surface and volume integrals of Vector fields, Gauss-divergence theorem and Stoke's theorem of vectors (statement only), Electrostatic Field, electric flux, Gauss's theorem of electrostatics and its application to plane charged sheet, charged conductor. Differential form of Gauss Law, Electric potential as line integral of electric field, potential due to a point charge, electric dipole, uniformly charged spherical shell and solid sphere, Calculation of electric field from potential, curl of electrostatic field, Capacitance of an isolated spherical conductor, Parallel plate, spherical and cylindrical condenser, Energy per unit volume in electrostatic field, Dielectric medium, Dielectric Polarisation, Displacement vector, Gauss's theorem in dielectrics.	**20**

UNIT II	**Magnetostatics:**Biot-Savart's law & its applications to straight conductor, circular coil and solenoid carrying current. Ampere's circuital law, Divergence and curl of magnetic field, Magnetic vector potential **Magnetic Properties of Matter**: Magnetization vector (M). Magnetic Intensity(H), Magnetic Susceptibility and permeability, Relation between B, H, M **Electromagnetic Induction**: Faraday's laws of electromagnetic induction, Lenz's law, curl of electric field, self and mutual inductance, L of single coil, M of two coils, Reciprocity Theorem, Energy stored in magnetic field	**13**
UNIT-III	**Electrical Circuits**: AC Circuits: Kirchhoff's laws for AC circuits, Complex Reactance and Impedance, Series LCR Circuit: (1) Resonance, (2) Power Dissipation and (3) Quality Factor, and (4) Band Width, Parallel LCR Circuit **Network theorems:** Ideal Constant-voltage and Constant-current Sources, Network Theorems: Thevenin theorem, Norton theorem, Superposition theorem, Reciprocity theorem, Maximum Power Transfer theorem, Applications to dc circuits	**15**
UNIT-IV	Maxwell`s equations and Electromagnetic wave propagation: Equation of continuity of current, Displacement current, Modified Ampere's law, Maxwell's equations, Poynting Theorem &Poynting vector, energy density in electromagnetic field, electromagnetic wave propagation through vacuum and isotropic dielectric medium, transverse nature of EM waves, polarization	**12**

Books Recommended:

1. Electricity, Magnetism & Electromagnetic Theory, S. Mahajan and Choudhury, 2012, Tata McGraw
2. Electricity and Magnetism, Edward M. Purcell, Cambridge University Press, 2013
3. Introduction to Electrodynamics, D.J. Griffiths, Pearson education, 2015

Instructions to Question Paper Setter: The question paper consist of three sections A, B & C. Section-A is compulsory consisting of short answer type questions (1 or 2 marks) from the whole syllabus. It should be of 12 Marks. Section-B consists of 8 questions and students will attempt any six questions. Each question carries 4 Marks. Section-C consists of 4 questions and Students will attempt any three questions. Each question carries 8 Marks.

SUBJECT TITLE: PHYSICS LABORATORY-II
SUBJECT CODE: BPHY-1222
SEMESTER: II
CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
0	0	4	2

Internal Assessment: 60
End Term Exam: 40
Duration of Exam: 3 Hrs

Objective and outcome of course: The aim of this course is to build an understanding about various components of an electrical circuit and to develop skill to measure the related physical quantities.

Note: Students will be required to perform at least 10 experiments from the given list of experiments:

List of experiments
1. To use a Multimeter for measuring (a) Resistances, (b) AC and DC Voltages, (c) DC Current, and (d) checking electrical fuses.

2. Measurement of charge and current sensitivity by using Ballistic Galvanometer
3. Determine a high resistance by Leakage Method
4. To determine Self Inductance of a Coil by Rayleigh's Method.
5. To compare capacitances using De'Sauty's bridge.
6. Measurement of field strength B and its variation in a Solenoid (Determine dB/dx).
7. To study the Characteristics of a Series RC Circuit.
8. To study the a series LCR circuit and determine its (a) Resonant Frequency, (b) Quality Factor
9. To study a parallel LCR circuit and determine its (a) Anti-resonant frequency and (b) Quality factor.
10. To determine a Low Resistance by Carey Foster's Bridge.
11. To determine the self inductance of the coil using Anderson's Bridge
12. To find the capacitance of a capacitor using Flashing and Quenching of a Neon lamp.
13. To determine the value of an unknown resistance using Post Office Box.

Books Recommended:

1. A Text Book of Practical Physics, I.Prakash& Ramakrishna, KitabMahal, 2011
2. B.Sc Practical Physics, C L Arora, S. Chand & Company, 2010

SUBJECT TITLE: CACULUS-II
SUBJECT CODE: BMAT-1221
SEMESTER: II
CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
4	0	0	4

Internal Assessment: 40
End Term Exam: 60
Duration of Exam: 3 Hrs

Objective and outcome of course:

This course is aimed to provide an introduction to the function of two or more variables and their partial differentiation and maxima and minima of function of several variables and use of double and triple integration to find areas and volumes.

Contents of Syllabus:

Sr. No	Contents	Contact Hours
UNIT-I	Function of two or more variables; partial differentiation, homogeneous functions and Euler's theorem, composite functions, total derivative, derivative of an implicit function, change of variable.	**10**
UNIT-II	Jacobian, Tangent and normal to a surface .Taylors and Maclaurin's series for a function of two variables, errors and approximations.	**10**
UNIT-III	Maxima and minima of function of several variables, Lagrange's method of undetermined multipliers.	**10**
UNIT-IV	Double and triple integral and their evaluation, change of order of integration, change of variable, Application of double and triple integration to find areas and volumes.	**15**

Recommended Books:

1. Thomes, G.B, Finney, R.L. Calculus and Analytic Gemetry, Ninth Edition, 1995.
2. N. Piskunov: Differential and Integral Calculus, Peace Publishers, Moscow, 1964.
3. Gorakh Prasad: Differential Calculus, Pothishala Pvt. Ltd., Allahabad, 2016.
4. Erwin Kreyszig: Advanced Engineering Mathematics, John Wiley and Sons, 2007.

Instruction of Question Paper setter

The paper setter is required to set question paper in three sections A , B and C . Section A consists of 12 MCQs of 1 mark each , Section B consists of 6 Questions with 3 internal choices of 4 marks each and section C consists of 3 questions with 1 internal choice of 8 marks each.

SUBJECT TITLE: Modern Algebra
SUBJECT CODE: BMAT-1222
SEMESTER: II
CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
4	0	0	4

Internal Assessment: 40
End Term Exam: 60
Duration of Exam: 3 Hrs

Objective and outcome of course:

The objective of this course is to present the relationships between abstract algebraic structures with familiar numbers systems such as the integers and real numbers.

Contents of Syllabus:

Sr. No	Contents	Contact Hours
UNIT-I	**Groups:** Definition, examples, subgroups, counting Principle, Lagrange's Theorem, Normal subgroups Quotient groups.	15
UNIT-II	Homo-morphisms, Fundamental theorem of homomorphism and related theorems. Cyclic Groups.	10
UNIT-III	**Rings:** Definition and examples of Rings, Elementary properties of Rings. Sub-rings, Homomorphism.	10
UNIT-IV	Ideals and Quotient Rings Field of Quotient of Integral domain, division rings. Euclidean Rings, Principal ideals.	10

Recommended books:

1. Text book on Algebra and Theory of equations by Chandrika Prasad. Pothishala Pvt. Ltd.1982.
2. Herstein, I.N.: Topics in Algebra, John Wiley & Sons; 2nd edition (June 20, 1975).
3. Linear Algebra by Schaum Outline series McGraw-Hill Education; 5 edition (December 11, 2012).

Instruction of Question Paper setter

The paper setter is required to set question paper in three sections A , B and C . Section A consists of 12 MCQs of 1 mark each , Section B consists of 6 Questions with 3 internal choices of 4 marks each and

section C consists of 3 questions with 1 internal choice of 8 marks each

COURSE TITLE: ENVIRONMENTAL SCIENCE
SUBJECT CODE: BEVS-1201
SEMESTER: II
CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
2	0	0	2

Internal Assessment: 40
End Term Exam: 60
Duration of Exam; 3 Hrs

Course Objectives:

- To identify global environmental problems arising due to various engineering/industrial/ and technological activities and the science behind these problems
- To realize the importance of ecosystem and biodiversity for maintaining ecological balance.
- To identify the major pollutants and abatement devices for environmental management and sustainable development.
- To estimate the current world population scenario and thus calculating the economic growth, energy requirement and demand.
- To understand the conceptual process related with the various climatologically associated problems and their plausible solutions.

Sr.No	Contents	Contact Hours
UNIT I	**The Multidisciplinary Nature of Environmental Studies** Definition, scope and importance, Need for public awareness **Natural Resources and associated problems.**	7

	a. Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people. **b.** Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems c. Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies. d. Food resources: World food problems, changes caused by agriculture and Overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. **e.** Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources, case studies **f.** Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification. g. Role of an individual in conservation of natural resources. **h.** Equitable use of resources for sustainable lifestyles	
UNIT II	**Ecosystems** (a) Concept of an ecosystem. (b) Structure and function of an ecosystem. (c) Producers, consumers and decomposers. (d) Energy flow in the ecosystem. (e) Ecological succession. (f) Food chains, food webs and ecological pyramids. (g) Introduction, types, characteristic features, structure and function of the following ecosystem: i) Forest ecosystem. ii) Grassland ecosystem. iii) Desert ecosystem. iv) Aquatic ecosystems (ponds, streams, lakes, rivers, ocean estuaries). **Biodiversity and its Conservation** (a) Introduction - Definition: genetic, species and ecosystem diversity. (b) Biogeographically classification of India. (c) Value of biodiversity: consumptive use, productive use, social, ethical aesthetic and (d) Option values. (e) Biodiversity at global, national and local levels. (f) India as a mega-diversity nation. (g) Hot-spots of biodiversity. (h) Threats to biodiversity: habitat loss, poaching of wildlife, man wildlife conflicts. (i) Endangered and endemic species of India. (j) Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.	**7**
UNIT	**Environmental Pollution: Definition**	**7**

III	**(a) Causes, effects and control measures of**: (i) Air pollution (ii) Water pollution (iii) Soil pollution (iv) Marine pollution (v) Noise pollution (vi) Thermal Pollution (vii) Nuclear pollution (b) Solid Waste Management: Causes, effects and control measures of urban and industrial wastes. (c) Role of an individual in prevention of pollution. (d) Pollution Case Studies. (e) Disaster management: floods, earthquake, cyclone and landslides **6. Social Issues and the Environment** (a) From unsustainable to sustainable development (b) Urban problems and related to energy (c) Water conservation, rain water harvesting, Watershed Management (d) Resettlement and rehabilitation of people; its problems and concerns. Case studies. (e) Environmental ethics: Issues and possible solutions (f) Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies. (g) Wasteland reclamation (h) Consumerism and waste products (i) Environmental Protection Act (j) Air (Prevention and Control of Pollution) Act (k) Water (Prevention and control of Pollution) Act (l) Wildlife Protection Act (m) Forest Conservation Act (n) Issues involved in enforcement of environmental legislation (o) Public awareness	
UNIT IV	**Human Population and the Environment** (a) Population growth, variation among nations (b) Population explosion - Family Welfare Programmed (c) Environment and human health (d) Human Rights (e) Value Education (f) HIV/AIDS (g) Women and Child Welfare (h) Role of Information Technology in Environment and Human Health (i) Case Studies **Field Work** (a) Visit to a local area to document environmental assets river/ (b) forest/grassland/hill/mountain (c) Visit to a local polluted site - Urban / Rural / Industrial / Agricultural (d) Study of common plants, insects, birds (e) Study of simple ecosystems-pond, river, hill slopes, etc. (Field work equal to 5 lecture hours)	**8**

Recommended Books

1. J.G. Henry and G.W. Heinke, 'Environmental Sc. & Engineering', Pearson Education, 2004.

2. G.B. Masters, 'Introduction to Environmental Engg. & Science', Pearson Education, 2004.
3. Erach Bharuch, 'Textbook for Environmental Studies', UGC, New Delhi,2003.

Instructions to Question Paper Setter*: The question paper consist of three sections A, B & C. Section-A is compulsory consisting of short answer type questions (1 or 2 marks) from the whole syllabus. It should be of 12 Marks. Section-B consists of 8 questions and students will attempt any six questions. Each question carries 4 Marks. Section-C consists of 4 questions and Students will attempt any three questions. Each question carries 8 Marks.*

COURSE TITLE: ORGANIC CHEMISTRY-II
SUBJECT CODE: BCHE-1223
SEMESTER: II
CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
2	0	0	2

Internal Assessment: 40
End Term Exam: 60
Duration of Exam: 3 Hrs

Objective and outcome of course: To impart advance knowledge of Aliphatic & Aromatic compounds.

Contents of Syllabus:

Sr. No	Contents	Contact Hours
UNIT-I	**Alkanes & Cycloalkanes:** IUPAC nomenclature of branced & 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 reaction, Corey-House reaction and decarboxylation of carboxylic acids), physical properties and chemical reactions of alkanes. Mechanism of free radical halogenation of alkanes: orientation, reactivity and selectivity. Cycloalkanes--nomenclature,method of formation, chemical reactions, Baeyer's strain theory and its limitations. Ring strain in small rings (cyclopropane and cyclobutane), theory of strain less rings. The case of cyclopropane ring: banana bonds. **Alkenes:** Nomenclature of alkenes-methods of formation, mechanisms and dehydration of alcohols, dehydrohalogenation of alkyl halides regioselectivity in alcohol dehydration. TheSaytzeff's rule, Hofmann elimination, physical properties and relative stabilities of alkenes. Chemical reactions of alkenes-mechanisms involved in hydrogenation, electrophilic and free radical additions Markownikoff's rule, Antimarkownikoff's rule, hydroboration-oxidation, oxymercuration reduction.	**10**

	Epoxidation, ozonolysis, hydration, hydroxylation and oxidation with $KMnO_4$.Polymerization of alkenes. Substitution at allylic and vinylic positions of alkenes.	
UNIT-II	**Cycloalkenes:** Methods of formation, conformation and chemical reactions of Cycloalkenes. **Dienes and Alkynes:** Nomenclature and classification of dienes: isolated, conjugated and cumulated dienes. Structure of allenes and butadiene, methods of formation, polymerization of dienes, Chemical reactions-I,2 and l,4 additions, Diels-Alder reaction. Nomenclature of alkynes, Methods of formation.Chemical reactions of alkynes, acidity of alkynes.Mechanism of electrophilic and nucleophilic addition reactions, hydroboration-oxidation.metal-ammonia reductions, oxidation and polymerization.	**10**
UNIT-III	**Aromatic Hydrocarbons:** Aromaticity: Huckel's rule, aromatic character of arenes, cyclic carbocations/carbanions& heterocyclic compounds with suitable examples, antiaromaticity&nonaromaticity; structure & stability of benzene, Electrophilic aromatic substitutions- nitration, halogenation, sulphonation and Friedel-Crafts alkylation/acylation with their mechanism, stability of Wheland intermediates (sigma complex), activation/deactivation of the aromatic ring & directing effects of the groups.	**5**
UNIT-IV	**Aryl halides:** Nomenclature and classes of alkyl halides, methods of formation, Nucleophilic aromatic substitution, The addition elimination and the elimination-additional mechanisms of nucleophilic aromatic substitution reactions. Relative reactivities of alkyl halides, allyl, benzyl, vinyl and aryl halides towards the nucleophilic substitutions.	**5**

Books Recommended:

1. Robert Thornton Morrison and Robert Neilson Boyd, Organic Chemsitry, Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).
2. I.L. Organic Chemistry (Volume I) , Darling Kindersley (India) Pvt. Ltd.(Pearson Education).
3. I.L. Finar, Organic Chemistry (Volume II): Stereochemistry & the chemistry of natural products, Darling Kindersley (India) Pvt. Ltd. (Pearson Education).

Instruction of Question Paper setter: The question paper consist of three sections A, B & C.

1. Section-A is compulsory consisting of 6 short answer type questions (2 marks) from the whole syllabus. Total marks to this section are 12. There will be no choice in this section.
2. Section-B consists of 8 questions.Students will attempt any six questions. Each question carries 4 Marks.
3. Section-C consists of 4 questions. Students will attempt any three questions. Each question carries 8 Marks.

COURSE TITLE: INORGANIC CHEMISTRY-I
SUBJECT CODE: BCHE-1224
SEMESTER: II
CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
4	0	0	4

Internal Assessment: 40
End Term Exam: 60
Duration of Exam: 3 Hrs

Objective and outcome of Course: To impart knowledge of basics of inorganic chemistry i.e. atomic structure and bonding

Contents of Syllabus:

Sr. No	Contents	Contact Hours
UNIT-I	**Atomic Structure:** Idea of de Broglie matter waves, Heisenberg uncertainty principle, atomic orbitals, Schrodinger wave equation, significance of, Ψ and , Ψ^2, quantum numbers, radial and angular wave functions and probability distribution curve, shapes of s, p, d orbitals. Aufbau and Pauli exclusion principles, Hund's multiplicity rule. Electronic configurations of the elements and ions. **Chemistry of Noble gases:** Chemical properties of the noble gases, chemistry of xenon, structure and bonding in xenon compounds.	10
UNIT-II	**Chemical Bonding-I:** 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. BeF_2 , BF_3 , CH_4, PF_5, SF_6, IF_7, $SnCl_2$, XeF_4, BF_4^-, PF_6^-, $SnCl_6^{-2}$. **Chemical Bonding-II:** Valence shell electron pair repulsion (VSEPR) theory to NH_3, H_3O^+, SF_4, ClF_3, ICl_2, and H_2O.MO theory, homonuclear (elements and ions of 1st and 2nd row), and heteronuclear (BO, CN, CO^+, NO^+, CO, CN), diatomic molecules, multicenter bonding in electron deficient molecule (Boranes) percentage ionic character from dipole moment and electronegativity difference.	10

UNIT-III	**Ionic Solids:** Concept of close packing, Ionic structures, (NaCl type, Zinc blende, Wurzite, CaF_2, and antifluorite), radius ratio rule and coordination number, Limitation of radius ratio rule, lattice defects, semiconductors, lattice energy and Born-Haber cycle, solvation energy and solubility of ionic solids, polarizing power and polarisability of ions, Fajan's rule. Metallic bond-free electron, valence bond and bond theories. **Weak Interactions**-Hydrogen bonding, van der Walls forces. **Periodic Properties:** Position of elements in the periodic table, effective nuclear charge and its calculations.Atomic and ionic radii, ionization energy, electron affinity and electronegativity-definition, methods of determination or evaluation, trends in periodic table and applications in predicting and explaining the chemical behavious.	**20**
UNIT-IV	**S-Block Elements:** Comparative study, diagonal relationships, salient features of hydrides, solvation and complexation tendencies including their function in biosystems, an introduction to alkyls and arys. **Group No. 13:** Comparative study (including diagonal relationship) of groups 13 elements, compounds like hydrides, oxides, oxyacids and halides of groups 13; hydrides of boron-diborane and higher boranes, borazine, borohydrides. **p-Block Elements:** Comparative study (including diagonal relationship) of groups 14-l7 elements, compounds like hydrides, oxides, oxyacids and halides of groups 14-17; fullerenes, carbides, fluorocarbons, silicates (structural principle), tetrasulphurtetranitride, basic properties of halogens, interhalogens and polyhalides.	**20**

Books Recommended:

1. Stereochemistry of Carbon Compounds by Ernest, L. Eliel, Tata McGraw-HilI.
2. Stereochemistry of Organic Compounds, D. Nasipuri, New Age International.
3. Stereochemistry of Organic Compounds, P.S. Kalsi, New Age, International.
4. Modern Organic Reactions, H.C. House, Benjamin.

Instruction of Question Paper setter: The question paper consist of three sections A, B & C.

1. Section-A is compulsory consisting of 6 short answer type questions (2 marks) from the whole syllabus. Total marks to this section are 12. There will be no choice in this section.
2. Section-B consists of 8 questions.Students will attempt any six questions. Each question carries 4 Marks.
3. Section-C consists of 4 questions. Students will attempt any three questions. Each question carries 8 Marks.

COURSE TITLE: CHEMISTRY LABORTARY-II
SUBJECT CODE: BCHE-1225
SEMESTER: II
CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
0	0	6	3

Internal Assessment: 60
End Term Exam: 40
Duration of Exam: 3 Hrs

Course Objective: To impart knowledge of basics of titrations and kinetics, potentiometry and colorimetry

List of Experiments:

Inorganic Experiments

1. Iodometry and Iodimetry Titrations:

(i) Standardisation of sodium thiosphate with K2Cr2O7 / KIO3
(ii) Determination of Cu(II)
(iii) Determination of H2O2
(iv) Determination of available chlorine in bleaching powder.

2. Precipitation Titrations

(i) AgNO3 – standardisation by Mohr's method / by using absorption indicator.
(ii) Determination of chloride.
(iii)Volhard's method for chloride determination.

Physical Chemistry Experiments

Chemical Kinetics

3.To determine the specific reaction rate of the hydrolysis of methyl acetate/ethyl acetate catalyzed by hydrogen ions at room temperature.
4.To study the effect of acid strength on the hydrolysis of an ester.
5.Viscosity& Surface Tension of pure liquids.
To determine the viscosity and surface tension of C_2H_5OH and glycerin solution in water
6.Molecular weight determined by Part method.

Colorimetry

7. To test the validity of Beer Lambert law.

Potentiometry

8. Titration of strong acid solution (HCl) with NaOH solution using quinhydrone electrode.
9. Titration of a mixture of strong and weak acids (HCl + CH3COOH) and hence thecomposition of the mixture.

Books Recommended:

1.Vogel's book on Inorganic Qualitative Analysis
2.Advanced Practical Physical Chemistry By J. B. Yadav

Program Name: B.Sc.B.Ed(Non-Medical)
Program Code: ED-1303

SYLLABUS

SEMESTER-III

Third Semester

COURSE		Contact Hours/Week			Credit	% of Total Marks					Exam Duration (Hours)
Code	**Course Title**	**L**	**T**	**P**		**CWA**	**LWA**	**MTE**	**ETE**	**Total**	
BPHY-2321	Statistical Physics & Thermodynamics	4	0	0	4	16	-	24	60	100	3
BPHY-2322	Vibration & Waves	3	0	0	3	16	-	24	60	100	3
BPHY-2323	Physics Lab-III	0	0	2	1	-	60	-	40	100	3
BMAT-2321	Linear Algebra	3	0	0	3	16	-	24	60	100	3
BMAT-2322	Differential Equations	3	0	0	3	16	-	24	60	100	3
BCHE-2324	Organic Chemistry-III	2	0	0	2	16	-	24	60	100	3
BCHE-2325	Physical Chemistry-II	4	0	0	4						
BCHE-2326	Chemistry Lab-III	0	0	2	1	-	60	-	40	100	3
Total		**23**	**0**	**4**	**25**						

SEMESTER: III

SEMESTER: III
COURSE TITLE: THERMAL AND STATISTICAL PHYSICS
SUBJECT CODE: BPHY-2321
SEMESTER: III
CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
4	0	0	4

Internal Assessment: 40
End Term Exam: 60
Duration of Exam: 3 Hrs

Objective and outcome of Course: The objective of this course is to develop a working knowledge of the laws and methods of thermodynamics & statistical physics and to use this knowledge to explore various applications. Many of these applications will relate to topics in materials science and the physics of condensed matter**.**

Contents of Syllabus:

Sr. No	Contents	Contact Hours
UNIT-I	Statistical definition of entropy, change of entropy of a system, additive nature of entropy, law of increase of entropy, reversible and irreversible processes with examples, Work done in a reversible process, Examples of increase of entropy in natural processes, Entropy and disorder, Brief review of the terms and Laws of Thermodynamics, Carnot's Cycle, Entropy changes in Carnot's Cycle. Applications of thermodynamics to thermoelectric effect, change of entropy along a reversible path in a P.V. diagram, entropy of a perfect gas, Equation of state of ideal gas from simple statistical consideration	**15**
UNIT-II	Derivation of Maxwell's thermodynamical relations, cooling produced by adiabatic stretching, adiabatic compression, change of internal energy with volume, Expression for (Cp-Cv), change of state and Clayperon Equation, Thermodynamical treatment of Joule-Thomson effect, Use of Joule-Thomson effect for liquification of helium, Production of very low temperature by adiabatic demagnetization,	**15**
UNIT-III	Basic ideas of Statistical Physics, Scope of Statistical Physics, basic ideas about probability, distribution of four distinguishable particles in two compartments of equal size. Concept of macrostates, microstates, thermodynamic probability, effects of constraints on the system, distribution of n particles in two compartments, deviation from the state of maximum probability, equilibrium state of dynamic system, distribution of distinguishable n particles in k compartments of unequal sizes.	**10**
UNIT-IV	Phase space and its division into elementary cells, three kinds of statistics. The basic approach in the three statistics, Maxwell-Boltzman statistics applied to an ideal gas in equilibrium, experimental verification of Maxwell-Boltzman's law of distribution of molecular speeds. Need of quantum statistics--B.E. statistics,	**20**

	derivation of Planck's law of radiation, deduction of Wien's displacement law, Rayleigh Jeans Law and Stefan's law from Planck's law, F.D. statistics, Electron gas Comparison of M.B., B.E. and F.D. statistics	

Books Recommended:

1. Thermal Physics, S. Garg, R. Bansal and C. Ghosh, 2008, Tata McGraw-Hill.
2. Thermodynamics, Kinetic Theory & Statistical Thermodynamics, Sears & Salinger, Narosa Publications, 1988
3. Thermal & statistical Physics, R. B Singh, New academic Science, 2011
4. Heat and Thermodynamics, M.W. Zemansky, Richard Dittman, Tata McGraw Hill, 2007

Instructions to Question Paper Setter: The question paper consist of three sections A, B & C.

1. Section-A is compulsory consisting of 6 short answer type questions (2 marks) from the whole syllabus. Total marks to this section are 12. There will be no choice in this section.
2. Section-B consists of 8 questions. Students will attempt any six questions. Each question carries 4 Marks.
3. Section-C consists of 4 questions. Students will attempt any three questions. Each question carries 8 Marks.

COURSE TITLE: VIBRATION & WAVES
SUBJECT CODE: BPHY-2322
SEMESTER: III
CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
3	0	0	3

Internal Assessment: 40
End Term Exam: 60
Duration of Exam: 3 Hrs

Objective and outcome of Course : The course covers Harmonic oscillations and coupled oscillations, wave motion in damped, driven media.

Contents of Syllabus:

Sr. No	Contents	Contact Hours
UNIT-I	Simple harmonic motion, energy of a SHM, Compound Pendulum, Torsional Pendulum, Electrical Oscillations, Transverse Vibrations of a mass on a string, composition of two perpendicular SHM of same period and of period in ratio 1: 2.	**8**
UNIT-II	Decay of free vibrations due to damping, differential equation of motion, types of damping, determination of damping co-efficient; Logarithmic decrement, relaxation time and Q- Factor, Electromagnetic damping (Electrical oscillator)	**14**
UNIT-III	Differential equation for forced mechanical and electrical oscillators, Transient and steady state behavior, Displacement and velocity variation with driving force frequency, variation of phase with frequency, resonance. Power supplied to an oscillator and its variation with frequency, Q-value and band width, Q-value as an amplification factor. Stiffness, coupled oscillators, Normal co-ordinates and normal modes of vibration, Inductance coupling of electrical oscillators.	**6**
UNIT-IV	Waves in physical media, Wave equation and its solution, Types of waves, particle velocity, acceleration and energy in progressive waves, Longitudinal waves on a rod. Transverse waves on a string, characteristic impedance of a string, Waves in absorbing media, Reflection and Transmission of transverse waves on a string at discontinuity, Reflection and transmission of energy, Reflection and transmission of longitudinal waves at a boundary, Standing wave ratio, Impedance matching, Energy of vibrating string., Wave and group velocity	**15**

Books Recommended:

1. S P Puri, Vibrations and Waves, Macmillan India Ltd., 2004.
2. H.J Jain, The Physics of Vibrations and Waves, John Wiley and Sons. 2013
3. N. K Bajaj, The Physics of Waves and Oscillations, Tata McGraw Hill, 1998

Instructions to Question Paper Setter: The question paper consist of three sections A, B & C.

1. Section-A is compulsory consisting of short answer type questions (1 or 2 marks) from the whole syllabus. It should be of 12 Marks.
2. Section-B consists of 8 questions and students will attempt any six questions. Each question carries 4 Marks.
3. Section-C consists of 4 questions and Students will attempt any three questions. Each question carries 8 Marks.

COURSE TITLE: PHYSICS LAB-III
SUBJECT CODE: BPHY-2323
SEMESTER: III
CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
0	0	4	2

Internal Assessment: 60
End Term Exam: 40
Duration of Exam: 3 Hrs

Objective and outcome of Course: The course covers experiments related to analogue electronics, characteristics of electronics devices, damped, driven and forced oscillations, and wave motion in media.

Note: Students will be required to perform at least 12 experiments from the given list of experiments

List of Experiments
1. Measurement of Planck's constant using LED.
2. To determine Stefan's Constant.
3. To determine the velocity of ultrasonic waves in a given liquid.
4. To measure the logarithmic decrement, coefficient of damping, relaxation time and quality factor of a simple damped pendulum.
5. To determine the frequency of AC mains using Electrical Vibrator.
6. To determine the frequency of electrically maintained tinning fork by means of Melde's apparatus in transverse mode of vibration.
7. To determine the frequency of a tuning fork using a sonometer.
8. To verify the laws of transverse vibrations of stretched strings using a sonometer.
9. To determine the coefficient of thermal conductivity of copper by Searle's Apparatus.
10. To determine the Coefficient of Thermal Conductivity of Cu by Angstrom's Method.
11. To determine the coefficient of thermal conductivity of a bad conductor by Lee and Charlton's disc method.
12 . To find the velocity of sound in the material of the given rod with a Knudt's tube
13. To determine the temperature co-efficient of resistance by Platinum resistance thermometer
14. To study the variation of thermo emf across two junctions of a thermocouple with temperature.
15. To record and analyze the cooling temperature of an hot object as a function of time using a thermocouple and suitable data acquisition system

Books Recommended:

1. B.Sc Practical Physics, C L Arora, S. Chand & Company, 2010
2. A Text Book of Practical Physics, InduPrakash and Ramakrishna, KitabMahal, 2011

SUBJECT TITLE: Linear Algebra
SUBJECT CODE: BMAT-2321
SEMESTER: III
CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
3	0	0	3

Internal Assessment: 40
End Term Exam: 60
Duration of Exam: 3 Hrs

Objective and outcome of course:
The objective of this course is to make able such student for solving systems of linear equations using multiple methods, including Gaussian elimination and matrix inversion. Carry out matrix operations, including inverses and determinants. Apply principles of matrix algebra to lineartransformations

Contents of Syllabus:

Sr. No	Contents	Contact Hours
UNIT-I	Vector spaces, Examples, Linear Dependence, Linear Combinations, Bases and Dimension, Subspaces. Quotient Spaces.	**10**
UNIT-II	Direct Sum of vector spaces, Dimension of a direct sum, Dual of a vector space. Matrices and change of basis.	**10**
UNIT-III	Linear transformation, Algebra of linear transformations, Matrices as linear mappings, Kernel and image, Rank and Nullity theorem, Singular and non-singular linear mappings, Isomorphism.	**10**
UNIT-IV	Composition of linear mappings Polynomials and linear operators, Square matrices as linear operators, matrix representation of a linear operator, Change of basis, characteristic and minimal polynomial for linear operators.	**15**

Recommended books:

1. Text book on Algebra and Theory of equations by Chandrika Prasad. Pothishala Pvt. Ltd.2017
2. Herstein, I.N.: Topics in Algebra, Wiley Eastern Limited. 2006
3. Linear Algebra by Schaum Outline series.4th Edition.
4. Surjeet Singh and QaziZameeruddin: Modern Algebra. S. Chand Publishing 8th Edition (Relevant portion)

Instruction of Question Paper setter
The paper setter is required to set question paper in three sections A, B and C . Section A consists of 12 MCQs of 1 mark each , Section B consists of 6 Questions with 3 internal choices of 4 marks each and section C consists of 3 questions with 1 internal choice of 8 marks each.

SUBJECT TITLE: Differential Equations
SUBJECT CODE: BMAT-2322
SEMESTER: III
CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
3	0	0	3

Internal Assessment: 40
End Term Exam: 60
Duration of Exam: 3 Hrs

Objective and outcome of course:
The objective of this course is to demonstrate understanding of the theoretical concepts and select and use appropriate models and techniques for finding solutions to differential equations-related problems with and without technology.

Contents of Syllabus:

Sr. No	Contents	Contact Hours
UNIT-I	**First order differential equations:** Order and degree of a differential equation, separable differential equations, Homogeneous differential equations, equations reducible to Homogenous differential equations Exact differential equations.Linear differential equations and equations reducible to linear differential equations.	10
UNIT-II	**Higher order differential Equations:** Solution of Linear homogeneous and non-homogeneous differential equations of higher order with constant coefficients and with variable coefficients, method of Variation of Parameters.	10
UNIT-III	Differential operator method, Linear non-homogeneous differential equations with variable coefficients, Euler's Cauchy method. **Series solution of Differential equation:** Regular point, ordinary point**,** Power Seriesmethod, Forbinious method.	10
UNIT-IV	Bessel, Legendre and Bessel Equations, Legendre and Bessel functions and their properties, recurrence relations, Orthogonality, Rodrigue's formula**.**	15

Recommended books:

1. H.T.H. Piaggio : An Elementary Treatise on Differential equations : Barman Press. 2007
2. R. K. Jain and S.R.K. Iyengar: Advanced Engineering Mathematics, Narosa Publishing House.Edition: 5th, 2016
3. ZafarAhsan: Differential Equations and Their Applications, Prentice-Hall of India Pvt. Ltd. Second Edition , Fourteenth Printing, July 2013
4. I. N. Sneddon : Elements of Partial Differential Equations, McGraw Hill Book Co. 2006

5 RaiSinghania : Ordinary and Partial Differential Equations" , S.Chand&Company, New Delhi.19th Edition, 2017

Instruction of Question Paper setter

The paper setter is required to set question paper in three sections A, B and C. Section A consists of 12 MCQs of 1 mark each , Section B consists of 6 Questions with 3 internal choices of 4 marks each and section C consists of 3 questions with 1 internal choice of 8 marks each.

COURSE TITLE: ORGANIC CHEMISTRY-III

SUBJECT CODE: BCHE-2324

SEMESTER: III

CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
2	0	0	2

Internal Assessment: 40

End Term Exam: 60

Duration of Exam: 3 Hrs

Course Objective: To impart knowledge of basics of organic chemistry i.e. alcohols, aldehydes and ketones

Contents of Syllabus:

Sr. No	Contents	Contact Hours
UNIT-I	**Alcohols:** Classification and nomenclature: Monohydric Alcohols-nomenclature, methods of formation by reduction of aldehydes, ketone, carboxylic acids and esters.Hydrogen bonding, Acidic nature, Reactions of alcohols. Dihydric alcohols-nomenclature, methods of formation, chemical reactions of vicinal glycols-nomenclature, methods of formation chemical reaction of vicinal glycols, oxidative cleavage with [Pb (OAc) and HIO_4] and Pinacol-Pinacolone rearrangement.	8
UNIT-II	Trihydric alcohol-nomenclature, methods off formation and chemical reactions of glycerol. **Phenols:** Nomenclature, structure and bonding.Preparation of Phenols, physical properties and acidic character.Comperative acidic strengths of alcohols and phenols, resonanace stabilization of phenoxideion.Reaction of phcnols-electrophilic aromatic subsititution, acylation and carboxylation Mechanisms of Fries rearrangement.Gattermansynthesis, Hauben.Heeschreaction.Lederer-Mianasse reaction and Reimer-Tiemann reaction.	12
UNIT-III	**Aldehydes and Ketones-I** 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 aldehyes and ketones using 1,3- dithianes, synthesis of ketones from nitrites and from carboxylic acids. Physical properties and Mechanism of nucleophillic addition to carbonyl group with particular emphasis ofBenzoin, Aldol, Perkin and Knoevenagel condensations, Condensation with ammonia and its derivatives, Wittig reaction, and Mannich reaction.	6
UNIT-IV	**Aldehydes and Ketones –II**	4

	Use of acetals as protecting group.Oxidation of aldehydes, Baeyer-Villiger oxidation of ketones, Cannizzaro reaction, MPV, Clemmensen, Wolff-Kishner, $LiAlH_4$ and $NaBH_4$reductions.Halogenation of enolizable ketones. An Introduction to unsaturated aldehydes and ketones, Michael addition.	

Recommended Books

1.OrganicChemsitry, Morrison and Boyd, Prentice- Hall.
2. Fundamentals of Organic Chemistry, Solomons, John Wiley.
3. Organic Chemistry. F.A. Carey, McGraw Hill, Inc.
4. Organic ChemistryVol. I, II & III, S.M. Mukherji, S.P. Singh and R.P.Kapoor, Wiley
5. Eastern Ltd (New Age International).
6. Jarry March Mechanisms of Organic Chemistry, Wiley

Instruction of Question Paper setter: The question paper consist of three sections A, B & C.

1. Section-A is compulsory consisting of 6 short answer type questions (2 marks) from the whole syllabus. Total marks to this section are 12. There will be no choice in this section.
2. Section-B consists of 8 questions. Students will attempt any six questions. Each question carries 4 Marks.
3. Section-C consists of 4 questions. Students will attempt any three questions. Each question carries 8 Marks.

COURSE TITLE: PHYSICAL CHEMISTRY-II
SUBJECT CODE: BCHE-2325
SEMESTER: III
CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
4	0	0	4

Internal Assessment: 40
End Term Exam: 60
Duration of Exam: 3 Hrs

Course Objective: To impart knowledge of basics of thermodynamics, phase equilibria and electro chemistry

Contents of Syllabus:

Sr. No	Contents	Contact Hours
UNIT-I	**Thermodynamics-I** Definition of thermodynamics terms: system, surroundings etc. Types of systems, intensive and extensive properties.State and path functions and their differentials, Thermodynamic processes, Concept of heat and work, elementry idea of thermochemistry.First Law of Thermodynimcs : 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 and inversion temperature, Calculation of w, q, dU&dH for the expansion of ideal gases under isothermal and adiabatic conditions for reversible process. **Theromodynamics-II- (Part-a):** Second law of thermodynamics: need for the law, different statements of the law. Carnot cycle and its efficiency, Carnot theorem.Themodynamic scale of temperature. **Theromodynamics-II- (Part-b):**Concept of 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, entropy as a criterion of spontaneity and equilibrium. Entropy change in ideal gases mixing of gases.	**15**
UNIT-II	**Thermodynamics-III:**Third law of thermodynamics, Nernst heat theorem, statement and concept of residual entropy, evaluation of absolute entropy from heat capacity data, Gibbs and Helmholtz functions; Gibbs function (G) and Helmhotz 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.	**5**
UNIT-III	**Phase Equilibrium:** Statement and meaning of the terms-phase, component and degree of freedom, derivation of Gibbs phase rule; phase equilibria of one	**10**

	component system-water and S systems. simple eutectic Pb-Ag sytems, desilverisation of lead. Liquid-Liquid mixtures-ideal liquid mixtures, Raoult's and Henry's law.Non-ideal system-azeotropes-HCI-HP and ethanol-water systems. Lower and upper consolute temperature, Effect of impurity on consolute temperature, immiscible liquids, steam distillation.Nernst distribution law, thermodynamic derivation & applications.	
UNIT-IV	**Electrochemistry-l(a):** Electrical transport-conduction in metals and in electrolyte solutions, specific conductance and equivalent conductance with dilution. Migration of ions and Kohlrauschlaw.Arrhenius theory of electrolyte dissociation and its limitations, weak and strong electrolytes, Ostwald's dilution law, its uses and limitations.Debye-Huckel-Onsagar's equation for strong electrolytes (elementa treatment only). **Electrochemistry-I(b):** Transport number, definition and deterriilfiafion by Hittorf method and moving boundary method. Applications of conductance measurements: determination of degree of dissociation, determination of K. of acids, determination of solubility product of a sparingly soluble salts, conductometric titrations. **Electrochemistry-II:**Types of reversible electrodes--gas-metal ion, metal-metal ion, 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-standard electrode.potential, sign conventions, electrochemical series and its significance. Electrolyte and Galvanic cells-reversible and irreversible cells, conventional representation of electrochemical cells. EMF of a cell and its measurements, Computation of cell EMF.Calculation of thermodynamic quantities of cell reaction (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., determination of pH using hydrogen, quinhydrone and glass electrodes by potentiomentric methods. Buffers--mechanism of buffer action, Henderson-Hazel equation, Hydrolysis of salts, Corrosion-types, theories and methods of combating it.	**15**

Books Recommended:

1. Thermodynamics for Chemists, S. Glasstone.
2 Chemical thermodynamics, P.A. Rock.
3. Principles of Physical Chemistry, S.H. Maron& C.F. Prutton.
4. Physical Chemistry, P.W. Atkins.
5. Physical Chemistry, Vol.2, K.L. Kapoor.
6. Physical Chemistry, K.J. Laidler.

Instruction of Question Paper setter: The question paper consist of three sections A, B & C.

1. Section-A is compulsory consisting of 6 short answer type questions (2 marks) from the whole syllabus. Total marks to this section are 12. There will be no choice in this section.
2. Section-B consists of 8 questions. Students will attempt any six questions. Each question carries 4 Marks.
3. Section-C consists of 4 questions. Students will attempt any three questions. Each question carries 8 Marks.

COURSE TITLE: CHEMISTRY LABORTARY-III
SUBJECT CODE: BCHE-2326
SEMESTER: III
CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
0	0	6	3

Internal Assessment: 40
End Term Exam: 60
Duration of Exam: 3 Hrs

Course Objective: To impart knowledge of basics of volumetric analysis and chromatography

List of Experiments:

1. Determination of acetic acid in commercial vinegar using NaOH, Alakanity of water sample.
2. Determination of alkali content of antacid.
3. Estimation of calcium content in chalk as calcium oxalate by permanganometry
4. Estimation of hardness of water by EDT A.
5. Estimation of ferrous and ferric by dichromate method.
6. Estimation of copper using sodium thiosulphate
7. Thin Layer Chromatography
8. Determination of R, values and identification of organic compounds.
9. Separation of green leaf pigments (spinach leaves may be used)
10. Preparation and separation of 2, 4-dinitrophenylhydrazones of acetone, benzophenonecyclohexanone using toluene and light petroleum (40 : 60).
11. Separation of a mixture of dyes

Books Recommended:

1. Vogel's book on Inorganic Qualitative Analysis

SYLLABUS

SEMESTER-IV

Fourth Semester

COURSE		Contact Hours/Week			Credit	% of Total Marks					Exam Duration (Hours)
Code	Course Title	L	T	P		CWA	LWA	MTE	ETE	Total	
BPHY-2421	Quantum Mechanics	3	0	0	3	16	-	24	60	100	3
BPHY-2422	Optics & Laser	3	0	0	3	16	-	24	60	100	3
BPHY-2423	Physics Lab-IV	0	0	2	1	-	60	-	40	100	3
BMAT-2421	Vector Analysis	3	0	0	3	16	-	24	60	100	3
BMAT-2422	Discrete Mathematics	3	0	0	3	16	-	24	60	100	3
BCHE-2424	Organic Chemistry-IV	2	0	0	2	16	-	24	60	100	3
BCHE-2425	Inorganic-Chemistry-II	4	0	0	4	16	-	24	60	100	3
BCHE-2426	Chemistry Lab-IV	0	0	2	1	-	60	-	40	100	3
Total		**22**	**0**	**4**	**24**						

Semester-IV

COURSE TITLE: QUANTUM PHYSICS
SUBJECT CODE: BPHY-2421
SEMESTER: IV
CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
3	0	0	3

Internal Assessment: 40
End Term Exam: 60
Duration of Exam; 3 Hrs

Objective and outcome of Course: This course connects the historical development of quantum mechanics with previous knowledge and learns the basic properties of quantum world. The course also covers the applications of quantum mechanics in different area.

Contents of Syllabus:

Sr. No	Contents	Contact Hours
UNIT I	Plancks's formula of Black body radiation and energy quantization, Wave-particle duality, Photoelectric effect, Compton effect, Pair production, De Brogile waves, wave pocket, Phase velocity and Group velocity, Electron microscope, Particle in a box, Particle diffraction, Davisson-Germer experiment, Interferferometry with particles, Uncertainty principle with applications, Principle of complementarity,	**10**
UNIT II	Time-dependent Schrodinger equations, Born's interpretation of Wave function, complex character, continuity and boundary conditions, probability interpretation, normalization, Probabilty current, Probability conservation equation, Principle of superposition, Fundamental postulates of quantum mechanics, Eigenvalues and eigenfunctions,. Operator formalism, Position, momentum and energy operators, expectation values, Ehrenfest theorem, Hermitian operators	**10**
UNIT III	**Problems in One Dimension:** Steady-state Schrodinger equation, Application to stationary states for one dimension, Potential step, Potential barrier, Tunnel effect, rectangular potential well, Quantum mechanics of simple harmonic oscillator, energy levels and energy eigen functions using Frobenius method, Hermite polynomials, ground state, zero point energy & uncertainty principle	**10**
UNIT IV	**Quantum theory of hydrogen-like atoms**: Time independent Schrodinger equation in spherical polar coordinates; separation of variables for second order partial differential equation, angular momentum operator & quantum numbers, Radial wave functions from Frobenius method, shapes of the probability densities for ground & first excited	**10**

	states, Orbital angular momentum quantum numbers *l* and m; s, p, d,.. shells.	

Reference Books:

1. Concept of Modern Physics, A. Beiser, S. Mahajan and S. R. Choudhury, Tata McGraw Hill,2011
2. Quantum Physics of Atoms, Molecular, R. Eisberg&R.Resnick, Second Edition, John Wiley, 2002.
3. Modern Physics, J. Bernstein, P.M. Fishbane, S.G. Gasiorowicz, Pearson, 2000.
4. Elements of Modern Physics, S.H. Patil, McGraw Hill, 1998.

Instructions to Question Paper Setter: The question paper consist of three sections A, B & C. Section-A is compulsory consisting of short answer type questions (1 or 2 marks) from the whole syllabus. It should be of 12 Marks. Section-B consists of 8 questions and students will attempt any six questions. Each question carries 4 Marks. Section-C consists of 4 questions and Students will attempt any three questions. Each question carries 8 Marks.

COURSE TITLE: OPTICS & LASER
SUBJECT CODE: BPHY-2422
SEMESTER: IV
CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
3	0	0	3

Internal Assessment: 40
End Term Exam: 60
Duration of Exam; 3 Hrs

Objective and outcome of Course: The course provides an extensive discussion of optical phenomena such as interference, diffraction, polarization. and laser

Contents of Syllabus:

Sr. No	Contents	Contact Hours
UNIT I	**Interference**: Concept of coherence, spatial and temporal coherence, coherence time, coherence length, area of coherence, Conditions for observing interference fringes, Interference by wavefront division and amplitude division, Young's double slit experiment, Lloyd's mirror and Fresnel's biprism, phase change on reflection, Michelson interferometer-working, principle and nature of fringes, Interference in thin films, Role of interference in anti-reflection and high reflection dielectric coatings, Multiple beam interference, Fabry-Perot interferometer, nature of fringes	**12**
UNIT II	**Diffraction**: Huygen-Fresnal theory half period zones, zone plates, Distinction between Fresnel and Fraunhofer diffraction, Fraunhofer diffraction at rectangular and circular apertures, Effects of diffraction in optical imaging, resolving power of microscope, telescope, Fabry-Perot interferometer. The diffraction grating, its use as a spectroscopic element, resolving power, Moire's fringes	**08**
UNIT III	**Polarization**: Concept and analytical treatment of unpolarised, plane polarized and elliptically polarized light. Double refraction, Nicol prism, sheet polarisers, retardation plates, Production and analysis of polarized light (quarter and half wave plates)	**07**
UNIT IV	**LASER:**Interacation of light with matter: Absorption, spontaneous emission, stimulated	**15**

	emission, Charatertistics of stimulated emission, Einstein coefficients and their relations, Light amplification, Population inversion, Lasing action, Components of Laser, Elementary theory of optical cavity, longitudinal and transverse modes, Principal pumping schemes, Three level and four level laser schemes, Types of lasers, Ruby and Nd : YAG lasers. He–Ne, and CO_2 lasers, Semiconductor lasers, Holography. Principle, recording of hologram and reconstruction of image, Theory of holography	

Reference Books:

1. Subramanayam, N.; Lal, B. and Avadhamulu; M. N. Textbook of Optics. New Delhi: S. Chand & Company, 2006.
2. Jenkins, F.A.; White, H.E. Fundamentals of Optics. USA: McGrawHill Publication,
3. Ghatak,A. Optics. New Delhi:Tata McGraw Hill Publication, 2008.

Instructions to Question Paper Setter: The question paper consist of three sections A, B & C. Section-A is compulsory consisting of short answer type questions (1 or 2 marks) from the whole syllabus. It should be of 12 Marks. Section-B consists of 8 questions and students will attempt any six questions. Each question carries 4 Marks. Section-C consists of 4 questions and Students will attempt any three questions. Each question carries 8 Marks.

COURSE TITLE: PHYSICS LAB-IV
SUBJECT CODE: BPHY-2423
SEMESTER: IV
CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
0	0	4	2

Internal Assessment: 60
End Term Exam: 40
Duration of Exam; 3 Hrs

Objective: The objective of this lab is to highlight Properties and Characteristics of light through experiments related to interference and diffraction phenomenon

Note: Students will be required to perform at least 10 experiments from the given list of experiments

List of Experiments
1. To determine the wavelength of laser source using diffraction of single slit.
2. To determine the wavelength of laser source using diffraction of double slits.
3. To determine (1) wavelength and (2) angular spread of He-Ne laser using plane diffraction grating
4. To determine refractive index of the Material of a prism using sodium source.
5. To determine the dispersive power and Cauchy constants of the material of a prism using mercury source.
6. To determine the wavelength of Laser source using Michelson's interferometer.
7. To determine wavelength of sodium light using Fresnel Biprism.
8. To determine wavelength of sodium light using Newton's Rings
9. To determine wavelength of (1) Na source and (2) spectral lines of Hg source using plane diffraction grating.

10. To determine dispersive power and resolving power of a plane diffraction grating.
11. To verify the law of Malus for plane polarized light.
12. To determine the specific rotation of sugar solution using Polarimeter.
13. To study the polarization of light by reflection and determine the polarizing angle for air- glass interface.

SUBJECT TITLE: Vector Analysis
SUBJECT CODE: BMAT-2421
SEMESTER: IV
CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
3	0	0	3

Internal Assessment: 40
End Term Exam: 60
Duration of Exam; 3 Hrs

Objective and outcome of course:
The objective of this course is to introduce the fundamental ideas to explain the characteristics of scalar and vector valued functions and master these in calculations. provide a physical interpretation of the gradient, divergence, curl and related concepts give an account of important vector field models of Nature.

Contents of Syllabus:

Sr. No	Contents	Contact Hours
UNIT-I	Vectors in the plane Cartesian Co-ordinates and vectors in spaces. Dot and cross products. Lines and planes in space, Cylinders and Quadric surfaces.	**10**
UNIT-II	Cylindrical and Spherical co-ordinates Vector valued functions and space curves. Arc length and Unit Tangent, vector curvature, Torsion	**10**
UNIT-III	Scalar and vector fields, differentiation of vectors, velocity and acceleration. Vector differential operators: Del, Gradient Divergence and Curl, their physical interpretations. Formulae involving Del applied to point functions and their products.	**10**
UNIT-IV	Line, surface and volume integrals Flux, Solenoidal and Irrotational vectors. Gauss Divergence theorem. Green's theorem in plane, Stoke's theorem (without proofs) and their applications.	**15**

Recommended books:

1. Engineering Mathematics, Pearson by Babu Ram.2nd Edition 2012.
2. Thomas and Finney: Calculus and Analytic Geometry. 9th Edition.
3. Liefhold, Louis: Calculus and Analytic Geometry. 6th Edition.
4. Ray Wylie, C., Advanced Engineering Mathematics, McGraw Hill. 6th Edition.

Instruction of Question Paper setter

The paper setter is required to set question paper in three sections A, B and C. Section A consists of 12 MCQs of 1 mark each , Section B consists of 6 Questions with 3 internal choices of 4 marks each and section C consists of 3 questions with 1 internal choice of 8 marks each.

SUBJECT TITLE: Discrete Mathematics
SUBJECT CODE: BMAT-2403
SEMESTER: IV
CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
3	0	0	3

Internal Assessment: 40
End Term Exam: 60
Duration of Exam: 3 Hrs

Objective and outcome of course:

The objective of this course is to provide better understanding of logic sentence in terms of predicates, quantifiers, and logical connectives, operations of sets and use Venn diagrams to solve applied problems; solve problems using the principle of inclusion-exclusion , determination of domain and range of a discrete or non-discrete function, graph functions, identify one-to-one functions, perform the composition of functions and the recursive or inductive step in applied problems and to give a recursive and a non-recursive definition for an iterative algorithm

Contents of Syllabus:

Sr. No	Contents	Contact Hours
UNIT-I	Introduction, Combination of Sets, ordered pairs, proofs of general identitiesof sets, relations, operations on relationsProperties of relations, functions, Hashing Functions, equivalence relations, compatibility relations, partial order relations.	**10**
UNIT-II	Basic counting principles Permutations and combinations Inclusion and Exclusion Principle, Recurrence relations, Recurrence relations, Generating Function, its Application.	**10**
UNIT-III	Graph and planar graphs- basic terminology, Multi-graphs, Weighted Graphs. Paths and Circuits Shortest paths, Eulerian paths and circuits. Planar Graphs. Trees. Lattices and Algebraic Structures, Duality, Distributive and Complemented Lattices.	**15**
UNIT-IV	Boolean Lattices and Boolean Algebras, Boolean Functions and Expressions, Prepositional Calculus. Design and Implementation of Digital Networks, Switching Circuits.	**10**

Recommended books:

1. D. Burton: Elementary Number Theory, McGraw-Hill. 7th Edition 2017

2. Niven and Zuckerman: An Introduction To Number Theory. 5th Edition, 2015.

Instruction of Question Paper setter

The paper setter is required to set question paper in three sections A , B and C . Section A consists of 12 MCQs of 1 mark each , Section B consists of 6 Questions with 3 internal choices of 4 marks each and section C consists of 3 questions with 1 internal choice of 8 marks each.

COURSE TITLE: ORGANIC CHEMISTRY-IV
SUBJECT CODE: BCHE-2424
SEMESTER: IV
CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
2	0	0	2

Internal Assessment: 40
End Term Exam: 60
Duration of Exam: 3 Hrs

Objective and outcome of Course : To impart knowledge of basics of carboxylic acids, ethers, nitrogen containg compounds

Contents of Syllabus:

Sr. No	Contents	Contact Hours
UNIT-I	**Carboxylic Acids:**Nomenclature, structure and bonding.physical properties, acidity of carboxylic acids, effects of substituents on acid strength. Preparation of carboxylic acids, Reactions of amides, Reactions of carboxylic acids, Mechanism of decarboxylation. Methods of formition and chemical reactions of halo acids.Hydroxyacids, maleic and tartaric acid, citric acids. (Structural Formula only), Methods of formation and chemical reaction of unsaturated nonocarboxylicacids.Dicaboxylic acids, methods of formation and effect of heat and dehydrating agents. **Carboxylic Acid Derivatives:** Structure and nomenclature of acid chlorides, esters.amides and cid anhydrides. Relative stability and reactivity of acyl derivatives. Physical properties, interconversion of acid derivatives by nucleophillic acyl substitution. Preparation of carboxylic derivatives, chemical reactions, Mechanism of esterfication and hydrolysis (acidic and Basic).	10
UNIT-II	**Ethers and Epoxides:** Nomenclature of ethers and methods of their formation, physical properties, Chemical reactions-cleavage and autooxidation, Ziesel's Method. Synthesis of epoxide, add and base catalyzed ring opening of epoxide, orientation of ring opening reactions of Grignard and organolithium reagents	10

	with epoxide. **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.	
UNIT-III	**Organic Compunds of Nitrogen** **a) Nitro Compounds** Preparation of nitroalkanes and nitroarenes.Chemical reactions of nitroalkanes.Mechanism of nucleophilic substitution in nitroarenes and their reactions in acidic, neutral and alkaline media, Picric acid.	**5**
UNIT-IV	**b) Amines** Reactivity, structure and nomenclature of amines, physical properties. Stereochemistry of amines Separation of a mixture secondary and tertiary amines. Structural features effecting the basicity of amines. Amine salts as phase-transfer catalyst and preparation of alkyl and aryl amines (reduction of nitro compounds and nitriles), reductive amination of aldehydic and ketonic compounds Gabriel-phthalimide reaction, Hoffmann bromamideraction.	**5**

Books Recommended:

1. Organic Chemsitry, F.A.Carey, McGraw Hill Inc.
2. Organic Chemsitry, Morrison & Boyd, Prentice Hall.

Instruction of Question Paper setter: The question paper consist of three sections A, B & C.

1. Section-A is compulsory consisting of 6 short answer type questions (2 marks) from the whole syllabus. Total marks to this section are 12. There will be no choice in this section.
2. Section-B consists of 8 questions. Students will attempt any six questions. Each question carries 4 Marks.
3. Section-C consists of 4 questions. Students will attempt any three questions. Each question carries 8 Marks.

COURSE TITLE: INORGANIC CHEMISTRY-II
SUBJECT CODE: BCHE-2425
SEMESTER: IV
CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
4	0	0	4

Internal Assessment: 40
End Term Exam: 60
Duration of Exam: 3 Hrs

Objective and outcome of Course: To impart knowledge of transition series, lanthanides and actinides

Contents of Syllabus:

Sr. No	Contents	Contact Hours
UNIT-I	**Chemistry of Elements of First Transition Series** Characteristic properties of d-block elements. Properties of the elements of the first transition series, their simple compounds and complexes illustrating relative stability of their oxidation states, coordination number and geometry. **Chemistry of Lanthanide Elements** Electronic structure, oxidation states and ionic radii and lanthanide contraction, complex formation, occurrence and isolation of lanthanide compounds.	15
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 behavior, spectral properties & stereochemistry **Chemistry of Actinides Elements** General features and chemistry of actinides, chemistry of separation of Np, Pu and Am from U, similarities between the later actinides and the later lanthanides. **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.	15
UNIT-III	**Oxidation and Reduction:** Use of redox potential data-analysis of redox cycle, redox stabilityto water-Frost, Latimer and Pourbaix diagrams. Principles involved in the extraction of the elements. **Acids and Bases:** Arrhenius, Bronsted-Lowry, the Lux-Flood solvent system and Lewis concepts of acids and bases.	9

UNIT-IV	**Non-aqueous Solvents:** Physical properties of a solvent, types of solvents and their general characteristics, reaction in non-aqueous solvents with reference to liquid NH_3 and liquid SO_2	**6**

Books Recommended:

1. J.D. Lee, Concise Inorganic Chemistry, 4th Ed.
2. J.E. Huheey, Inorganic Chemistry, Harper & Row.
3. F.A.Cotton and G. Wilinson, Advanced Inorganic Chemistry, Interscience Publishers.
4. N.N. Greenwood and A. Earnshaw, Chemistry of Elements, Pergamon Press

Instruction of Question Paper setter: The question paper consist of three sections A, B & C.

1. Section-A is compulsory consisting of 6 short answer type questions (2 marks) from the whole syllabus. Total marks to this section are 12. There will be no choice in this section.
2. Section-B consists of 8 questions.Students will attempt any six questions. Each question carries 4 Marks.
3. Section-C consists of 4 questions. Students will attempt any three questions. Each question carries 8 Marks.

COURSE TITLE: CHEMISTRY LABORTARY-IV
SUBJECT CODE: BCHE-2426
SEMESTER: IV
CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
0	0	6	3

Internal Assessment: 60
End Term Exam: 40
Duration of Exam: 3 Hrs

Objective and outcome of Course : To impart knowledge of qualitative analysis

1.	Detection of elements (N, S and halogens) and functional groups (phenolic, carboxylic, carbonyl, esters, carbohydrates, amines, amides, nitro and anilide) in simple organic compounds.
2.	To determine the solubility of benzoic acid at different temperatures and to determine H of the dissolution process.
3.	To determine the enthalpy of neutralization of a weak acid/weak base versus strong base/strong acid and determine the enthalpy of ionization of the weak acid/weak base.
4.	To determine the enthalpy of solution of solid calcium chloride

Books Recommended:

1. Vogel A. I., Tatchell A. R., Furnis B. S., Hannaford A. J., Smith P.W.G.,Vogel's Text Book of Practical Organic Chemistry,5thEdn.,Pubs: ELBS, 1989.

2. Pavia D.L., Lampanana G.M., Kriz G.S. Jr., Introduction to Organic Laboratory Techniques, 3rd

3. Advanced Practical Physical Chemistry By J. B. Yadav

SYLLABUS

SEMESTER-V

Fifth Semester

COURSE		Contact Hours/Week			Credit	% of Total Marks					Exam Duration (Hours)
Code	**Course Title**	**L**	**T**	**P**		**CWA**	**LWA**	**MTE**	**ETE**	**Total**	
BPHY-3521	Atomic & Molecular Spectra	3	0	0	3	16	-	24	60	100	3
BPHY-3522	Solid State Physics	3	0	0	3	16	-	24	60	100	3
BPHY-3523	Physics Lab-V	0	0	2	1	-	60	-	40	100	3
BMAT-3521	Statics	3	0	0	3	16	-	24	60	100	3
BMAT-3522	Calculus of Variations	3	0	0	3	16	-	24	60	100	3
BCHE-3524	Organic Chemistry-V	2	0	0	2	16	-	24	60	100	3
BCHE-3525	Physical Chemistry-III	4	0	0	4	16	-	24	60	100	3
BCHE-3526	Chemistry Lab-V	0	0	2	1	-	60	-	40	100	3
BEDU-1101	Philosophical Perspective of Education	2	0	0	2	15			35	50	1.5
BEDU-1102	Sociological Perspective of Education	2	0	0	2	15			35	50	1.5
Total		**24**	**0**	**4**	**26**						

SEMESTER-V

COURSE TITLE: ATOMIC SPECTRA
SUBJECT CODE: BPHY-3521
SEMESTER: V
CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
3	0	0	3

Internal Assessment: 40
End Term Exam: 60
Duration of Exam; 3 Hrs

Objective and outcome of Course : This course is designed to study the spectrum of atom and molecules. The course also covers the effect of magnetic field on the spectral lines and its applications of spectroscopy in different area.

Sr. No	Contents	Contact Hours
UNIT I	One Electron atomic Spectra: Spectrum of Hydrogen atom, Line spectra, Electron Angular Momentum. Space Quantization, Electron Spin and Spin Angular Momentum, Stern Gerlach experiment, Larmor's Theorem, Spin Magnetic Moment, Spin-orbit coupling, Total angular momentum	**8**
UNIT II	Atoms in External Magnetic Field: Zeeman Effect (normal and Anomalous), Experimental set-up for studying Zeeman effect, Explanation of normal Zeeman effect(classical and quantum mechanical), Explanation of anomalous Zeeman effect(Lande g-factor), Zeeman pattern of D1 and D2 lines of Na-atom	**8**
UNIT III	Many electron atoms: Exchange symmetry of wave function, Symmetric and Antisymmetric Wave Functions, Pauli's Exclusion Principle, and periodic classification of elements, atomic spectra (Helium), Essential features of spectra of Alkaline-earth elements, Spectral Notations for Atomic States, Total angular momentum, Vector Model: Spin-orbit coupling, L-S and J-J coupling schemes, in atoms-L-S and J-J couplings, equivalent and non-equivalent electrons, Two valance electron system-spectral terms of non-equivalent and equivalent electrons, comparison of spectral terms in L-S And J-J coupling, Hyperfine structure of spectral lines and its origin	**12**
UNIT IV	Interaction energy ideas, X-ray spectra, Mosley law, Absorption spectra, Auger effect, General Considerations of Molecular spectra, Electronic States of Diatomic Molecules,	**12**

	Rotational Spectra (Far IR and Microwave Region), Vibrational Spectra (IR Region), Rotator Model of Diatomic Molecule, Raman Effect, Electronic Spectra	

Recommended Books

1. Introduction to Atomic Spectra: H.E. White-Auckland McGraw Hill,
2. Elements of Spectroscopy, Gupta, Kumar and Sharma, PragatiPrakashan, Meerut, 2016
3. Atomic and MoleculerSpectra:Laser , Raj Kumar, KedarNath Ram Nath Publications.

Instructions to Question Paper Setter: The question paper consist of three sections A, B & C. Section-A is compulsory consisting of short answer type questions (1 or 2 marks) from the whole syllabus. It should be of 12 Marks. Section-B consists of 8 questions and students will attempt any six questions. Each question carries 4 Marks. Section-C consists of 4 questions and Students will attempt any three questions. Each question carries 8 Marks.

COURSE TITLE: SOLID STATE PHYSICS
SUBJECT CODE: BPHY-3522
SEMESTER: V
CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
3	0	0	3

Internal Assessment: 40
End Term Exam: 60
Duration of Exam; 3 Hrs

Objective and outcome of Course : The aim of this course is to provide students with a background and understanding of the fundamentals of the solid state physics and to expose them to some exciting current research in this field

Sr. No	Contents	Contact Hours
UNIT I	Crystal structure, Symmetry operations for a two and three dimensional crystal, Two dimensional Bravais lattices, Three dimensional Bravais lattices, Basic primitive cells, Crystal planes and Miller indices, Diamond and NaCl structure. Crystal Diffraction: Bragg's law, Experimental methods for crystal structure studies, Laue equations, Reciprocal lattices of SC, BCC and FCC, Brag's law in reciprocal lattice, Brillouin zones and its construction in two and three dimensions, Structure factor and atomic form factor	**12**
UNIT II	Lattice Vibrations and Phonons: Concepts of phonons, Scattering of photons by phonons, linear monoatomic and diatomic Chains, Density of modes, Acoustical and Optical Phonons, Qualitative Description of the Phonon Spectrum in Solids. Dulong and Petit's Law, Einstein and Debye theories of specific heat of solids, T^3 law	**10**
UNIT III	Magnetic Terminology, Types of Magnetism, Classical Langevin Theory of diamagnetism and Paramagnetism, Quantum Mechanical Treatment of diamagnetism and Paramagnetism, Curie's law, Weiss's Theory of Ferromagnetism and Ferromagnetic Domains, Discussion of B-H Curve, Hysteresis and Energy Loss, Basic Idea of Antiferromagnetism and Ferrimagnetism.	**10**
UNIT IV	Free electron model of metals, free electron, Fermi gas and Fermi energy, Band Theory: Kronig- Penney model, Metals and insulators, Qualitative discussion of the following: Conductivity and its variation with temperature in semiconductors, Fermi levels in	**12**

	intrinsic and extrinsic semiconductors, band gap in semiconductors Superconductivity: Experimental Results, Critical Temperature, Critical magnetic field, Meissner effect. Type I and type II Superconductors, Isotope effect.	

Recommended Books:

1. Introduction to Solid State Physics by C. Kittel (Wiley Eastern)
2. Solid State Physics by S.O Pillai, New Age International Publisher
3. Solid State Physics by Puri and Babbar.

Instructions to Question Paper Setter: The question paper consist of three sections A, B & C. Section-A is compulsory consisting of short answer type questions (1 or 2 marks) from the whole syllabus. It should be of 12 Marks. Section-B consists of 8 questions and students will attempt any six questions. Each question carries 4 Marks. Section-C consists of 4 questions and Students will attempt any three questions. Each question carries 8 Marks.

COURSE TITLE: PHYSICS LABORATORY
SUBJECT CODE: BPHY-3523
SEMESTER: V
CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
0	0	4	2

Internal Assessment: 60
End Term Exam: 40
Duration of Exam; 3 Hrs

Objective: The course covers experiments related to atomic spectra & Solid state physics

Note: Students will be required to perform at least 10 experiments from the given list of experiments

List of Experiments
1. Photo-electric effect: photo current versus intensity and wavelength of light; maximum energy of photo-electrons versus frequency of light
2. To determine the Planck's constant using LEDs of at least 4 different colours.
3. To determine the wavelength of H-alpha emission line of Hydrogen atom.
4. To determine the ionization potential of mercury.
5. To determine the absorption lines in the rotational spectrum of Iodine vapour.
6. To determine the value of e/m by (a) Magnetic focusing or (b) Bar magnet.
7. To setup the Millikan oil drop apparatus and determine the charge of an electron.
8. Study of Zeeman Effect: with external magnetic field; Hyperfine splitting
9. Measurement of Planck's constant using black body radiation and photo-detector
10. Measurement of susceptibility of $Fecl_3$ (Quinck`s Tube Method)
11. To measure the Magnetic susceptibility of Solids.
12. To measure the Dielectric Constant of a dielectric Materials
13. To draw the BH curve of Fe using Solenoid & determine energy loss from Hysteresis.
14. To find energy band gap of semiconductor using P-N junction diode.
15. To determine the Hall coefficient of a semiconductor sample.

Books Recommended:

1. A Text Book of Practical Physics, I.Prakash& Ramakrishna, KitabMahal, 2011
2. Elements of Solid State Physics, J.P. Srivastava, Prentice-Hall of India, 2006
3. B.Sc Practical Physics, C L Arora, S. Chand & Company, 2010

SUBJECT TITLE: Statics
SUBJECT CODE: BMAT-3521
SEMESTER: V
CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
3	0	0	3

Internal Assessment: 40
End Term Exam: 60
Duration of Exam: 3 Hrs

Objective and outcome of course:

The purpose of the study of statics is to develop an understanding of the principles of statics and the ability to analyze problems in a systematic and logical manner, including the ability to draw free-body diagrams. Ability to analyze the statics of calculation of the reactions necessary to ensure static equilibrium and knowledge of internal forces and moments in members.

Contents of Syllabus:

Sr. No	Contents	Contact Hours
UNIT-I	**Statics:** Basic notation, Newton Laws of motion, system of two forces, parallelogram law of forces, resultant of two collinear forces, resolution of forces, moment of a force, couple, theorem on moments of a couple.	**10**
UNIT-II	Co planer forces, resultant of three coplanar concurrent forces, theorem of resolved parts, resultant of two forces acting on a rigid body, Varignon's theorem, generalized theorem of moments.	**10**
UNIT-III	Equilibrium of two concurrent forces, equilibrium condition for any number of coplanar concurrent forces, Lami's theorem. λ - μ theorem, theorems of moments.	**10**
UNIT-IV	Resultant of a force and a couple. Equilibrium conditions for coplanar non-concurrent forces. **Friction**: Definition and nature of friction, laws of friction, Centre of gravity.	**15**

Recommended Books:

1) S.L. Loney: The elements of statics and dynamics, Cambridge University Press. 4th Edition, 2014
2) J. L. Synge and B. A. Griffth : Principles of mechanics, Published by Nabu Press.2013

Instruction of Question Paper setter

The paper setter is required to set question paper in three sections A, B and C. Section A consists of 12 MCQs of 1 mark each , Section B consists of 6 Questions with 3 internal choices of 4 marks each and section C consists of 3 questions with 1 internal choice of 8 marks each.

SUBJECT TITLE: Calculus of Variations
SUBJECT CODE: BMAT-3522
SEMESTER: V
CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
3	0	0	3

Internal Assessment: 40
End Term Exam: 60
Duration of Exam: 3 Hrs

Objective and outcome of course:

The prerequisites for this course is to develop Fully understanding of the properties of geometrical problems and familiar with Variational problems , isoperimetric problems with methods for solving boundary value problems.

Contents of Syllabus:

Sr. No	Contents	Contact Hours
UNIT-I	Basic concepts of the calculus of variations such as Functionals, extremum, variations, function spaces, the Brachistochrone problem.	**10**
UNIT-II	Necessary condition for an extremum, Euler`s equation with the cases of one variable and several variables, Variational derivative.	**10**
UNIT-III	Invariance of Euler`s Equations. Variational problem in parametric form. General Variation: Functionals dependent on one or two functions.	**10**
UNIT-IV	Derivation of basic formula, Variational problems with moving boundaries, Broken extremals, Weirstrass–Erdmann conditions.	**15**

Recommended Books

1.Abdul J. Jerry, Introduction to Integral Equations with Applications, 2nd Ed., Clarkson University Wiley Publishers, 1999.
2. Chambers, Ll. G., Integral Equations: A short Course, International Text Book Company Ltd., 1976.
3. R. P. Kanwal, Linear Integral Equations, 2nd Ed., BirkhauserBosten, 1997.
4. Hochstadt Harry, Integral Equations, John Wiley & Sons, 1989.

5. I. M. Gelfand, S.V. Fomin, Calculus of Variations, Dover Books, 2000.
6. Weinstock Robert, Calculus of Variations with Applications to Physics and Engineering,

Instruction of Question Paper setter

The paper setter is required to set question paper in three sections A, B and C. Section A consists of 12 MCQs of 1 mark each , Section B consists of 6 Questions with 3 internal choices of 4 marks each and section C consists of 3 questions with 1 internal choice of 8 marks each.

COURSE TITLE: ORGANIC CHEMISTRY-V
SUBJECT CODE: BCHE-3524
SEMESTER: V
CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
2	0	0	2

Internal Assessment: 40
End Term Exam: 60
Duration of Exam: 3 Hrs

Objective and outcome of course: To impart knowledge of basics of spectroscopy & organometallics

Contents of Syllabus:

Sr. No	Contents	Contact Hours
UNIT-I	**Spectroscopy:** Nuclear magnetic resonance (NMR) spectroscopy. Proton magnetic resonance (^{1}H NMR) spectroscopy, nuclear shielding and deshielding, chemical shift and molecular structure, spin-spin splitting and coupling constants, 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. **Electromagnetic spectrum: Absorption Spectra** Ultraviolet (UV) absorption spectroscopy-absorption laws (Beer-Lambert's law, Molar absorptivity, presentation and analysis ofUV Spectra, types of electronic transitions, effect of conjugation. Concept of chromophore and auxochrome. Bathochromic, hypsochromic, hyperchromic and hypochromic shifts. UV spectra of conjugated enes and enones	15
UNIT-II	**Infrared (IR):** Infrared (IR) absorption spectroscopy-molecular vibrations, Hooke's law, Selection rules, intensity and position of IR bands, measurement of lR spectrum, fingerprint region, characteristic absorption of various functional groups and Interpretation of IR spectra of simple organic compounds. Problems pertaining to the structure elucidation of simple organic compounds using UV, IR, and PMR spectroscopic techniques.	5

UNIT-III	**Organometallic Compounds** Organomagnesium Compounds The Grignard reagents formation, structure and chemical reactions. Organozinc compounds: formation and chemical reactions. Organolithium compounds: formation and chemical reactions.	**5**
UNIT-IV	**Organosulphur Compounds** Nomenclature, structural features, methods of formation and chemical reactions of thiols, thioethers, sulphonic acids, and sulphonamides.	**5**

Books Recommended:

1.Organic Chemistry, F.A Carey, McGraw-Hill, Inc.
2.Introduction to Organic Chemistry, Streitwieser, Healthcock and Kosover and Kosover, Macmillan.
3.Organic Chemistry, Vol. I, II & III, S.M. Mukherji, S.P. Singh and R.P. Kapoor, Wiley Eastern Ltd. (New Age International).

Instruction of Question Paper setter: The question paper consist of three sections A, B & C.

1. Section-A is compulsory consisting of 6 short answer type questions (2 marks) from the whole syllabus. Total marks to this section are 12. There will be no choice in this section.
2. Section-B consists of 8 questions. Students will attempt any six questions. Each question carries 4 Marks.
3. Section-C consists of 4 questions. Students will attempt any three questions. Each question carries 8 Marks.

COURSE TITLE: PHYSICAL CHEMISTRY-III
SUBJECT CODE: BCHE-3525
SEMESTER: V
CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
4	0	0	4

Internal Assessment: 40
End Term Exam: 60
Duration of Exam: 3 Hrs

Objective and outcome of course : To impart knowledge of basics of spectroscopy & photochemistry.

Contents of Syllabus:

Sr. No	Contents	Contact Hours
UNIT-I	**Elementary Quantum Mechanics:** Black-body radiations, Planck's radiation law, photoelectric effect, heat capacity of solids. Sinusoidal wave equation Hamiltonian operator, Schrodingcr 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. **Spectroscopy:** Electromagnetic radiation, regions of spectrum, basic features of different spectrometers, statement of Born-Oppenheimer approximation, degrees of freedom.	**20**
UNIT-II	**Rotational Spectrum :** Diatomic molecules. Energy levels of a rigid rotor (semi-classical principles), selection rules, spectral intensity, determination of bond length, qualitative description of non-rigid rotor, 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	**20**

	of anharmonic motion and isotope on the spectrum, idea of vibrational frequencies of different functional groups. **Raman Spectrum : C**oncept of polarizability, pure rotational and pure vibrational Raman spectra of diatomic molecules, selection rules.	
UNIT-III	**Electronic Spectrum :** Concept of potential energy curves for bonding and antibonding molecular orbitals, qualitative description of selection rules and Franck-Condon principle. Qualitative description of σ, π and n M.O.their energy levels and their respective transitions. **Solid State: D**efinition of space lattice and unit cell, Laws of crystallography-(i) Law of constancy of interfacial angles. (ii) Law of rationality of indices (iii) Law of symmetry elements in crystals, X-ray diffraction by crystals. Derivation of Bragg's equation. Determination of crystal structure ofNaCI, KCI and CsCI (Laue's method and powder method).	**10**
UNIT-IV	**Photochemistry** Interaction of radiation with matter, difference between thermal and photochemical process. Laws of photochemistry: Grothus-Drapperlaw, Stark-Einstein law, Jablonski diagram depiciting various processes occurring in the excited state, qualitative description of fluorescence, non- radiative processes (internal conversion, intersystem crossing), quantumyield, photosensitized reactions- energy transfer processes (simple examples). Basic concepts of Laser and Maser. Photochemistry of vision and colour	**10**

Books Recommended:

1. Physical Chemistry, R.A Alberty, Wiley Eastern Ltd.
2. The Elements of Physical Chemistry, P. W. Atkins, Oxford.
3. Physical Chemistry Through Problems, S.K. Dogra and S. Dogra, Willey Eastern Ltd.
4. Fundamentals of Photochemistry, Rohtga and Mukherji.

Instruction of Question Paper setter: The question paper consist of three sections A, B & C.
1.Section-A is compulsory consisting of 6 short answer type questions (2 marks) from the whole syllabus. Total marks to this section are 12. There will be no choice in this section.
2. Section-B consists of 8 questions. Students will attempt any six questions. Each question carries 4 Marks.
3.Section-C consists of 4 questions. Students will attempt any three questions. Each question carries 8 Marks.

COURSE TITLE: CHEMISTRY LABORTARY-V
SUBJECT CODE: BCHE-3526
SEMESTER: V
CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
0	0	6	3

Internal Assessment: 60
End Term Exam: 40
Duration of Exam: 3 Hrs

Objective and outcome of Course: To impart knowledge of synthesis of inorganic & organic compounds.

List of Experiments:

1. Preparation of sodium trioxalatoferrate(III), $Na_3[Fe(C_2O_4)_3]$ and determination of its composition by permagnometry.
2. Preparation of Ni-DMG complex, $[Ni(DMG)_2]^{2+}$
3. Preparation of copper tetra-ammine complex. $[Cu(NH_3)_4]SO_4$
4. Preparation of cis-and trans-bis(oxalato) diaquachromate(III) ion.
5. Synthesis of Iodoform from ethanol and acetone
6. Synthesis of Aromatic electrophlic substitution of benzene, p-nitroacetanilide, 2,4,6-tribromophenol, Diazotization/Coupling
7. Preparation of methyl orange and methyl red
8. Preparation of benzoic acid from toluene
9. Preparation of m-nitroaniline from m-dinitrobenzene

Books Recommended:

1. Vogel's book on Inorganic Qualitative Analysis

2. Vogel's book on Organic Qualitative Analysis

SUBJECT TITLE: **PHILOSOPHICAL PERSPECTIVE IN EDUCATION**
SUBJECT CODE: BEDU-1101
SEMESTER: I B.A/B.Sc.B.Ed
CONTACT HOURS/WEEK:

Lecture(L)	Tutorial(T)	Practical(P)	Credit(C)
2	0		2

Internal Assessment: 15
End Term Exam: 35
Duration of Exam: 1.5Hrs

(A) OBJECTIVES AND OUTCOME OF COURSE:

To enable the student teachers to:

- Make pupil teachers understand the concept of education
- Understand the historical background of education in India
- Help them to know the concept of philosophy and its relationship with education.
- Understand the educational philosophy of some reputed thinkers.
- Sensitize the pupil teachers towards human values and teachers role in creation of values based system of education

(B) CONTENTS OF SYLLABUS:

Sr. No	Contents	Contact Hours/Week
UNIT-I	i. Education: Meaning, Nature, Scope, Philosophy: its nature and scope, Relationship between philosophy and education.	
UNIT-II	ii. Philosophies of education: Naturalism, Idealism, pragmatism.	02 hours per

UNIT-III	iii.	Reflections on education: Guru Nanak Dev Ji, R.N.Tagore, Gandhi, Aurobindo and Vivekanand`s contribution to educational philosophy.	week (12 weeks)
UNIT-IV	iv.	Values: Concept, types, sources and role of teacher in inculcating values.	

Sessional Work (any one of the activities)

(i) Preparing a handout of quotes of educational thinkers (any one)on education, human conduct, truth and morality.
(ii) Analysis and study of values of school students.

(C) BOOKS RECOMMENDED

a. Ansari,S.H (2003) . Philosophical Foundations of Education .New Delhi : Sanjay Prakashan.
b. Black, H.S. (1955) .Building a Philosophy of Education, New Delhi :Prentice Hall of India.
c. Rajput, J.S.(2006). Human values and Education. New Delhi: Pragun Publications.
d. Pring, R (2004). Philosophy of Education – Aims, Theory, Common Sense and Research, New York: Continuum.
e. Sinha, Jadunath (2006). Outlines of Indian Philosophy. Calcutta: New Control.
f. Solomon, R.C. (2008) The Little Philosophy Book. New York: OUP
g. Lal, B.K. (1978/2005). Contemporary Indian Philosophy. Delhi: Motilal Banarsi Dass
h. Brubacher, J. S. Modern Philosophies in Education
i. Oomen, T.K. (2014). Social Exclusion independent India. Orient Blackswan.
j. Taneja, V.R. (1998) Educational Thought and Practice. New Delhi: Sterling Publishers Pvt. Ltd.

(D) EVALUATION:

External Examination	35 Marks
Internal Assessment	15 Marks
(a)Attendance	3 Marks
(b)Written Assignments	6 Marks
(c)Two mid Terms Exam	6 Marks

(E) INSTRUCTIONS FOR THE PAPER-SETTER:

The question paper will consist of three Sections: A, B, and C. Section A **(**UNIT-I) & (UNIT-II) and B (UNIT-III) & (UNIT-IV) will have two questions from the respective units of the syllabus and will carry 10 marks each. Section C will consist of 5 questions of 3 marks in each which will cover the entire syllabus uniformly.

(F) INSTRUCTIONS FOR THE CANDIDATES:

Candidates are required to attempt one question each from the sections A and B and the entire section C.

SUBJECT: SOCIOLOGICAL PERSPECTIVE IN EDUCATION
SUBJECT CODE: BEDU-1102
SEMESTER :I B.A/B.Sc.B.Ed
CONTACT HOURS/WEEK:

Lecture(L)	Tutorial(T)	Practical(P)	Credit(C)
2	0		2

Internal Assessment: 15
End Term Exam: 35
Duration of Exam: 1.5Hrs

(A) OBJECTIVES AND OUTCOME OF COURSE:

To enable the student teachers to:

- Understand the concept of education from a sociological perspective.
- Analyze social stratification in Indian society.
- Inculcate human values among the learners.
- Be an agent of change for removal of various types of disparities.

(B) CONTENTS OF SYLLABUS:

Sr. No	Contents	Contact Hours/Week
UNIT-I	i. Sociology of education: concept, Nature and Scope.	
UNIT-II	ii. Social Stratification: caste, class, gender, religion in Indian society.	02 hours per

		week (12 weeks)
UNIT-III	iii. Sustainable development: concept, importance and its awareness through education.	
UNIT-IV	iv. Culture: concept, characteristics, acculturation and enculturation.	

SESSIONAL WORK (Any one of the following)

(i) Report on different types of disparities in Indian society.

(ii) Evaluation of Right to Education Act-2009 in any one School.

(C) BOOKS RECOMMENDED:

1. Ball, Stephen, J (1990). Politics and Policy-making in Education: Explorations in Political Sociology. London: Routledge.
2. Bruner, J.C (1997). The Culture and Education, London: Harvard University Press.
3. Friere, Paulo (1972). Pedagogy of the Oppressed. Harmond worth: Penguin.
4. Gandhi, M.K (1962). The Problem of Education, Ahmadabad: Navajivan Publishing House.
5. Sen, Amartya (1999). Development as Freedom. Oxford: Clarendon.
6. Hurn, C.J. (1993). Limits and Possibilities of Schooling: An Introduction to the Sociology of Education. Boston: Allyn and Bacon.
7. Pandey,K,P.(2007). Perspectives in Social Foundations of Education.Delhi:Shipra
8. Singharoy,D.K.(Ed.). (2010).Interrogating Social Development. Delhi: Manohar

(D) EVALUATION:

External Examination	35 Marks
Internal Assessment	15 Marks
(a)Attendance	3 Marks
(b)Written Assignments	6 Marks
(c)Two mid Terms Exam	6 Marks

(E) INSTRUCTIONS FOR THE PAPER-SETTER:

The question paper will consist of three Sections: A, B, and C. Section A**(**UNIT-I) & (UNIT-II) and B (UNIT-III) & (UNIT-IV) will have two questions from the respective units of the syllabus and will carry 10 marks each. Section C will consist of 5 questions of 3 marks in each which will cover the entire syllabus uniformly.

(F) INSTRUCTIONS FOR THE CANDIDATES:

Candidates are required to attempt one question each from the sections A and B and the entire section C.

SYLLABUS

SEMESTER-VI

Sixth Semester

COURSE		Contact Hours/Week			Credit	% of Total Marks					Exam Duration (Hours)
Code	Course Title	L	T	P		CWA	LWA	MTE	ETE	Total	
BPHY-3621	Nuclear & Particle Physics	4	0	0	4	16	-	24	60	100	3
BPHY-3622	Electronics	2	0	0	2	16	-	24	60	100	3
BPHY-3623	Physics Lab-VI	0	0	2	1	-	60	-	40	100	3
BMAT-3621	Dynamics	3	0	0	3	16	-	24	60	100	3
BMAT-3622	Numerical Methods	3	0	0	3	16	-	24	60	100	3
BCHE-3624	Organic Chemistry-VI	2	0	0	2	16	-	24	60	100	3
BCHE-3625	Inorganic Chemistry-III	4	0	0	4	16	-	24	60	100	3
BCHE-3626	Chemistry Lab-VI	0	0	2	1	-	60	-	40	100	3
BEDU-1201	Understanding the Learner and Learning	2	0	0	2	15			35	50	1.5
BEDU-1202	School Management	2	0	0	2	15			35	50	1.5
BEDU-3501	Teaching of Life Sciences	2	0	0	2	15			35	50	1.5
BEDU-3502	Teaching of Physical Sciences	2	0	0	2	15			35	50	1.5

BED-109	Pedagogy of school Subject (PART-I) Teaching of Science	2	0	0	2	15			35	50	1.5
BEDU-3601	Teaching of Life Sciences	2	0	0	2	15			35	50	1.5
BEDU-3602	Teaching of Physical Sciences	2	0	0	2	15			35	50	1.5
BED-110	Teaching of Mathematics	2	0	0	2	15			35	50	1.5
BED-210	Teaching of Mathematics	2	0	0	2	15			35	50	1.5
BED-209	Pedagogy of school Subject (PART-II) Teaching of Science	2	0	0	2	15			35	50	1.5
Total		**24**	**0**	**4**	**26**						

Semester-VI

COURSE TITLE: NUCLEAR & PARTICLE PHYSICS
SUBJECT CODE: BPHY-3621
SEMESTER: VI
CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
4	**0**	**0**	**4**

Internal Assessment: 40
End Term Exam: 60
Duration of Exam; 3 Hrs

Objectiveand outcome of Course: The course aims to provide knowledge of fundamental aspects of the structure of the nucleus, radioactive decay, nuclear reactions, the interaction of radiation and matter and basic fundamental particles of the universe.

Sr. No	Contents	Contact Hours
UNIT I	Nuclear Properties: Constituents of nucleus, non-existence of electrons in nucleus, Nuclear mass and binding energy, features of binding energy versus mass number curve, nucleus radius, angular momentum and parity, nuclear moments: magnetic dipole moment and electric quadruple moment, properties of nuclear forces, Yukawa theory, Nuclear Models: Liquid drop model, semi-empirical mass formula, condition of stability, evidence for nuclear magic numbers, Shell Model, energy level scheme, angular momenta of nuclear ground states, parity and magnetic moment of nuclear ground states	**15**
UNIT II	Radioactive Decays: Modes of decay of radioactive nuclides and decay Laws, radioactive series and displacement law, radioactive dating, constituents of Cosmic rays,	**15**

	Alpha decay: Gamow's theory of alpha decay, barrier penetration as applied to alpha decay, Geiger Nuttal law, Beta decays: β-, β+ and electron capture decays, Neutrino hypothesis and its detection, parity violation in β decay, Gamma transitions: Excited levels, isomeric levels, Gamma transitions, internal conversion	
UNIT III	Nuclear Reactions: Types of nuclear reactions, reactions cross section, conservation laws, Kinematics of nuclear reaction, Q-value and its physical significance, compound nucleus, level width. Interaction of Nuclear Radiation with matter: Energy loss due to ionization (BetheBlock formula), energy loss of electrons, Cerenkov radiation, Gamma ray interaction through matter, photoelectric effect, Compton scattering, pair production, neutron interaction with matter Basis of detection of nuclear radiations, Gas-filled detectors, proportional and Geiger-Muller counters, Scintillation detectors.	**15**
UNIT IV	Particle physics: Particle interactions; basic features, types of particles and its families. Symmetries and Conservation Laws: energy and momentum, angular momentum, parity, baryon number, Lepton number, Isospin, Strangeness and charm, concept of quark model, color quantum number and gluons	**15**

Recommended Books:

1. Introduction to Nuclear and Particle Physics by V. K. Mittal, R. C. Verma, and S.C. Gupta Prentice Hall of India, 2011
2. Introductory nuclear Physics by Kenneth S. Krane, Wiley India Pvt. Ltd., 2008
3. Nuclear Physics D. C Tayal by Himalaya Publication Home, 2007

Instructions to Question Paper Setter: The question paper consist of three sections A, B & C. Section-A is compulsory consisting of short answer type questions (1 or 2 marks) from the whole syllabus. It should be of 12 Marks. Section-B consists of 8 questions and students will attempt any six questions. Each question carries 4 Marks. Section-C consists of 4 questions and Students will attempt any three questions. Each question carries 8 Marks.

COURSE TITLE: Electronics
SUBJECT CODE: BPHY-3622
SEMESTER: VI
CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
3	0	0	3

Internal Assessment: 40
End Term Exam: 60
Duration of Exam; 3 Hrs

Objective and outcome of Course: The objective of course is to provide the students with a basic understanding of the physics and principles of operation of the most important semiconductor devices in modern microelectronics and photonics.

Sr. No	Contents	Contact Hours
UNIT I	PN Junction Diode, Qualitative Idea of Current Flow Mechanism in Forward and Reverse Biased Diode, Characteristics of PN junction diode, Static and Dynamic Resistance, Principle and structure of (1) LEDs (2) Photodiode (3) Solar Cell, Half-wave Rectifiers, Centre-tapped and Bridge Full-wave Rectifiers Calculation of Ripple Factor and Rectification Efficiency, Basic idea about filter circuits (LC and π filters)	8
UNIT II	Bipolar Junction transistors: n-p-n and p-n-p Transistors, Characteristics of CB, CE and CC Configurations, Active, Cutoff, and Saturation Regions, Current gains α and β, Relations between α and β, Structure and characteristics of Field Effect Transistor (FET), MOSFET	8
UNIT III	Amplifying action of transistor, Working of CE Amplifier, Voltage divider biasing circuit for CE Ampifier, Amplifier analysis using h-parameter, Equivalent Circuit, Analysis of a single-stage CE amplifier using Hybrid Model, Determination of current	**7**

	gain, power gain, input and output Impedance,	
UNIT IV	Sinusoidal Oscillators: Barkhausen's Criterion for Self-sustained Oscillations, LC oscillator (tuned collector, tuned base Hartley), RC oscillators, phase shift and Wein bridge. Instrumentations: Introduction to CRO: Block Diagram of CRO. Applications of CRO: (1) Study of Waveform, (2) Measurement of Voltage, Current, Frequency, and Phase Difference	**7**

Books Recommended:

1. Integrated Electronics, J. Millman and C.C. Halkias, Mc-Graw Hill Publication Co. Ltd., 2008
2. Electronics: Fundamentals and Applications, J.D. Ryder, Prentice Hall, 2004
3. Solid State Electronic Devices, B.G.Streetman&S.K.Banerjee, PHI Learning, 2009
4. Principle of Electronics, V K Mehta and Rohit Mehta S Chand & Company, 2012

Instructions to Question Paper Setter: The question paper consist of three sections A, B & C. Section-A is compulsory consisting of short answer type questions (1 or 2 marks) from the whole syllabus. It should be of 12 Marks. Section-B consists of 8 questions and students will attempt any six questions. Each question carries 4 Marks. Section-C consists of 4 questions and Students will attempt any three questions. Each question carries 8 Marks.

COURSE TITLE: PHYSICS LABORATORY
SUBJECT CODE: BPHY-3623
SEMESTER: VI
CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
0	**0**	**4**	2

Internal Assessment: 60
End Term Exam: 40
Duration of Exam; 3 Hrs

Objective: The course covers experiments related to analogue electronics, characteristics of solid state electronics devices and nuclear physics.

Note: Students will be required to perform at least 12 experiments from the given list of experiments

Contents
1. To study V-I characteristics of PN junction diode, and Light emitting diode.
2. To study the V-I characteristics of a Zener diode and its use as voltage regulator.
3. Study of V-I & power curves of solar cells, and find maximum power point & efficiency.
4. To study the characteristics of a Bipolar Junction Transistor in CE configuration.
5. To design a CE transistor amplifier of a given gain (mid-gain) using voltage divider bias.
6. To study the frequency response of voltage gain of a RC-coupled transistor amplifier.
7. To V-I characteristic of Solar Cell.
8. Study of half wave, full wave and bridge rectifier.
9. To draw output and mutual characteristics of an FET and determine its parameters.
10. To set up an oscillator and to study its output on CRO for different C-values.

11. To draw the plateau of a GM counter and find its dead time.
12. To study the statistical fluctuations and end point energy of beta particles using GM counter.
13.To study the absorption of beta particles in aluminium using GM counter and determine the absorption coefficient of beta particles from it.
14. To study the response of RC circuit to various input voltage (square, sine and triangular
15 Study of half wave, full wave and bridge rectifier with filter.

Recommended Books:

1. Basic Electronics: A text lab manual, P.B. Zbar, A.P. Malvino, M.A. Miller, Mc-Graw Hill, 2001
2. OP-Amps and Linear Integrated Circuit, R. A. Gayakwad, 2000, Prentice Hall.
3. A Text Book of Practical Physics, I.Prakash& Ramakrishna, 2011, KitabMahal
4. B.Sc Practical Physics, C L Arora, S. Chand & Company, 2010

SUBJECT TITLE: Dynamics
SUBJECT CODE: BMAT-3621
SEMESTER: VI
CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
3	0	0	3

Internal Assessment: 40
End Term Exam: 60
Duration of Exam; 3 Hrs

Objective and outcome of course: The objective of this course is to develop an ability to apply knowledge to analyze motion of a particle with constant acceleration, by a string and along a smooth inclined plane that will help to design a system, component, or process to meet desired needs within realistic constraint.

Contents of Syllabus:

Sr. No	Contents	Contact Hours
UNIT-I	Motion of a particle with constant acceleration, acceleration of falling bodies, motion under gravity, motion of a body projected vertically upward, Motion of a two particles connected by a string.	**10**
UNIT-II	Motion along a smooth inclined plane constrained motion along a smooth inclined plane. Variable acceleration, Simple harmonic motion, elastic string, simple pendulum.	**10**
UNIT-III	Projectile, Work, Power , conservative fields and potential energy, work done against gravity, potential energy of a gravitational field. Relative	**10**

	motion, relative displacement, velocity and acceleration.	
UNIT-IV	Motion relative to a rotating frame of reference. Linear momentum, angular momentum, conservation of angular momentum, impulsive forces, principle of impulse and momentum.	**15**

Recommended Books:

1) S. L. Loney: The elements of statics and dynamics, Cambridge University Press. 2016
2) J. L. Synge and B. A. Griffth : Principles of mechanics, Published by Nabu Press.2011

Instruction of Question Paper setter

The paper setter is required to set question paper in three sections A , B and C . Section A consists of 12 MCQs of 1 mark each , Section B consists of 6 Questions with 3 internal choices of 4 marks each and section C consists of 3 questions with 1 internal choice of 8 marks each.

SUBJECT TITLE: Numerical Methods
SUBJECT CODE: BMAT-3622
SEMESTER: VI
CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
3	0	0	3

Internal Assessment: 40
End Term Exam: 60
Duration of Exam: 3 Hrs

Objective and outcome of course:

The course will develop numerical methods aided by technology to solve algebraic, transcendental, and differential equations, and to calculate derivatives and integrals. The course will also develop an understanding of the elements of error analysis for numerical methods and certain proofs. The course will further develop problem solving skills.

Contents of Syllabus:

Sr. No	Contents	Contact Hours
UNIT-I	Error: Sources, Propagation and Analysis. Non-Linear Equations: Bisection, Regula-Falsi, Secant, Newton-Raphson, and General Iteration Methods and their convergence, Aitkin's Method for acceleration of the Convergence	**10**
UNIT-II	Methods for multiple roots, Newton-Raphson and General iteration Methods for System of Non-Linear Equations, Methods for Complex roots and Methods for finding	**10**

UNIT-III	Roots of Polynomial Equations. Linear System of Equations: Direct Methods: Gauss elimination method, Gauss-Jordan Elimination methods, Decomposition methods : Crout's Methods	**10**
UNIT-IV	Iterative Methods: Jacobi iterative method, Gauss-Seidel iterative method, Power Method , Householder Method	**15**

Recommended Books :

1. MK Jain, SRK Iyenger and RK Jain: Numerical Methods for Scientific and Engineering Computations, New Age Intenational (P) Limited, Publishers, New Delhi.2013
2. Kendall E Atkinson: An introduction to Numerical Analysis, John Wiley &Sons, Printed in India by Replika Pvt. Ltd. 2nd Edition, 1989
3. S.S.Sastry: Introductory Methods of Numerical Analysis, Prentice Hall of India Pvt. Ltd., New Delhi.5th Edition 2012
4. FB Hilderbrand : Introduction to Numerical Analysis, Dover Publication Inc, New York,. 2nd Edition 1987

Instruction of Question Paper setter

The paper setter is required to set question paper in three sections A , B and C . Section A consists of 12 MCQs of 1 mark each , Section B consists of 6 Questions with 3 internal choices of 4 marks each and section C consists of 3 questions with 1 internal choice of 8 marks each.

COURSE TITLE: ORGANIC CHEMISTRY-VI
SUBJECT CODE: BCHE-3624
SEMESTER: VI
CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
2	**0**	**0**	**2**

Internal Assessment: 40
End Term Exam: 60
Duration of Exam: 3 Hrs

Objective and outcome of Course : To impart knowledge of heterocyclic compounds, polymers, carbohydrates & amino acids.

Contents of Syllabus:

Sr. No	Contents	Contact Hours
UNIT-I	**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 mechanism of electrophlic substitution. Mechanism of nucleophlic substitution reaction in pyridine derivatives. Comparison of basicity of pyridine, piperidine and pyrrole. Introduction to condensed five and six membered heterocycles.Preparation and reactions of indole, quinoline and isoquinolinewith special reference to Fischer indole synthesis, Skraup synthesis and Bischler- Napieralski synthesis.	**7**

	Mechanism of electrophlic substitution reactions of indole, quinoline and isoquinoline.	
UNIT-II	**Synthesis of Polymers:** Ziegler-Natta polymerziation and vinyl polymers. Condensation or step growth polymerziation. Urea formaldhehyde resins, epoxy resins and polyurethanes. Natural and synthetic rubbers. **Organic Synthesis Via Enolatcs** Acidity of α-hydrogens, alkylation of diethyl malonate and ethyl acetoacetate. Synthesis of ethyl acetoacetate: the Claisen condensation. Keto-enoltautomerism of ethyl acetoacetate. Alkylation and acylation of enamines.	**8**
UNIT-III	**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 threodiastereomers. 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. Structures of ribose and deoxyribose. An introduction to disaccharides (maltose, sucrose and lactose) and polysaccharide starch and cellulose without involving structure determination	**7**
UNIT-IV	**Amino Acids, Pcptides, 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 levels of protein structure. Protein denaturation/renaturation. Nucleic acids: Introduction, Constituents of nucleic acids Ribonucleosides and ribonucleotides. The double helical structure of DNA.	**8**

Books Recommended:

1.Organic Chemistry, F.A Carey, McGraw-Hill, Inc.
2.Introduction to Organic Chemistry, Streitwieser, Healthcock and Kosover and Kosover, Macmillan.
3.Organic Chemistry, Vol. I, II & III, S.M. Mukherji, S.P. Singh and R.P. Kapoor, Wiley Eastern Ltd. (New Age International).

Instruction of Question Paper setter: The question paper consist of three sections A, B & C.

1.Section-A is compulsory consisting of 6 short answer type questions (2 marks) from the whole syllabus. Total marks to this section are 12. There will be no choice in this section.

2. Section-B consists of 8 questions. Students will attempt any six questions. Each question carries 4 Marks.

3. Section-C consists of 4 questions. Students will attempt any three questions. Each question carries 8 Marks.

COURSE TITLE: INORGANIC CHEMISTRY-III
SUBJECT CODE: BCHE-3625
SEMESTER: VI
CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
4	0	0	4

Internal Assessment: 40
End Term Exam: 60
Duration of Exam: 3 Hrs

Objective and outcome of Course : To impart knowledge of Transition metal complexes, Bioinorganic chemistry & organometallics.

Contents of Syllabus:

Sr. No	Contents	Contact Hours
UNIT-I	**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. **Thermodynamic and Kinetic Aspects of Metal Complexes** A brief outline of thermodynamic stability of metal complexes and factors	15

	affecting the stability, substitution reactions of square planar complexes.	
UNIT-II	**Magnetic Properties of Transition Metal Complexes** Types of magnetic behaviour, methods of determining magnetic susceptibility, spin-only formula, L-S coupling, Correlation of μ_s and μ_{eff} values, orbital contribution to magnetic moment, application of magnetic moment data for 3d-metal complexes. **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 electronic spectrum of $[Ti(H_2O)_6]^{3+}$ complexion. **Hard and Soft acids and Bases (HSAB)** Classification of acids and bases as a hard and soft, Pearson's HSAB concept, acid-base strength and hardness and softness. Symbiosis, theoretical basis of hardness and softness, electronegativity and hardness and softness.	**20**
UNIT-III	**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}, Nitrogen fixation.	**10**
UNIT-IV	**Silicones and Phosphazenes:** Silicones and Phosphazenes as examples of inorganic polymers,nature of bonding in triphosphazenes. **Organometallic Chemistry:** Definition, Nomenclature and classification of organometallic compounds. Preparation, properties, bonding and applications of alkyls,of' Li, Al, Hg, Sn and Ti, a brief account of metal-ethylene complexes and homogeneous hydrogenation, mononuclear carbonyls and the nature of bonding in metal carbonyls.	**15**

Books Recommended:

1. D.F.C. Shriver, P.W. Atkins and C.H. Langford, Inorganic Chemistry, ELBS Oxford,1991.

2. J.E. Huheey, E.A. Keiter, R.L. Keiter, Inorganic Chemistry, 4th Ed, Pearson Education,Singapore, 1999

3. J.D.Lee, Concise Inorganic Chemistry, ELBS, Oxford 1994.

4. Puri Sharma Kalia Principles of Inorganic Chemistry

Instruction of Question Paper setter: The question paper consist of three sections A, B & C.

1.Section-A is compulsory consisting of 6 short answer type questions (2 marks) from the whole syllabus. Total marks to this section are 12. There will be no choice in this section.

2. Section-B consists of 8 questions. Students will attempt any six questions. Each question carries 4 Marks.

3.Section-C consists of 4 questions. Students will attempt any three questions. Each question carries 8 Marks

COURSE TITLE: CHEMISTRY LABORTARY-VI
SUBJECT CODE: BCHE-3626
SEMESTER: VI
CONTACT HOURS/WEEK:

Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
0	0	6	3

Internal Assessment: 60
End Term Exam: 40
Duration of Exam: 3 Hrs

Objective and outcome of Course : To impart knowledge of synthesis

List of Experiments

1. Separation of fluorescein and methylene blue.
2. Separation of leaf pigments from spinach leaves.
3. Determine the strength of the given acid conductometricallyusin standard alkali solution.
4. To determine the solubility and solubility product of a given sparingly soluble electrolyte conductometrically.
5. To study the saponification of ethyl acetate conductometrically.
6. Determine the ionisation constant of a weak acid conductometrically.
7. To determine the strength of the given acid solution pH- metrically by using standard alkali solution.
8. Determine the molar refraction of methanol, ethanol and propanol.

9. To study the distribution of benzoic acid between benzene and water, and ether and water. **10.** Knowledge of Stereochemical Study of Organic Compounds. Rand S configuration of optical isomers. E, Z configuration of geometrical isomers **11.** Conformational analysis of cyclohexanes and substituted cyclohexanes

Books Recommended:

1. Experiments in Physical Chemistry, R.C. Das, and B. Behra, Tata Mc-graw Hill.
2. Advanced Practical Physical Chemistry, J.B. Yadav, Goel Publishing House.
3. Advanced Exp. Chemistry, Vol. I-Physical, J.N. Gurutu and R. Kapoor, S. Chand & Co.
4. Selected Exp. in Physical Chemistry, N.G. Mukherjee, J.N. Ghose& Sons.
5. Exp. in Physical Chemistry, J.C. Ghosh, BhartiBhavan.

SUBJECT TITLE: UNDERSTANDING THE LEARNER AND LEARNING
SEMESTER: II B.A/B.Sc.B.Ed
SUBJECT CODE: BEDU-1201
CONTACT HOURS/WEEK:

Lecture(L)	Tutorial(T)	Practical(P)	Credit(C)
2	0		2

Internal Assessment: 15
End Term Exam: 35
Duration of Exam: 1.5Hrs

OBJECTIVES AND OUTCOME OF COURSE:

To enable the student teachers to:

- Understand the learner and his potentiality;
- Understand the process of human development with special reference to adolescence;
- Analyze the characteristics and problems of Indian adolescents;
- Familiarize with administration and interpretation of psychological tests;
- Apply the understanding of the different typed of learners in various classroom situations;
- Understanding the motivation and its impact in the classroom.

(A) CONTENTS OF SYLLABUS:

Sr. No	Contents	Contact Hours/Week

UNIT-I	i.	Educational psychology- concept, nature, scope and importance.	02 hours per week (12 weeks)
UNIT-II	ii.	Growth and development: meaning, difference, principles, influence of heredity and environment on growth and development of a child.	
UNIT-III	iii.	Intelligence: concept, theories-Spearman, and Gardner. Uses and limitations of Intelligence tests.	
UNIT-IV	iv.	Learning: Meaning, process and factors affecting learning of an individual, Trial and error theory and classical conditioning theory.	

SESSIONAL WORK (any one of the activities)

(i) Administration and interpretation of any one psychological test (Intelligence).
(ii) Visit to a school and write a report on problems being faced by the Students.

(C) BOOKS RECOMMENDED:

(1) Bigge, M.C. & Row. (1971): Learning Theories for Teachers (2nd Ed.). N.Y.: Harper Collins.
(2) Bower, G.H. and Hilgard, E.R. (1981) theories of Learning. Prentic Hall, Inc. Englewood Cliffs, New Jersey.
(3) Woolfolk, A. (2006) Educational Psychology. New Delhi: Pearson Publications.
(4) Hall, C.S., Gardener, L. and John, B.C. (2010) Theories of Personality. Delhi: Aggarwal Printing Press.
(5) Chauhan, S.S. (2002). Advanced Educational Psychology. New Delhi: Vikas Publishing.
(6) Havighurst, R. et al. (1995). Society and Education. Baston: Allyen ad Bacon.
(7) Kamat, A.R.(1985). Education and Social Change in India. Bombay: Samaiya Publishing Co.
(8) Rinehart and Winston, Bhatia, K.K. (2008). Basis of Educational Psychology. Ludhiana: Kalyani Publishers.
(9) Sharma, K.N. (1990). Systems, Theories and Modern Trends in Psychology.Agra: Woolfork.
(10) Upadhya, B. & Singh Y.K.(2011). Encyclopaedia of Education Psychology.(vol. I to II).Delhi: APH
(11) Crawford, W & De Cecco, J.P. The Psychology of Learning and Instruction Delhi:Previtice-Hall.
(12) Kumar,R.(2009) Child Development.(Vol.I To II). New Delhi: APH

(D) EVALUATION:

External Examination	35 Marks
Internal Assessment	15 Marks
(a)Attendance	3 Marks
(b)Written Assignments	6 Marks
(c)Two mid Terms Exam	6 Marks

(E) INSTRUCTIONS FOR THE PAPER-SETTER:

The question paper will consist of three Sections: A, B, and C. Section A**(**UNIT-I) & (UNIT-II) and B (UNIT-III) & (UNIT-IV) will have two questions from the respective units of the syllabus and will carry 10 marks each. Section C will consist of 5 questions of 3 marks in each which will cover the entire syllabus uniformly.

(F) INSTRUCTIONS FOR THE CANDIDATES:

Candidates are required to attempt one question each from the sections A and B and the entire section C.

SUBJECT: SCHOOL MANAGEMENT
SUBJECT CODE: BEDU-1202
SEMESTER : II B.A/B.Sc. B.Ed
CONTACT HOURS/WEEK:

Lecture(L)	Tutorial(T)	Practical(P)	Credit(C)
2	0	0	2

Internal Assessment : 15
End Term Exam : 35
Duration of Exam : 1.5Hrs

(A) OBJECTIVES AND OUTCOME OF COURSE:

To enable the student teachers to:

- Understand the concept and importance of school management.
- Understand the concept of time table and co-curricular activities.
- Understand the role of worthy head masters and teachers.
- Understand the roles of students‟ self-government.
- Understand the concept of supervision.

(B) CONTENTS OF SYLLABUS:

Sr. No	Contents	Contact Hours/Week
UNIT-I	i. School management-concept, nature, scope, Time table meaning, types, importance and principles.	02 hours per week (12 weeks)
UNIT-II	ii. Co-curricular activities-concept, content, types, advantages, importance and organization of different co-curricular activities.	
UNIT-III	iii. Leadership: concept, theories and qualities of leader. School Personnel- Head of the institution, teachers and students	
UNIT-IV	iv. Supervision- concept, types, principles, methods of supervision effects in existing supervisory programme and suggestions.	

SESSIONAL WORK (Any one of the following)

(i) Preparation of blue print of the time- table.
(ii) Organisation of morning assembly at the school/college.

(C) BOOKS RECOMMENDED:

1. Kowalski, Theodore. J (2001). Case Studies on Educational Administration (3rd ed.) New York, Longman.
2. Mukhopadhyay, Marmar and Tyagi, R.S (2005). Governance of School Education in India. New Delhi, NIEPA.
3. Jha, Jyotsna, Saxena, K.B.C. and Baxi, C.V (2001). Management Processes in Elementary Education: A Study of Existing Practices in Selected States in India. New, Delhi, The European Commission.
4. Tilak, J. B.G (1992). Education and Structural Adjustment. Prospects 22 (4), 84: 407- 22.
5. Drucker (2001). Management Challenges for the 21st Century. New York: Harperbusiness.
6. Glasser (1998). The Quality School, 3rd ed. Harper-perennial Library.
7. Mukerjee, S.N.- Secondary School Administration. 72
8. Safaya&Shaida- School Administration & Organisation.
9. Sidhu, K.S.- School Organisation & Administration. International Prakashan, Jalandhar.
10. Walia, J.S.-Foundations of School Administration and organisation. Paul.

(D) EVALUATION:

External Examination	35 Marks
Internal Assessment	15 Marks
(a)Attendance	3 Marks
(b)Written Assignments	6 Marks
(c)Two mid Terms Exam	6 Marks

(E) INSTRUCTIONS FOR THE PAPER-SETTER:

The question paper will consist of three Sections: A, B, and C. Section A **(**UNIT-I) & (UNIT-II) and B (UNIT-III) & (UNIT-IV) will have two questions from the respective units of the syllabus and will carry 10 marks each. Section C will consist of 5 questions of 3 marks in each which will cover the entire syllabus uniformly.

(F) INSTRUCTIONS FOR THE CANDIDATES:

Candidates are required to attempt one question each from the sections A and B and the entire section C.

SUBJECT TITLE: PEDAGOGY OF A SCHOOL SUBJECT (PART-I)
TEACHING OF ENGLISH
SUBJECT CODE: BEDTE-3514
SEMESTER : V B.A/B.Sc.B.Ed
CONTACT HOURS/WEEK:

Lecture(L)	Tutorial(T)	Practical(P)	Credit(C)
2	0	0	2

Internal Assessment :15
End Term Exam : 35
Duration of Exam : 1.5Hrs

(A) OBJECTIVES AND OUTCOME OF COURSE:

To enable the student teachers to:

- Understand the nature and importance of English language;
- Identify the proficiency, interests and needs of learners in the context of grammar and vocabulary;
- Develop presentation skills among learners;
- Develop activities and tasks for English language learners;

- Apply methods, approaches and materials for teaching English at different levels in the Indian context.

(B) CONTENTS OF SYLLABUS:

Sr. No	Contents	Contact Hours/Week
UNIT-I	i. Language: meaning, nature and its roles. Difference between home language and school /language and role of home language/Mother tongue in learning the school language/foreign language.	02 hours per week (12 weeks)
UNIT-II	ii. History and Status of English language in India: Basic linguistic principles, objectives, methods: Translation, Bilingual and Direct. iii. Presentation Skills: (i) Dramatization (ii) Extempore (iii) Declamation	
UNIT-III	iv. Mechanics &Methods of Reading; Letter and non-letter methods, silent & loud reading, intensive & extensive reading and reading for comprehension. v. Introduction to speaking and listening	
UNIT-IV	Vi Use of dictionary & thesaurus as resources in teaching and learning the language. Grammar its different types and methods of teaching Grammar: Inductive & deductive. Vii Teaching Writing Skills (i) Mechanics of writing (ii) Teaching writings to the beginners (iii) From controlled to free practices (iv)Creative writing	

ACTIVITIES (ANY ONE OF THE FOLLOWING)

(i) Discussion on the problems of English language at elementary level.
(ii) Identification of grammatical errors at the elementary level and remedial measure

(C) BOOKS RECOMMENDED:

1. Gurrey, P. (1954). The teaching of written English. London: Longmans Green and Co.
2. Regional Institute of English, Chandigarh (1972). Teacing English. Regional Institute of English, Chandigarh
3. Bhatia, Achla & Kaur, Ravjeet (2011). Modern Teaching of English. Patiala: Twenty First Century Publications
4. Bhatia, K.K. Teaching and Learning English as a Foreign Language
5. Chapman, L.R.H. Teaching English to Beginners, Longmans, London.
6. Raman, M. (2004).English Language Teaching.Atlantic Publishers, New Delhi.
7. Sachdeva, M.S.(2013). Teaching of English. Patiala: Twenty First Century Publications.

8. Notes for Teachers in Training – Regional Institute English Chandigarh, O.U.P.
9. Venkateswaran, S.Principles of Teaching English.
10. Venugopal, K.R. Methods of Teaching English, Neel Kamal Publishers.

(D) EVALUATION:

External Examination	35 Marks
Internal Assessment	15 Marks
(a)Attendance	3 Marks
(b)Written Assignments	6 Marks
(c)Two mid Terms Exam	6 Marks

(E) INSTRUCTIONS FOR THE PAPER-SETTER:

The question paper will consist of three sections: A, B, And C. Section A**(**UNIT-I) & (UNIT-II) and B (UNIT-III) & (UNIT-IV) will have two questions from the respective units of the syllabus and will carry 10 marks each. Section C will consist of 5 question of 3 marks in each which will cover the entire syllabus uniformly.

(F) INSTRUCTIONS FOR THE CANDIDATES :

Candidates are required to attempt one question each from the sections A and B and the entire section C.

SUBJECT: PEDAGOGY OF A SCHOOL SUBJECT (PART-I) TEACHING OF MATHEMATICS
SUBJECT CODE: BEDTM-3518
SEMESTER : V B.A/B.Sc.B.Ed
CONTACT HOURS/WEEK:

Lecture(L)	Tutorial(T)	Practical(P)	Credit(C)
2	0	0	2

Internal Assessment : 15
End Term Exam : 35
Duration of Exam : 1.5Hrs

(A) OBJECTIVES AND OUTCOME OF COURSE:

To enable the student teachers to:

- Understand the nature of mathematics.
- Understand the importance and objectives of teaching mathematics.

- Understand the methodology of teaching to be used while teaching Mathematics.
- Understand the principles of curriculum constructions in mathematics.
- Improve competencies in secondary level mathematics.
- Setup mathematics club in the school and organize its activities.

(B) CONTENTS OF SYLLABUS:

Sr. No	Contents	Contact Hours/Week
UNIT-I	i. Nature of mathematics: Meaning, Nature, Importance and values of mathematics, scope of mathematics. ii. Historical development of notations and hypothesis in mathematics: Contributions to mathematics (Aryabhatta, Bhaskarasharya, Pythagoras, Ramanujam)	02 hours per week (12 weeks)
UNIT-II	iii. Teaching Aids: Meaning, Needs and Importance of Teaching Aids, principles of selections of Audio-Visual aids, Types of Teaching Aids.	
UNIT-III	iv. Objectives: Aims and objectives of teaching mathematics in elementary and secondary school; Bloom's taxonomy of educational objectives. v. Mathematics Teacher: Meaning, Needs and Importance of teacher, qualification of a mathematics teacher, qualities of mathematics teacher.	
UNIT-IV	vi. Pedagogical analysis : Meaning and procedure for continuing pedagogical analysis. Classification of content, objectives, evaluation etc.	

SESSIONAL WORK (Any one of the following)

(i) Teaching aid from the 3-dimentional aspects.
(ii) Creative way of teaching of mathematics at elementary level.
(iii) Preparing a question bank for mathematics.

(C) BOOKS RECOMMENDED:

a. Taylor, Helen and Harris, Andrew : Learning and Teaching Mathem

b. Hansen, et al : Children's Errors in Mathematics.

c. Witt, Marcus : Primary Mathematics for Trainee Teachers.

d. Chambers, P: Teaching Mathematics in Secondary School.

e. Butler and Wren : The Meaning of Secondary School Mathematics.

f. Chadha, B.N : The Teaching of Mathematics.

g. Gakhar, S.C : Teaching of Mathematics.

h. Mangal. S.K. : Teaching of Mathematics.

i. N.C.E.R.T Text Books (6^{th} Class to 10^{th} Class)

j. Sidhu, K.S. : Teaching of Mathematics.

k. Dr. Neetu Sethi :Teaching of Mathematics.

(D) EVALUATION:

External Examination	35 Marks
Internal Assessment	15 Marks
Attendance	3
Written Assignments	6
Two Mid Terms Exam	6

(E) INSTRUCTIONS FOR THE PAPER-SETTER:

The question paper will consist of three sections A, B and C. Section A**(**UNIT-I) & (UNIT-II) and B (UNIT-III) & (UNIT-IV) will have two questions from the respective units of the syllabus and will carry 10 marks each. Section C will consist of 5 questions of 3 marks in each which will cover the entire syllabus uniformly.

(F) INSTRUCTIONS FOR THE CANDIDATES:

Candidates are required to attempt one question each from the sections A and B and the entire section C.

SUBJECT: PEDAGOGY OF A SCHOOL SUBJECT (PART-I) TEACHING OF SCIENCE
SUBJECT CODE : BEDTS-3517
SEMESTER : V B.A.B.Ed.
CONTACT HOURS/WEEK :

Lecture(L)	Tutorial(T)	Practical(P)	Credit(C)
1	0	1	2

Internal Assessment : 15
End Term Exam : 35
Duration of Exam : 1.5Hrs

(A) OBJECTIVES AND OUTCOME OF COURSE:

To enable the student teachers to:

- Identity objectives of teaching Science at different School Stages.
- Understand the nature and significance of Science.
- Develop habit of Observation, exploration, classification and systematic way of thinking.
- Understand the impact of Science upon our way of life
- Acquaint with scientific method and enable them to develop scientific attitude.

(B) CONTENTS OF SYLLABUS:

Sr. No	Contents	Contact Hours/Week
UNIT-I	• Nature and significance of Science: Nature, Scope and Importance of Science, Correlation in Science: Concept, correlation with other subjects. • Aims and Objectives of teaching Science at elementary and secondary school, need and criteria for selection of objective, Bloom's Approach to the Taxonomy of the Educational objectives.	2 hours per week (12 weeks)
UNIT-II	• Science Curriculum: Meaning, Principles of Curriculum construction, Approaches to Curriculum organization, Science Curriculum improvement in India.	
UNIT-III	• Learning Experience and Teaching Aids: Edgar Dale's cone of learning experiences, importance and concept of Teaching Aids. Concept of improvisation. Role of ICT in Science Teaching.	
UNIT-IV	• Science Text Book: Meaning and Characteristics of good text book. Evaluation of a Text book. Science Teacher: Science teacher and Professional growth.	

Activities (Any one of the following)

(i) Pedagogical analysis of any Science topic.

(ii) Developing a model (working static) on any topic in Science.

(iii) Writing instructional objectives in behavioral from on any three Science topic.

(C) BOOKS RECOMMENDED:

1. Cutting, Goger and Kelly, Orla (2014). Creative Teaching in Primary Science.
2. Dunne.Mick (2014). Primary Science (2nd ed.).
3. Mohan, R. (2002). Innovation Science Teaching Delhi: Prentice – hall.
4. Kaur Rakshinder (2007), Teaching of Science, Twenty first century publications, Patiala.

5. Kholi,V.K. How to Teach science, Shri Krishnan Publications, Ambala.
6. Mohan, Radha (2004), Innovative Science Teaching For Physical Science Teachers, Prentice Hall Of India, New Delhi.
7. Mangal, S.K. Teaching of Science, Arya Book Depot, New Delhi.
8. Siddiqi & Siddiqi (2002) Teaching of Science today and tomorrow, Doaba House, New Delhi.
9. Sharma, R.C. (1998) Modern Science Teaching, Dhanpal Rai Publishers, New Delhi.
10. Sundarajan, S. (1995) Teaching Science in Middle School: A Resource Book. Orient Longman, Hyderabad.
11. UNESCO (1996) Source Book for Science Teaching, UNESCO: Paris.
12. Vaidya, N(1999) Science Teaching for the 21st Century, Deep and Deep Publishers, New Delhi.

(D) EVALUATION:

External Examination	35 Marks
Internal Assessment	15 Marks
Attendance	3
Written Assignments	6
Two Mid Terms Exam	6

(E) INSTRUCTIONS FOR THE PAPER-SETTER:

The question paper will consist of three sections A, B and C. Section A**(**UNIT-I) & (UNIT-II) and B (UNIT-III) & (UNIT-IV) will have two questions from the respective units of the syllabus and will carry 10 marks each. Section C will consist of 5 questions of 3 marks in each which will cover the entire syllabus uniformly.

(F) INSTRUCTIONS FOR THE CANDIDATES:

Candidates are required to attempt one question each from the sections A and B and the entire section C is compulsory.

SUBJECT: PEDAGOGY OF A SCHOOL SUBJECT (PART-II) TEACHING OF ENGLISH

SUBJECT CODE: BEDTE-3614
SEMESTER :VI B.A/B.Sc.B.Ed
CONTACT HOURS/WEEK:

Lecture(L)	Tutorial(T)	Practical(P)	Credit(C)
2	0	0	2

Internal Assessment : 15

End Term Exam : 35
Duration of Exam : 1.5Hrs

(A) OBJECTIVES AND OUTCOME OF COURSE:

To enable the student teachers to:

- Develop the required skills and their inter links for mastering the language.
- Prepare and use teaching aids in the classroom and ICT (INTERNET and Computer Technology);
- Understand the teaching of poetry, prose and drama;
- Understand the functions of language lab;
- Understand constructive approach to language teaching and learning;
- Understand the process of language assessment/evaluation.

(B) CONTENTS OF SYLLABUS:

Sr. No	Contents	Contact Hours/Week
UNIT-I	i. Vocabulary its types and various ways of teaching and expansion of vocabulary, ii. Developing the writing skills: Choice of script, dictation and spellings.	02 hours per week(12 weeks)
UNIT-II	iii. Formal and Informal writings such as Application/Letters, short story, diary, notices reports, Advertisements etc. iv. Teaching Composition; Types and procedure. Poetry and prose; its meaning, style of writing & recitation/reading with respect to rhyme scheme and language used.	
UNIT-III	v. Audio-Visual aids: meaning, importance and its types with special reference to preparation of charts, models, PPT and use of print media. vi. ICT, Concept of language lab.	
UNIT-IV	vi. Lesson Planning: Importance, preparation of lesson plans for teaching Prose, Poetry, Grammar and Composition, vii. Evaluation, meaning and importance of tests and examination, different types of tests; oral, written and Some ways and means for testing different skills of English Language	

SESSIONAL WORK (Any one of the following)

(i)Analysis of advertisement in regional newspaper on the basis of language.
(ii)Preparation of transparencies

(C)BOOKS RECOMMENDED:

1 Bhatia, Achla &Kaur, Ravjeet (2011). Modern Teaching of English. Patiala: Twenty First Century Publications.
2. Bhatia, K.K.Teaching and Learning English as a Foreign Language.
3. Chapman, L.R.H.Teaching English to Beginners,Longmans, London.
4. Deepika & Singh, Surjit (2010).Techniques of Teaching English. Patiala: Twenty First Century Publications.
5. Fisby, A.W. (1970). Teaching English: Notes and Comments in English Overseas,E.L.B.S.,London.
6. N.C.E.R.T. (1970).English for Today Book I & II at Home and School.
7. Raman, M. (2004).English Language Teaching.Atlantic Publishers, New Delhi.
8. Sachdeva, M.S.(2013). Teaching of English. Patiala: Twenty First Century Publications.
9. Seely, John. Oxford Guide to Writing and Speaking Teaching of English.
10. Singh, Y. K. (2005). Teaching of English.APH Publication Corporation, New Delhi.
11. Notes for Teachers in Training –Regional Institute English Chandigarh, O.U.P.
12 Venkateswaran, S. Principles of Teaching English.
13.V enugopal, K.R. Methods of Teaching English,Neel Kamal Publishers.

(D) EVALUATION:

External Examination	35 Marks
Internal Assessment	15 Marks
Attendance	3
Written Assignment/Project work	6
Two Mid-term Examinations	6

(E) INSTRUCTIONS FOR THE PAPER-SETTER:

The question paper will consist of three sections; A, B and C. Section A **(**UNIT-I) & (UNIT-II) and B (UNIT-III) & (UNIT-IV) will have two questions from the respective units of the syllabus and will carry 10 marks each. Section C will consist of 5 questions of 3 marks in each, which will cover the entire syllabus uniformly.

(F) INSTRUCTIONS FOR THE CANDIDATES: Candidates are required to attempt one question each from the sections A and B and the entire section C.

SUBJECT: PEDAGOGY OF A SCHOOL SUBJECT (PART-II) TEACHING OF MATHEMATICS
SUBJECT CODE: BEDTM-3618
SEMESTER :VI **B.A/B.Sc.B.Ed**
CONTACT HOURS/WEEK:

Lecture(L)	Tutorial(T)	Practical(P)	Credit(C)
2	0	0	2

Internal Assessment: 15
End Term Exam: 35
Duration of Exam: 1.5Hrs

(A) OBJECTIVES AND OUTCOME OF COURSE:

To enable the student teacher to:

- Understand the nature of Mathematics.
- Understand the importance and objectives of teaching mathematics.
- Understand the methodology of teaching to be used while teaching mathematics.
- Improve competencies in secondary level mathematics.
- Setup mathematics club in the school and organize its activities.

(B) CONTENTS OF SYLLABUS:

Sr. No	Contents	Contact Hours/Week
UNIT-I	i. **Strategies for learning and Teaching Mathematics:** Concept formations and Concept attainment. Concept attainment model and Constructivism and Zone of proximal devilment for learning and Teaching of concepts.	02 hours per week(12 weeks)
UNIT-II	ii. **Methods of Teaching:** Lecture, Discussion, Demonstration, Inductive-Deductive, Problem-solving and Project.	
UNIT-III	iii. **Lesson Planning**: Importance, Objectives, Phases, Basic steps, Components; Micro Teaching: Steps, Some important skills. iv. **Mathematics Library**: Need and importance of Mathematics Library, Material for Mathematics Library.	
UNIT-IV	v. **Mathematics Laboratory:** Purposes of Mathematics Laboratory, Need, Importance of Mathematics Laboratory, Equipments for Mathematics Laborators.	

SESSIONAL WORK (Any one of the following)

I. Preparation of Case study of Slow or Gifted learners in Mathematics.

II. Constructions of achievement test.
III. Preparation of enrichment program for gifted children in Mathematics.

(C)BOOKS RECOMMENDED:

1. Taylor, Helen and Harris, ANDREW: Learning and Teaching Mathematics.
2. Hansen et al: Children'S Erroes in mathematics.
3. Witt, Marcus: Teaching Mathematics for Trainee Teachers.
4. Chambers,P : Teaching Mathematics in Secondary School.
5. Butler and Wren : The Meaning of Secondary School Mathematics.
6. Chadha, B.N : The teaching of Mathematics.
7. Gakhar,S.K : Teaching of Mathematics.
8. Mangal.S.K: Teaching of Mathematics.
9. N.C.E.R.T. Text Books (6^{th} class to 10^{th} class)
10. Sidhu, K.S: Teaching of Mathematics.
11. Dr. Neetu sethi : Teaching of Mathematics.

(D) EVALUATION:

External Examination	35 Marks
Internal Assessment	15 Marks
Attendance	3
Written Assignment/Project work	6
Two Mid-term Examinations	6

(E) INSTRUCTIONS FOR THE PAPER-SETTER:

The question paper will consist of three sections; A, B and C. Section A **(**UNIT-I) & (UNIT-II) and B (UNIT-III) & (UNIT-IV) will have two questions from the respective units of the syllabus and will carry 10 marks each. Section C will consist of 5 questions of 3 marks in each, which will cover the entire syllabus uniformly.

(F) INSTRUCTIONS FOR THE CANDIDATES:

Candidates are required to attempt one question each from the sections A and B and the entire section C.

SUBJECT: PEDAGOGY OF A SCHOOL SUBJECT (PART-II) TEACHING OF SCIENCE
SUBJECT CODE: BEDTS-3617
SEMESTER : VI B.A.B.Ed
CONTACT HOURS/WEEK:

Lecture(L)	Tutorial(T)	Practical(P)	Credit(C)
1	0	1	2

Internal Assessment: 15
End Term Exam: 35
Duration of Exam: 1.5Hrs

(A) OBJECTIVES AND OUTCOME OF COURSE:

To enable the student teacher to:

- Identity objectives of teaching science at different school stages
- Understand the nature and significance at science
- Development habit of observation, exploration, classification and systematic way of thinking.
- Understand the impact of science upon our way of life
- Acquaint with scientific methods and enable them to develop scientific attitude.

(B) CONTENTS OF SYLLABUS:

Sr. No	Contents	Contact Hours/Week
UNIT-I	• Science Laboratory: Planning, Purchase and Maintenance of apparatus, Maintenance of stock and store registers.	2 hours per week (12 weeks)
UNIT-II	• Methods of teaching: Lecture method, Lecture-cum-demonstration, Heuristic method, Inductive & deductive method, Problem-solving method, Project method.	
UNIT-III	• Micro Teaching: Procedure or Cycle of Micro Teaching, Advantage of Micro Teaching Lesson planning in science: concept objectives, importance and steps.	
UNIT-IV	• Evaluation: Concept, importance, type, Difference between Examination, Measurement & Evaluation, Qualities of good evaluation programme.	

SESSIONAL WORK (Any one of the following)

(i) Pedagogical analysis of any science topic

(ii) Development of a macro lesson plan based on any science topic.

(B) BOOKS RECOMMENDED

1. Cutting, Goger nd Kelley, Orla (2014). Creative Teaching in Primary Science.
2. Dunne. Mick (2014). Primary Science (2nd ed).
3. Mohan, R. (2002). Innovation Science Teaching Delhi: Prentice-hall.
4. Kaur, Rakshinder (2007), Teaching of Science, Twenty First century publication, Patiala.
5. Kohli, V.K. How to Teach Science, Shri Krishna Publication, Ambla.
6. Mangal, S.K. Teaching of Science , Arya Book Depot, New Delhi.
7. Siddiqi & Siddiqi (2002) Teaching of Science Today and Tomorrow, Doaba House, New Delhi.
8. Sharma, R.C.(1998) Modern Science Teaching, Dhanpal Rai Publishers, New Delhi.
9. Kulsreshtha, S.P. (2005) Teaching of Science, Surya Publication, Meerut.
10. Soni, Anju,(2000) Teaching of Science, Tandon Publications,Ludhiana.

(D) EVALUATION:

External Examination	35 Marks
Internal Assessment	15 Marks
Attendance	3
Written Assignment/Project work	6
Two Mid-term Examinations	6

(E) INSTRUCTIONS FOR THE PAPER-SETTER:

The question paper will consist of three sections; A, B and C. Section A **(**UNIT-I) & (UNIT-II) and B (UNIT-III) & (UNIT-IV) will have two questions from the respective units of the syllabus and will carry 10 marks each. Section C will consist of 5 questions of 3 marks in each, which will cover the entire syllabus uniformly.

(F) INSTRUCTIONS FOR THE CANDIDATES:

Candidates are required to attempt one question each from the sections A and B and the entire section C is compulsory.

SYLLABUS

SEMESTER-VII

Semester :VII - BSC. B.Ed.(Integrated Medical/Non-Medical) (Pass%age will be 40% in each Paper)

Subject		Contact hours/Week			Credit	Evaluation Scheme (% of Total Marks)					
Code	Title	L	T	P		CWA	LWA	MTE	ETE	Total	**Exam Duration (Hours)**
School Internship Subject-I & School Internship Subject-II		0	0	2	2	30	---	---	100	130	35 minutes
		0	0	2	2	30	---	---	100	130	35 minutes
BEDU4706	Teaching of English										
BEDU4709	Teaching of Science										
BEDU4710	Teaching of Mathematics										
BEDU4722	Engagement with Community (Experience for social and Environmental sensitivity)	0	0	1	1	15	---	---	25	40	Viva
	Personality Development				Non-credential subjects						
	Health & Yoga										
	Communication Skills										
Total					**05**					**300**	

SUBJECT TITLE: SCHOOL INTERNSHIP & ENGAGEMENT WITH COMMUNITY
SUBJECT CODE: BEDU-4714-4729 & BED -4730
SEMESTER: VII B.Ed
CONTACT HOURS/WEEK:

Lecture(L)	Tutorial(T)	Practical(P)	Credit(C)
0	0	10	5

Subject	**Internal**	**External**	**Total**
School Internship Subject I	**30**	**100**	**130**
School Internship Subject II	**30**	**100**	**130**
Engagement with Community	**15**	**25**	**40**
		Total	**300**

Internship in schools is organized for a minimum duration of 16 weeks. During this period, the students are provided with opportunities to each in government and private schools with systematic supervisory support and feedback from faculty. During the internship, student- teacher work as a regular teacher and participate in all the school activities, including planning, teaching and assessment, interacting with school teachers, community members and children.

School internship should include an initial phase of 4 weeks of supervised teaching practice in the school. This phase would include school engagement, peer observations and observations of interns lesson by faculty. During this period, each trainee-teachers has to plan at least 10 lessons in each school subject. At the culmination of this phase, the subject teacher will conduct 1 discussion lesson for each school subject. First discussion lesson should be held during 'Teaching Practice" and 2nd should be at the end of the Teaching Practice" and this will evaluate the performance of the internal. Each discussion lesson will be of 10 marks.

During internship, the student-teachers apart from taking regular classes as per the time table the school, has to perform certain activities/assignments. Each student-teacher has to plan and deliver at least 40 lessons in each school subject. Besides, the student teacher are to observe 20 lessons, 10 in each school subject taught by fellow student- teachers.

Further, each student teacher has to develop strategies /teaching techniques to identify a slow learner /talented learner/ child with learning difficulties or any other case /problem for action research at the initial stage of internship program and conduct the study in detail. A 72 report is to be prepared detailing all the steps of study. The tools, techniques used, response sheets or any other valuable document in support of the study should be submitted along with the report. The action research

report will be evaluated either by the teacher supervising the internship or by the subject teacher. This action research report will carry 10 marks.

EVALUATION

Subject	Internal	External	Total
School Internship Subject I	30	100	130
School Internship Subject II	30	100	130
Engagement with Community	10	30	40
		Total	**300**

Semester :VIII B.Sc.B.Ed .(Integrated Medical/Non-Medical) (Pass % age will be 40% in each paper)

Subject		Contact Hours/Week			CREDIT	Evaluation Scheme (% of Total Marks)					
Code	Title	L	T	P		CWA	LWA	MTE	ETE	Total	Exam Duration (Hours)
BEDU-4801	Learning Assessment	4	1	0	5	18	---	12	70	100	03hours
BEDU 4802	Inclusion School and Education	2	0	0	2	09	---	06	35	50	1.5 hrs
BEDU 4803	School, Society and Gender	2	0	0	2	09	---	06	35	50	1.5 hrs
BEDU 4804	Understanding the Self	2	0	0	2	09	---	06	35	50	1.5 hrs
BEDU 4805	Texts; Reading and Reflecting	2	0	0	2	09	---	06	35	50	1.5 hrs
BEDU 4806	Language Proficiency and Learner	2	0	0	2	09	---	06	35	50	1.5 hrs
BEDU 4807	Health and Physical Education	1	0	1	2	09	---	06	35	50	1.5 hrs
BEDU 4808	Teacher Education	2	0	0	2	09	---	06	35	50	1.5 hrs
BEDU 4809	Special Education	2	0	0	2	09	---	06	35	50	1.5 hrs
	Total				**21**					**500**	

SUBJECT TITLE: LEARNING ASSESSMENT
SUBJECT CODE: BEDLA-4801
SEMESTER : VIII B.A/B.Sc.B.Ed
CONTACT HOURS/WEEK:

Lecture(L)	Tutorial(T)	Practical(P)	Credit(C)
5	0	0	5

Internal Assessment : 30
End Term Exam : 70
Duration of Exam : 3Hrs

(A) OBJECTIVES AND OUTCOME OF COURSE:

To enable the student teachers to:

- Gain a critical understanding of issues in assessment and evaluation.
- Differentiate between various types of assessment.
- Use of a wide range of assessment tools.
- Select and construct various types of assessment tools appropriately.
- Evolve realistic, comprehensive and dynamic assessment.

(B) CONTENTS OF SYLLABUS:

Sr. No.	Contents	Contact Hours/Weeks
UNIT - I	i. Assessment: Meaning, Characteristics, purpose. ii. Evaluation: Meaning, Characteristics of good evaluation, diagnostic, formative and summative evaluation.	05 hours per week (12 weeks)
UNIT - II	iii. Techniques of assessment: assignments, projects, tests: objective and essay type, Seminars and Reports as assessment devices. iv. Construction of a Test: Planning (Blue Print), Preparation, Try Out and Evaluation as assessment devices.	
UNIT - III	v. Statistical tools and techniques: percentage, percentile rank, vi. Frequency distribution, central tendency measures- mean, median and mode; normal distribution curve.	
UNIT - IV	vii. Continuous and comprehensive evaluation: concept, significance, merits and limitations. viii. Examination Reforms: flexibility, quality and range of questions, school based credit	

SESSIONAL WORK (any one of the activities)

(i) Prepare a report on implementation of CCE at school level.
(ii) Construction of an achievement test in any school subject at elementary/secondary.
(iii) Critical appraisal of learning outcomes – scholastic and co - scholastic.

(C) BOOKS RECOMMENDED

i. Singh H.S.(1974).Modern Educational Testing. New Delhi: Sterling Publication.
ii. Newman, F.M. (1996). Authentic achievement: Restructuring schools for intellectual quality. San Francisco, CA: Jossey-Bass.
iii. Nitko, A.J. (2001). Educational assessment of students (3rd ed.). Upper Saddle River, NJ: Prentice Hall.
iv. Norris N. (1990). Understanding Educational Evaluation, Kogan Page Ltd.
v. Rao, Manjula (1998). Training material on continuous and comprehensive evaluation (monograph) Mysore: Regional Institute of Education (NCERT).
vi. Ved Prakash, et.al. (2000). Grading in schools, NCERT, Published at the publication Division by the secretary, NCERT, New Delhi: Sri Aurobindo Marg.
vii. Rao, Manjula (2004): Evaluation in schools – a training package (monograph), Mysore: Regional Institute of Education (NCERT).
viii. Nandra. I. (2011): Learning Resources & Assessment of learning, Patiala: Twenty First Century Publication.
ix. Gregory, R.J. (2014). Psychological Testing: History, Principles and Applications (6th Edition). New Delhi: Pearson Publications.
x. Kaur. J., Bist. R. (2016) Assessment of Learning. Patiala: Twenty First Century Publication.
xi. Nandra, I.(2017). Assessment for Learning. Patiala: Twenty first Century Publications.

(D) EVALUATION

External Examination	70 Marks
Internal Assessment	30 Marks
Attendance	6 Marks
Written Assignment/Project work	12 Marks
Two Mid-term Examinations/ House Test	12 Marks

(E) INSTRUCTIONS FOR THE PAPER-SETTER

The question paper will consist of three Sections: A, B, and C. Section A and B will have four questions from the respective Sections of the syllabus and will carry 10 marks each. Section C will consist of 10 questions of 3 marks each which will cover the entire syllabus uniformly and carry 30 marks in all.

(F) INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt two questions each from the sections A and B and the entire section C.

SUBJECT TITLE: INCLUSIONS SCHOOL AND EDUCTION
SUBJECT CODE: BEDISE-4802
SEMESTER: VIII B.A/B.Sc.B.Ed
CONTACT HOURS/WEEK:

Lecture(L)	Tutorial(T)	Practical(P)	Credit(C)
2	0	0	2

Internal Assessment: 15
End Term Exam: 35
Duration of Exam: 1.5Hrs

(A) OBJECTIVES AND OUTCOME OF COURSE

To enable the student teachers to:

- Understand the concept and importance of inclusiveness in education.
- Use different teaching strategies for inclusive education.
- Understand the role of teachers, parents and community for supporting inclusion.
- Understand the recommendations of various Policies.
- To understand Diversity, Disability and Inclusion.

(B) CONTENTS OF SYLLABUS:

Sr. No	Contents	Contact Hours/Week
UNIT-I	i. Inclusive Education: meaning, concept and its Importance. ii. Difference between special, integrated and inclusive education, Barriers in inclusive education	02 hours per week(12 weeks)
UNIT-II	iii. Teaching strategies for inclusive education and creating conductive environment in inclusive schools.	
UNIT-III	iv. Creating and sustaining inclusive practices: Role of teachers, parents and community.	
UNIT-IV	v. Project Integrated Education for Disabled Children (1987), the Persons with Disabilities Act (1985).	

SESSIONAL WORK (any one of the activities)

1. Field visit to school promoting inclusive practices.
2. Analysis of teaching learning practices with reference to inclusion.

3. Prepare a case study on any of the categories (mentioned above) of children with diverse needs.

(C) BOOKS RECOMMENDED

1. Archer L, Hutchings M. and Ross A (2003). Higher Education and Social Class Issues of Exclusion and Inclusion. London: Routledge Falmer Taylor and Francis Group.
2. Jha, J and D. Jhingran (2002). Elementary Education for the Poorest an other Deprived Groups: the Real Challenge of Universalisation, New Delhi: Centre For Policy Research.
3. Ghai, A (2002). Disability in the Indian Context: Post-Colonial PerspectivCorker and T. Shakespeare (Eds.) Disability/Post-modernity. Embodying Disability Theory (88- 100). London: Continuum.
4. Alur, M. (2002). Introduction in Hegarty, S & Alur M (Eds.), Education and Children with Special Needs: From Segregation to Inclusion. New Delhi: Sage Publications.
5. Stringfield, S (2006). Equity in Education: Experiences and Directions for Developing and Developed Countries – Contexts of Learning, Routledge, UK.
6. Mithu Alur and Michael Bach (2005). Inclusive Education from Rhetoric to Reality,New Delhi, Viva Books Ltd.
7. Singh Agyajit & Surjit Singh (2010) Education of Exceptional Children, Patiala Twenty First Century Publications.
8. Sharma Yoginder K and Madhulika Sharma (2014) Inclusive Education –Special Educational Needs of Learners New Delhi , Kanishka Publisher
9. Dr.Jaswant Kaur Virk (2017) Inclusive School Patiala Twenty First Century Publications.
10. Dr. Jitinder Kumaur (2013) Inclusive Education: A journey through challengers Twenty First Century Publications.
11. Dr. Agyajit & Surjit Singh (2014) Education of Exceptional Children, Patiala Twenty First Century Publications.
12. Virk Jaswant, Alka Arora and Richa Sharma Sood (2010) Fundamentals of Inclusive Education Twenty First Century Publications.

(D) EVALUATION

Theory Examination (External)	35 Marks
Internal Assessment	15 Marks
Attendance	3 Marks
Written Assignment	6 Marks
Two Mid Term Examination	6 Marks

(E) INSTRUCTIONS FOR THE PAPER-SETTER:

The question paper will consist of three Sections: A, B, and C. Section A **(**UNIT-I) & (UNIT-II) and B (UNIT-III) & (UNIT-IV) will have two questions from the respective units of the syllabus and will carry 10 marks each. Section c will consist of 5 questions of 3 marks in each which will cover the entire syllabus uniformly and carry 15 marks in all. **(F) INSTRUCTIONS FOR THE CANDIDATES**

Candidates are required to attempt one question each from the sections A and B and the entire section C.

SUBJECT TITLE: SCHOOL, SOCIETY AND GENDER
SUBJECT CODE: BEDSSG 4803
SEMESTER: VIII B.A/B.Sc.B.Ed
CONTACT HOURS/WEEK:

Lecture(L)	Tutorial(T)	Practical(P)	Credit(C)
2	0		2

Internal Assessment: 15
End Term Exam: 35
Duration of Exam: 1.5Hrs

(A) OBJECTIVES AND OUTCOME OF COURSE:

To enable the student teachers to:

- Understand the basic terms, Concepts used in gender studies.
- Understand the gender discrimination in construction and dissemination of knowledge.
- Develop an awareness and sensitivity.
- Understand some important landmark in connection with gender and education in the contemporary perspective.

(B) CONTENTS OF SYLLABUS:

Sr. No	Contents	Contact Hours/Week
UNIT-I	1. Meaning of gender, sex, sexuality, patriarchy, masculinity and feminism. 2. Gender equality in India with special reference to Caste, class and religion.	2 hours per week (12 Weeks)
UNIT-II	1. Concept of Gender Equity and equality in education. Problems of access, Retention, Stagnation and drop out. 2. Gender Indenties and socialization practices in family, school, other formal and Informal Organizations.	
UNIT-III	1. Role of Education in Gender Sensitization: Identifying education as a catalyst agent for gender equality. 2. Role of curricular and Co- curricular activities in combating gender bias.	
UNIT-IV	1. Schooling of girls: Inequalities and Intervention for girls Participation in schooling 2. Efforts of government and non- government organization in dealing with gender inequalities.	

SESSIONAL WORK (any one of the activities):

- Identification of gender bias in school text book.

- Preparation of report on organizational climate in single- sex and co- education school.

(C) BOOKS RECOMMENDED:

1. Aeker, S (1994)Feminist theory and the study of gender and education.
2. Ahmad, Karuna (1984) Social context of womens education 1921 -81, New frontiers in higher education Vol- XV No. 3
3. Barks, O (1971): Sociology of Education Ed.2 Landon : Batsford.
4. Crapo, H. (ed) (1970) : Family. Class and education, London: Longman
5. Kumar, K (1991): Political agenda of Education, New Delhi: Sage.
6. Shokeshaft, Charol (1989). Women in education administration, New Bury Park: Sage Publication.
7. Tyler, W. (1977): The sociology of educational inequality, London: Methuen.
8. Lips, Hilary M. (1989) Sex and Gender an Introduction, California: Mountainview, Mayfield Publishing Company.

(D) EVALUATION:

External Examination	35 Marks
Internal Assessment	15 Marks
Attendance	3 Marks
Written Assignments	6 Marks
Two mid Terms Exam	6 Marks

(E) INSTRUCTIONS FOR THE PAPER-SETTER:

The question paper will consist of three sections: A, B, And C. Section A**(**UNIT-I) & (UNIT-II) and B (UNIT-III) & (UNIT-IV) will have two questions from the respective units of the syllabus and will carry 10 marks each. Section C will consist of 5 question of 3 marks in each which will cover the entire syllabus uniformly.

(F) INSTRUCTIONS FOR THE CANDIDATES:

Candidates are required to attempt one question each from the sections A and B and the entire section C.

SUBJECT TITLE: UNDERSTANDING THE SELF
SUBJECT CODE: BEDUS-4804
SEMESTER : VIII B.A/B.Sc.B.Ed
CONTACT HOURS/WEEK:

Lecture(L)	Tutorial(T)	Practical(P)	Credit(C)
2	0		2

Internal Assessment : 15
End Term Exam : 35
Duration of Exam : 1.5Hrs

(A) OBJECTIVES AND OUTCOME OF COURSE:

To enable the student teachers to:

- Be aware of the processes of socialization.
- Understand the self of the growing 'student' as well as 'teacher'.
- Shape their own and student's sense of identity.
- Reflect on one's aspirations and possibilities in order to develop a growing sense of agency as a 'teacher', a 'professional', as well as a 'human being'.

(B) CONTENTS OF SYLLABUS:

Sr. No	Contents	Contact Hours/Week
UNIT-I	i. Socialization and Development of Self: At home, community and at school inter linkages within wider social-cultural contexts. ii. Role of Positive Thinking in Self development.	02 hours per week(12 weeks)
UNIT-II	iii. The Influence of Peer Group, media message, technology and globalization on identity formation.	
UNIT-III	iv. Schooling as a process of identity formation: Developing national, secular and humanistic identity.	
UNIT-IV	v. Constructive role of education and 'critical pedagogy' in moving towards peaceful living.	

SESSIONAL WORK (any one of the activities)

- SWOC Analysis matrix of self (Strength, Weakness, Opportunities and Challenges).
- Developing Emotional Integration through Practice of Yoga & Meditation.

(C) BOOKS RECOMMENDED:

1. Sarah Grison, Michal S. Gazzaniga. Psychology in your life (2016) . Norton,W.W & company Inc.
2. Bhattacharya, Srinibas (2000). Sociological Foundations of Education. New Delhi: Atlantic Publishers and Distributors.
3. M Carnoy,D Rhoten (2002).What Does Globalization Mean for Educational Change ? A Comparative Approach, Comparative Education Review.
4. Pathak, Avijit (2004). Social Implications of Schooling: Knowledge, Pedagogy and Consciousness. Rainbow Publishers: Noida.
5. Ramalingam, Dr.Panch. (2010). Recent Stidies in School Psychology. New Delhi, Authorpress.
6. Cornelisson,R.M.M.,Mishra,G.,Varma,S.(2011a). Foundation of Indian psychology: vol.1, concept and theories, New Delhi, India:Pearson.
7. Baron, R.A. (2012).Psychology. New Delhi: Prentice Hall of India Pvt. Ltd.
8. Dr. Rekha, Kaur Jasjot, Dr. Raminderjit Kaur (2016). Understanding the Self. Patiala, Twenty First Century Publications.

(D) EVALUATION:

External Examination	35 Marks
Internal Assessment	15 Marks
Attendance	3 Marks
Written Assignments	6 Marks
Two Mid Terms Exam	6 Marks

(E) INSTRUCTIONS FOR THE PAPER-SETTER:

The question paper will consist of three sections A, B and C. Section A **(**UNIT-I) & (UNIT-II) and B (UNIT-III) & (UNIT-IV) will have two questions from the respective units of the syllabus and will carry 10 marks each. Section C will consist of 5 questions of 3 marks in each which will cover the entire syllabus uniformly.

(F) INSTRUCTIONS FOR THE CANDIDATES:

Candidates are required to attempt one question each from the sections A and B and the entire section C.

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SUBJECT: TEXTS: READING AND REFLECTING
SUBJECT CODE: BEDTRR-4805
SEMESTER : VIII B.A/B.Sc.B.Ed
CONTACT HOURS/WEEK:

Lecture(L)	Tutorial(T)	Practical(P)	Credit(C)
2	0		2

Internal Assessment : 15
End Term Exam : 35
Duration of Exam : 1.5Hrs

(A) OBJECTIVES AND OUTCOME OF COURSE:

To enable the student teacher to:

- Understand different types of Text.
- Understand National policy on education.
- Understand national curriculum framework.
- Reflection upon different types of policy documents.
- Reflection upon core elements of text book on gender, environment and health.
- Understand problem faced by children in reading.

(B) CONTENTS OF SYLLABUS

Sr. No	Contents	Contact Hours/Week
UNIT-I	i. Reading resources: National policy on education(1986). ii. Reading resources: National curriculum framework (2005).	02 hours per week(12 weeks)
UNIT-II	iii. Reflection on core element (NPE-1986): Aims of education, pedagogy and evaluation. iv. Reflection on core elements(NCF-2005):Aims of education, pedagogy and evaluation	
UNIT-III	v . Reading of text books(class viii/ix) -science ,social sciences, mathematics and language. vi. Reflection on core elements in the above stated school text	

	books with respect to gender, environment and health.	
UNIT-IV	vii. Evaluation of Reading skills with special reference to test of rate of reading. viii. Problems faced by children in reading –causes and remedies.	

SESSIONAL WORK (any one of the activities):

(i) Analysis of two articles/advertisement from newspaper/magazine etc.

(ii) Writing a book review and critically analyzing the content and language of the text.

(C) BOOKS RECOMMENDED:

1. Nandra, inder dev (2017)Reading and Reflecting on text.21st century publication,Patiala.
2. Garg,Seema(2017) Reading and reflecting on text.21st century publication,Patiala.
3. Indra devi,M,Prasant kumar,J,Rao,Digumarti Bhaskar(2004)Values in languages Text Book.Discovery publishing house,Patiala.
4. Shri vastave B.P.;The Teaching of Reading.Bharti publication new delhi.
5. Grellet,F.(1981) Devloping Reading Skills; Apractical guide to reading comprehension exercises.Cambridge University press.

(D) EVALUATION:

External Examination	35 Marks
Internal Assessment	15 Marks
Attendance	3
Written Assignment/Project work	6
Two Mid-term Examinations	6

(E) INSTRUCTIONS FOR THE PAPER-SETTER:

The question paper will consist of three sections; A, B and C. Section A **(**UNIT-I) & (UNIT-II) and B (UNIT-III) & (UNIT-IV) will have two questions from the respective units of the syllabus and will carry 10 marks each. Section C will consist of 5 questions of 3 marks in each, which will cover the entire syllabus uniformly.

(F) INSTRUCTIONS FOR THE CANDIDATES:

Candidates are required to attempt one question each from the sections A and B and the entire section C.

SUBJECT: LANGUAGE PROFICIENCY AND LEARNER
SUBJECT CODE: BEDLPL-4806
SEMESTER : VIII B.A/B.Sc.B.Ed
CONTACT HOURS/WEEK:

Lecture(L)	Tutorial(T)	Practical(P)	Credit(C)
2	0		2

Internal Assessment : 15
End Term Exam : 35
Duration of Exam : 1.5Hrs

(A) OBJECTIVES AND OUTCOME OF COURSE:

To enable student teacher to

i. Comprehend ideas, for reflection and thinking, as well as for expression and communication.
ii. To enable student teacher to enhance one's facility in the language of instruction is thus a vital need of student-teachers.
iii. To enable student teacher to strengthen the ability to 'read', 'think', 'discuss & communicate' as well as to 'write'.
iv. To enable student teacher to Understand the concept of classroom transaction.

(B) CONTENTS OF SYLLABUS:

Sr. No	Contents	Contact Hours/Week
UNIT-I	i. Engaging with popular Subject- based Expository Writing: Selected Articles, biographical writing.	02 hours per week (12 weeks)
UNIT-II	ii. Engaging with different writing: newspapers, magazine and contemporary educational issues.	
UNIT-III	iii. School Magazine: objective, significance and layout iv. Wall Magazine: objective, significance and preparation	

UNIT-IV	v. Classroom discourse and its nature, Discussion and Questioning as tool for learning. vi. Engaging with educational writing: Extracts or chapters from authors who deal with themes from education, schooling, teaching or learning.	

SESSIONAL WORK (any one of the activities):

- Preparation of a plan to use multilingualism as a strategy in the classroom.
- Debate and Discussion in classroom on the policies specified in the syllabus and report writing thereof.

(C) BOOKS RECOMMENDED:

1. Mishra, P. and Koehler, M.J. 2006. "Technological Pedagogical Content Knowledge: A Framework for Teacher Knowledge". Teachers College Record, Vol. 108, No. 6, pp. 1017- 1054.
2. Ghosh, S. (2009). Mass Communication: An Indian Perspective. Shishu Sahitya Samsad.
3. Sachdeva, M.S.(2013). Teaching of English. Patiala: Twenty First Century Publications.
4. Mangal, U.(2010). Teaching of Hindi. New Delhi: Arya Book Depot.
5. Sinha, S.(2009). Roseublatt's Theory of Reading. Explaining Literature contemporary education dialogue.6(2),pp. 223-237.
6. Sullivan, M. (2008). Lesssons for Guided writing. Scholastic. National curriculum framework.(2005).
7. Kumar, Krishna.(2007). The child's language and the Teacher. New Delhi: National Book.

(D) EVALUATION:

External Examination	35 Marks
Internal Assessment	15 Marks
Attendance	3 Marks
Written Assignments	6 Marks
Two Mid Terms Exam	6 Marks

(E) INSTRUCTIONS FOR THE PAPER-SETTER:

The question paper will consist of three sections A, B and C. Section A **(**UNIT-I) & (UNIT-II) and B (UNIT-III) & (UNIT-IV) will have two questions from the respective

units of the syllabus and will carry 10 marks each. Section C will consist of 5 questions of 3 marks in each which will cover the entire syllabus uniformly.

(F) INSTRUCTIONS FOR THE CANDIDATES:

Candidates are required to attempt one questions each from the sections A and B and the entire section C.

SUBJECT: HEALTH AND PHYSICAL EDUCATION
SUBJECT CODE: BEDHP-4807
SEMESTER : VIII B.A/B.Sc.B.Ed
CONTACT HOURS/WEEK:

Lecture(L)	Tutorial(T)	Practical(P)	Credit(C)
4	0	1	2

Internal Assessment : 15
End Term Exam : 35
Duration of Exam : 1.5Hrs

(A) (A) OBJECTIVES AND OUTCOME OF COURSE:

To enable the student teachers to:

- Understand the concept of holistic health and its various dimensions.
- Understand the importance of sports and yoga for development of holistic health.
- Develop positive attitude.
- Be equipped about their health status.
- Be aware about rules of safety in hazardous situation.
- Sensitise, motivate and help them to acquire the skills for physical fitness.

(B) CONTENTS OF SYLLABUS:

Sr. No	Contents	Contact Hours/Week
UNIT-I	Endocrine glands: Functions and location in the body. Human Nervous System: parts and its functions.	02 hours per week(12 weeks)
UNIT-II	Nutrition: Functions of food and food habits, elements of a balanced diet and malnutrition. School Health Programmes: Health Service, Health Supervision and Health Instruction.	
UNIT-III	Health Education: concept, objective, importance and principles of Health Education. Posture: meaning and importance of good posture, common postural deformities: causes, preventive measures and remedial exercises and massage therapies.	
UNIT-IV	Yoga: Modern concept, types, need and importance, benefits of specific yoga asans with their techniques (Surya Namaskar, Tad Asana, Padma Asana, Chakra Asana, Dhanus Asana). Contemporary health problems and preventions: Dru abuse, Alcoholism, smoking, obesity, stress and depression.	

SESSIONAL WORK (any one of the activities):

(i) Prepare a chart of balanced diet.
(ii) Performing different Yoga Asnas.
(iii) Preparation of first-aid box.

(C) BOOKS RECOMMENDED

1. Bucher, C.A. (1964) Foundations of Physical Education, New York: Mosby and company.
2. Kang Gurpreet singh & Deol Nishan Singh. (2013). An Introduction to Health and Physical Education, 21st century publications, India.
3. Alderman, H., Behrman, J. R., Lavy, V., & Menon, R (1997). Child Nutrition, Child Health, and School Enrolment, Policy Research Working Paper 1700 (January).
4. The World Bank Policy Research Department, Poverty and Human Resources Division.
5. Agarwal, D. K., Upadhyay, S. K., Tripathi, A. M., Agarwal K. N (1987). Nutritional Status, Physical Work Capacity and Mental Function in School Children. Nutrition Foundation of India, Scientific Report 6.
6. Brahmam, G. N. V. (2003). Evaluation of Mid Day Meal Programme in the States of Andhra Pradesh, Karnataka, Orissa, Tamil Nadu, Kerala, and Gujarat. Paper presented at a workshop on mid-day meal programme in schools in India convened by the Nutrition Foundation of India, New Delhi. August, 1.
7. Chandler A.M. K, Walker S. P, Connolly K, Grantham-McGrenor S. M (1995). School Breakfast Improves Verbal Fluency in Undernourished Jamaican Children. Journal of Nutrition, 125 (4), 894-900.
8. Drèze, Jean & Aparajita Goyal (2003). Future of Mid-Day Meals, Economic and Political Weekly, November 4673- 4683 (special articles).
9. Government of India (2004). Guidelines for National Programme of Nutritional Support to Primary Education. New Delhi: Ministry of Human Resource Development, Department of Elementary Education and Literacy.
10. Levinger, B (1996). Nutrition, Health and Education For All. Newton, MA: Education Development Centre.
11. Liu, J. Raine, A. Venables, P. H. Dalais, C. Mednick, S.A. (2003). Malnutrition at Age 3 years and Lower Cognitive Ability at Age 11 years: Independence from Psycho-social Adversity. Arch Pediatrics & Adolescent Medicine. 157 (60): 593 -600.
12. Mathews, R (1996). Importance of Breakfast to Cognitive Performance and Health, Perspectives in Applied Nutrition, 3,3: 204-212.
13. Mehrotra, Santosh (2006). Child Malnutrition and Gender Discrimination in South Asia. Economic and Political Weekly. March 11.

(D) EVALUATION

External Examination	35 Marks
Marks Internal Assessment	15 Marks
Attendance	3 Marks
Written Assignment/Project work/Response Sheets	6 Marks
Two Mid-term Examinations/ House Test	6 Marks

(E) INSTRUCTIONS FOR THE PAPER-SETTER

The question paper will consist of three Sections: A, B, and C. Section A **(**UNIT-I) & (UNIT-II) and B (UNIT-III) & (UNIT-IV) will have two questions from the respective units of the syllabus and will carry 10 marks each. Section C will consist of 5 questions of 3 marks in each which will cover the entire syllabus uniformly.

(F) INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt one question each from the sections A and B and the entire section C.

SUBJECT: ENVIRONMENTAL ISSUES AND AWARENESS THROUGH EDUCATION
SUBJECT CODE: BEDEE-4808
SEMESTER : VIII B.A/B.Sc.B.Ed
CONTACT HOURS/WEEK:

Lecture(L)	Tutorial(T)	Practical(P)	Credit(C)
2	0		2

Internal Assessment : 15
End Term Exam : 35
Duration of Exam : 1.5Hrs

(B) OBJECTIVES AND OUTCOME OF COURSE:

To enable the student teachers to:

- To enable student teacher to get acquainted with the concept of environment and environmental education.
- To enable student teacher to be aware of the problems of environment issues and preserval of resources.
- To enable student teacher to develop desirable sensitivity, attitude, values and respect for the environment.
- To enable student teacher to understand the concept of ecosystem.

(B) CONTENTS OF SYLLABUS:

Sr. No	Contents	Contact Hours/Week
UNIT-I	i. Educational Environment: Meaning, Need, Objectives, Methods, Importance and Principles, Curriculum, Teacher's Role in Environmental Education efforts at school level.	02 hours per week (12 weeks)
UNIT-II	ii. Environmental Issues: Pollution, Green House Effect, Global Warming, Depletion in Ozone layer, Acid Rain: Causes & Effects.	
UNIT-III	iii. Ecology: Meaning, Characteristics, Scope, Principles and Types. iv. Ecosystem: Meaning, Importance, Characteristics, Types, Components, Food Web, Food Chain.	
UNIT-IV	v. Conservation: Natural Resources, Energy, Forest and wild life through exhibitions and plantation, Eco-Clubs, Government commitment in National and International fields. vi. Health Education: Meaning, definitions, Characteristics, Obstacles and How to build healthy environment.	

SESSIONAL WORK (any one of the activities):

1.Writing instructional objectives in behavioural form for five topics from the text book.

2.To prepare a scrapbook of current issues/themes pertaining to the broad area of

3.discipline/subject taken up by the print media.

4.Preparation of a low-cost teaching aid.

5. visit to a School having Eco- Club.

(C) BOOKS RECOMMENDED:

1. Sekhri, Isha(2012).Environmental Education. Patiala: Twenty first Century Publications.
2. Sobti, Saroj & Singh ,Surjit (2009) . Environmental Education (Pbi).Patiala : Twenty First Century Publications.
3. Rajagopalan, R.(2006). Environmental Studies from Crisis to Cure. Oxford University.
4. Shrivastva, K.K.(2004). Environmental Education. New Delhi : Kanishka Publishers & Distributors.
5. Kumar, V.(2000). Modern Method of Teaching Environmental Education. New Delhi: Sarup & Sons.
6. Kohli, V.k.& Kohli , V. Environmental Pollution & Management . Vivek Publishers.

(D) EVALUATION:

External Examination	35 Marks
Internal Assessment	15 Marks
Attendance	3
Written Assignments	6
Two Mid Terms Exam	6

(E) INSTRUCTIONS FOR THE PAPER-SETTER:

The question paper will consist of three sections A, B and C. Section A **(**UNIT-I) & (UNIT-II) and B (UNIT-III) & (UNIT-IV) will have two questions from the respective units of the syllabus and will carry 10 marks each. Section C will consist of 5 questions of 3 marks in each which will cover the entire syllabus uniformly.

(F) INSTRUCTIONS FOR THE CANDIDATES:

Candidates are required to attempt one questions each from the sections A and B and the entire section C.

SUBJECT TITLE: GUIDANCE AND COUNSELING

SUBJECT CODE: BEDGC-4809
SEMESTER VIII B.A/B.Sc.B.Ed
CONTACT HOURS/WEEK:

Lecture(L)	Tutorial(T)	Practical(P)	Credit(C)
2	0		2

Internal Assessment: 15
End Term Exam: 35
Duration of Exam: 1.5Hrs

(C) OBJECTIVES AND OUTCOME OF COURSE:

To enable the student teachers to:-

- Understand the need and importance of Guidance and Counseling.
- Understand the process involved in guidance and Counseling.
- To familiarize with testing and non- testing techniques.
- Organize guidance programme in Secondary/Senior Secondary Schools.

(B) CONTENTS OF SYLLABUS:

Sr. No	Contents	Contact Hours/Week
UNIT-I	1. Guidance: - meaning, Nature, Scope, need and types-educational, Vocational and personal- their meaning and objectives. 2. Principles of Guidance and Counseling.	2 Hours per week(12 Weeks)
UNIT-II	1. Guidance Services: - Individual information Service, Counseling Service, Placement and follow-up services. 2. Testing Techniques- Testing of mental abilities aptitudes' and interests. 3.Non Testing Techniques- Interview, Rating Scales, Cumulative Record Card.	
UNIT-III	1. Counseling:-Concept, Approaches- Directive, Non Directive, Eclectic. 2. Principles of Counseling. 3. Qualities and training of a counselor.	
UNIT-IV	1. Counseling Interview:- Steps in Counseling interview 2. Role of Teacher as Counselor 3.Organization of Guidance Programme. Meaning, Objectives, Importance and various Patterns.	

SESSIONAL WORK (any one of the activities):

1. Interest Inventory

2. Visit to an Employment Exchange.

3. Study of an adolescent for guidance.

(C) BOOKS RECOMMENDED:

1. Walia, J.S:- Foundation of Guidance, Paul Publishers.

2. Rao, S.N and Sahajpal, P: Counseling and Guidance (3rd edition). Delhi, McGrill Hill.

3. Jones, A.E: Principles of Guidance, Tata Mc Graw Hill.

4. Nanda, S.K: Guidance and Counseling, Tandon Publishers**.**

5. Gupta, S.Barki & Mukkhopadayay: Career and Counseling Education.Delhi:Kalpaz Guidance and Counseling-A Manual, Sterling Publication.

6. Bhatia, K.K: Priciples of Guidance and Counseling, Kalyani Publishers.

7. Goyal,R.P.:Sikhya Ate Visayak Agvayee (Punjabi University(Publication)

(D) EVALUATION:

External Examination	35 Marks
Internal Assessment	15 Marks
Attendance	3 Marks
Written Assignments	6 Marks
Two mid Terms Exam	6 Marks

(E) INSTRUCTIONS FOR THE PAPER-SETTER:

The question paper will consist of three sections: A, B, And C. Section A **(**UNIT-I) & (UNIT-II) and B (UNIT-III) & (UNIT-IV) will have two questions from the respective units of the syllabus and will carry 10 marks each. Section C will consist of 5 question of 3 marks in each which will cover the entire syllabus uniformly.

(F) INSTRUCTIONS FOR THE CANDIDATES:

Candidates are required to attempt one question each from the sections A and B and the entire section C.

SUBJECT: TEACHER EDUCATION
SUBJECT CODE: BEDTE-4811
SEMESTER : VIII **B.A/B.Sc.B.Ed**
CONTACT HOURS/WEEK:

Lecture(L)	Tutorial(T)	Practical(P)	Credit(C)
2	0	0	2

Internal Assessment : 15
End Term Exam : 35
Duration of Exam : 1.5Hrs

(A) OBJECTIVES AND OUTCOME OF COURSE:

To enable the student teachers to:

- Familiarize with teaching profession and teacher education.
- Gain insight on problems of teacher education in India.
- Know the qualities of a good teachers.
- Understanding the new recommendations of NCF 2009 on teacher education.
- Understanding the innovations and new trends in teacher education.

(B) CONTENTS OF SYLLABUS:

Sr. No	Contents	Contact Hours/ Week
UNIT-I	• Teacher education: Meaning, Nature, importance. • Qualities of a good Teacher. Problems of Teacher Education in India.	02 hours per week (12 weeks)
UNIT-II	• Objectives of Teacher Education At different Levels: Pre Primary, Primary, Secondary level.	
UNIT-III	• NCF 2009 on Teacher Education.	
UNIT-IV	Innovations in Teacher Education**:** Meaning, Nature and strategies. Current Trends in teacher Education.	

SESSIONAL WORK (any one of the activities):

- Critical appraisal of teacher education programme (ETT/B.Ed./M.Ed.) being implemented in a teacher education institution.
- Attitudinal survey of teacher trainees.

(C) BOOKS RECOMMENDED:

1. Balasubramanium. P.S. and Vimala E.P. Kumar. Teacher Education.
2. Bansal, N.K. (2003). Teacher Education Programmes in India and France compared.
3. University News, 41(33), 9.
4. Jawanda, J.S. In-service Teacher Education.
5. NCERT: Second All India Survey of' Teacher Education.
6. Saxena, Mishra and Mohanty: Teacher Education, Meerut, R. Lall Book Depot. Shanna, R. A. Teacher Education.
7. Singh, Yogesh Kumar & Nath, Ruchika (2005). Teacher Education. New Delhi: APH Publishing Corporation.
8. Preparing Professional and Humane Teacher. New Delhi: NCTE.Pire, E.A. Better Teacher Education. Ramachandran, V. and Ramkumar, V. (2011). Education in India. New Delhi: National Book Trust.
9. Handa, Anupam and Kumar, Naresh (2013). Teacher Education. Patiala: Twenty First Century Publications.
10. Radha M.(2013), Teacher Education, Delhi, PHI Learning Pvt. Ltd.
11. Garg I.(2014), Teacher Education, New Delhi, A.P.H. Publishing Corporation.
12. Namarta (2014), Teacher Education, Meerut, R. Lall Book depot.
13. Kaur, G. (2014).Teacher Education, Patiala : Twenty first century publications.
14. Saxena N.R. Mishra B.K.(2015) Meerut, R.Lall Book Depot.
15. Sharma S.P.(2015) Teacher Education, New Delhi, Kanishka Publishers.

(D) EVALUATION:

External Examination	35 Marks
Internal Assessment	15 Marks
(a)Attendance	3 Marks
(b)Written Assignments	6 Marks
(c)Two mid Terms Exam	6 Marks

(E) INSTRUCTIONS FOR THE PAPER-SETTER:

The question paper will consist of three sections A, B and C. Section A **(**UNIT-I) & (UNIT-II) and B (UNIT-III) & (UNIT-IV) will have two questions from the respective units of the syllabus and will carry 10 marks each. Section C will consist of 5 questions of 3 marks in each which will cover the entire syllabus uniformly.

(F) INSTRUCTIONS FOR THE CANDIDATES:

Candidates are required to attempt two questions each from the sections A and B and the entire section C is compulsory.

SUBJECT: EDUCATION TECHNOLOGY
SUBJECT CODE: BEDET-4810
SEMESTER : VIII **B.A/B.Sc.B.Ed**
CONTACT HOURS/WEEK:

Lecture(L)	Tutorial(T)	Practical(P)	Credit(C)
2	0	0	2

Internal Assessment : 15
End Term Exam : 35
Duration of Exam : 1.5Hrs

(A) OBJECTIVES AND OUTCOME OF COURSE:

To enable the student teachers to:

a) Understand the meaning, nature, and Characteristics of educational technology.
b) Understand the role of educational technology in education.
c) Understand the concept of programmed learning.
d) Understand the concept of Mass Media.
e) Understand the concept M-learning.
f) Understand the Recent trends in educational technology.

(C) CONTENTS OF SYLLABUS:

Sr. No	Contents	Contact Hours/ Week
UNIT-I	• Education technology: meaning, Nature, Characteristics, Types. • Role of Educational Technology in modern educational practices.	02 hours per week (12 weeks)
UNIT-II	• Programmed Learning: Concept, Characteristics, Difference between programmed learning and traditional learning. •	
UNIT-III	• Mass Media and Education: meaning, Purposes, Role of Mass media in education.	

UNIT-IV	• Recent Trends in Educational Technology. • M-Learning: Meaning, Objectives, Advantages and disadvantages.	

SESSIONAL WORK (any one of the activities):

- Preparation of any topic of school level (from class 6th to 10th) through M-learning.
- Preparation of lesson plan by using PPT.
- Write a Report on effects of mass media on our society.

(C) BOOKS RECOMMENDED:

1) Walia.J.S (2015-16) Educational technology. Ahim Paul Publication, jalandhar.
2) Sethi.M (2015) Educational technology.21st century publication, Patiala.
3) Mangal.S.K ,uma mangal(2014).Essential of educational technology.PHI learning private limited,Delhi.
4) Thakur.A.S,Abhinav thakur(2013-14)Essential of educational technology. Agrawal publications,Agra-2.
5) Sharma.R.A(2013) Essential of educational technology.R.Lall Book Depot,Meerut.
6) Nandra.I.S(2009)Educational technology.21st century publication ,Patiala.
7) Sachdeva.M.S,chanchal kumar,kusum Sharma(2009)Essential of educational technology.21st century publication,Patiala.
8) Bhusan,A.&Ahuja,M,(1992)Educational technology.Vikas publication, Meerut.

(D) EVALUATION:

External Examination	35 Marks
Internal Assessment	15 Marks
(a) Attendance	3 Marks
(b) Written Assignments	6 Marks
(c) Two mid Terms Exam	6 Marks

(E) INSTRUCTIONS FOR THE PAPER-SETTER:

The question paper will consist of three sections A, B and C. Section A **(**UNIT-I) & (UNIT-II) and B (UNIT-III) & (UNIT-IV) will have two questions from the respective units of the syllabus and will carry 10 marks each. Section C will consist of 5 questions of 3 marks in each which will cover the entire syllabus uniformly.

(F) INSTRUCTIONS FOR THE CANDIDATES:

Candidates are required to attempt two questions each from the sections A and B and the entire section C is compulsory.