SAVITRIBAI PHULE PUNE UNIVERSITY

FACULTY OF EDUCATION

DEPARTMENT OF EDUCATION AND EXTENSION

Four Year Integrated B.Sc.B.Ed.

(SEMISTER AND CREDIT BASE)

Four Year Integrated B.Sc. B.Ed

SAVITRIBAI PULE PUNE UNIVERSITY, PUNE

FOUR YEAR INTEGRATED BSc Bed (Semister and credit base)

PROGRAMME GUIDELINES

Title :

The Title of the programme is Bachelor of Science and Bachelor of Education [BSc. BEd].

Objectives of the BSc.B.Ed (Integrated) Course :-

To enable the student teacher :
1. to act as agents of modernization and social change.
2. to promote social cohesion, international understanding and protection of human rights and right of the child.
3. to acquire competencies and skills needed forScience and Mathematics teacher.
4. to use competencies and skills needed for becoming an effective Science and Mathematics teacher.
5. to become competent and committed Science and Mathematics teacher.
6. to be sensitive about emerging issues such as environment, population gender equality, etc.
7. to inculcate rational thinking and scientific temper among the Teacher students.
8. to develop critical awareness about the social realities among the students.
9. to use innovative teaching methods.
10. to use managerial skills.

Duration :

The Duration of the programme shall be four academic years organized in semester pattern with two semesters in a year. Each semester will consist of 100 days of instruction excluding examination.

Eligibility for admission :

BSc.,BEd-10+2[Higher Secondary School] from a recognized board with Physics, Chemistry, Mathematics / Biology with 50%marks for General, 45% for SC/ST/NT/OBC categories.

The Selection will be on marit cum test shall be on All India Basis (If .There shall not be Lateral Entry or Exit to the programme.

Intake :

The annual intake for each of the programme shall be 50 students in one unit.
Medium of Instruction :
The medium of instruction shall be English.

Instruction

Classes for the Int. BSc BEd shall be conducted in regular mode with 6hrs. of daily instruction [including theory and practical hours] in 6 day week pattern.

Attendance

Students of the programme are required to secure a minimum 75% of attendance to appear in the semester examinations.

Evaluation

Evaluation shall be of two patterns- Continuous Internal Examination with Sessionals, Assignments , Seminars etc. and End Semester Examinations-Theory and Practicals.

Grades shall be awarded in the following pattern- A+[GradePoint 10] , A[GP9], B+[GP8], B[GP7], C[GP6], D[GP5],F[GP0].

The final result in each course will be determined on the basis of Continuous assessment and End Semester Exams in the ratio- 40:60 for theory courses and 60: 40 for Practical courses.

The University Regulations regarding Supplementary Exams shall apply to this programme also. No student who has F grade in any of the courses shall be awarded the degree.

Course Outline

Semester	Course Code	Course Component	Course Name	Number of Credits
1	FC-1	Science Component	Foundation Course I - General English I	3
	FC-2		Foundation Course II - General Matathi I/ General German I	3
	SS-1		Elective I - Physics-I/Computer Science -I	5 (Theory 3 + 2 Practical)
	SS-2		Elective II - Chemistry-I/Informatics Practices-I	5 (Theory 3 + 2 Practical)
	SS-3		Elective III - Botany-I/Zoology-I/Mathematics-I	5 (Theory 3 + 2 Practical)
	CC-1	Education Component	Basics in Education	4
	AC-1		Education for Peace & Human Rights	2
	AC-2		Learning Resources	2
	AC-3		Communication Skills - I (Soft Skills)	2
	AC-4		Work Education - I (Computers/Agriculture/Electrical-Electronics)	2
			TOTAL	**33**
2	FC-1	Science Component	Foundation Course II - General English II	3
	FC-2		Foundation II - General Matathi II/General German II	3
	SS-1		Elective - I - Physics-II/Computer Science - II	5 (Theory 3 + 2 Practical)
	SS-2		Elective - II - Chemistry-II/Informatics Practices-II	5 (Theory 3 + 2 Practical)
	SS-3		Elective-III - Botany-II/Zoology-II/Mathematics-II	5 (Theory 3 + 2 Practical)
	CC-2	Education Component	Teacher and School Education in India	4
	AC-2		Learning Resources : Effective use in Class Rooms	2
	AC-3		Communication Skills - II (Proficiency in Class Rooms)	2
	AC-4		Work Education - II (Computers/Agriculture/Electrical-Electronics)	2
	AC-15		Gender issues in Schools	2
			TOTAL	**33**
3	FC-1	Science Component	Foundation Course I - General English III	3
	FC-2		Foundation Course II - General Matathi III/General German III	3
	SS-1		Elective I - Physics III/Computer Science III	5 (Theory 3 + 2 Practical)
	SS-2		Elective II - Chemistry III/Informatics Practices III	5 (Theory 3 + 2 Practical)
	SS-3		Elective III- Botany III/Zoology III/Mathematics III	5 (Theory 3 + 2 Practical)

	CC-3	Education Component	Learner, Learning and Cognition	4
	AC-5		Inclusive Education Practices in Schools	2
	AC-6		Learning Psychology: Practical	2
	AC-7		Use of ICT for Effective Learning	2
	AC-8		Assessment for Learning - I	2
			TOTAL	**33**
4	FC-1	Science Component	Foundation Course I - General English IV	3
	FC-2		Foundation Course II - General Marathi IV/General GermanIV	3
	SS-1		Elective I - Physics IV/Computer Science IV	5 (Theory 3 + 2 Practical)
	SS-2		Elective II - Chemistry IV/Informatics Practices IV	5 (Theory 3 + 2 Practical)
	SS-3		Elective III - Botany IV/Zoology IV/Mathematics IV	5 (Theory 3 + 2 Practical)
	CC-4	Education Component	Human Development in Socio-Cultural Context	4
	AC-8		Assesment for Learning-II	2
	AC-7		Use of ICT for Effective Learning	2
	AC-9		Environment Education & Disaster Management	2
	AC-6		Learning Pshychology: Practical	2
			TOTAL	**33**
5	SS-1	Science Component	Elective I - Physics V/Computer Science V	5 (Theory 3 + 2 Practical)
	SS-2		Elective II - Chemistry V/Informatic Practices V	5 (Theory 3 + 2 Practical)
	SS-3		Elective III - Botany V/Zoology V/Mathematics V	5 (Theory 3 + 2 Practical)
	CC-5	Education Component	Curriculum and School Programs	4
	PC-1		Pedagogy Course (Subject I): Science - I	4
	PC-2		Pedagogy Course (Subject II) Mathematics/Biology-I	4
	AC-10		Basics Action Research	2
	TP-1		Learning to Function as a Teacher - Core Training I	4
			TOTAL	**33**
6	SS-1	Science Component	Elective I - Physics VI/Computer Science VI	5 (Theory 3 + 2 Practical)
	SS-2		Elective II - Chemistry VI/Informatic Practices VI	5 (Theory 3 + 2 Practical)
	SS-3		Elective III - Botany VI/Zoology VI/Mathematics VI	5 (Theory 3 + 2 Practical)
	CC-6	Education Component	Instructual Technology	4
	PC-1		Pedagogy Course (Subject I): Science II	4
	PC-2		Pedagogy Course (Subject II): Mathematics II/Biology II	4
	AC-12		Health & Physical Education	2
	TP-1		Learning to Function as a Teacher - School Experience Programme (One week)	4
			TOTAL	**33**
7	SS-1	Science Component	Elective I - Physics VII/Computer Science VII	5 (Theory 3 + 2 Practical)
	SS-2		Elective II - Chemistry VII/Informatic Practices VII	5 (Theory 3 + 2 Practical)
	SS-3		Elective III - Botany VII/Zoology VII/Mathematics VII	5 (Theory 3 + 2 Practical)
	CC-7	Education Component	Schooling, Socialisation & Identity	4
	AC-12		Yoga & Well being	2
	TP-2		Intership in Teaching (School Placement) (6 weeks duration)	6
	AC-11		Guidance and CounSelling	4
	AC-15		Arts and Asthetic Education	2
			TOTAL	**33**
8	SS-1	Science Component	Elective I - Physics VIII/Computer Science VIII	5 (Theory 3 + 2 Practical)
	SS-2		Elective II - Chemistry VIII/Informatic Practices VIII	5 (Theory 3 + 2 Practical)
	SS-3		Elective III - Botany VIII/Zoology VIII/Mathematics VIII	5 (Theory 3 + 2 Practical)

	SS-1		Elective Project I(Physics/Computer Science)	2
	SS-2		Elective Project II(Chemistry/Informatics Practices)	2
	SS-3		Elective Project III(Botany/Zoology/Mathematics)	2
	CC-8	Education Component	Vision of Indian Education: Issues & Concerns	4
	CC-9		Learning Management and E-Learning	4
	AC-13		Community Work	2
	AC-14		Entrepreneurship Development	2
			TOTAL	**33**

Semester – I
Course Name: Foundation Course I –General English I

Credits: 3

Course Code: FC-1

Objectives	• Students should acquire the ability to listen and understand, and should be able to employ non-verbal clues to make connections and draw inferences. • Students should develop the habit of reading for information and pleasure; draw inferences and relate texts to previous knowledge; read critically and develop the confidence to ask and answer questions. • Students should be able to employ her communicative skills, with a range of styles, and engage in a discussion in an analytical and creative manner. • Students should be able to identify a topic, organise and structure thoughts and write with a sense of purpose and an awareness of audience. • Students should be able to use language creatively and imaginatively in text transaction and performance of activities. • Students should be able to articulate individual/personal responses effectively. • Students should be able to use language and vocabulary appropriately in different contexts and social encounters. • Students should be able to use his/her critical/ thinking faculty to read between the lines and go beyond the text. • Students should be able to write simple messages, invitations, short paragraphs, letters (formal and informal) applications, simple narrative and descriptive pieces, etc. • Students should be able to use his/her proficiency in English to explore and study other areas of knowledge through print and non-print media.
Syllabus	UNIT I 1. Dandi March – Louis Fischer 2. Aspects of the Indian Constitution- M.C Chagla 3. Individual Freedom – Jawaharlal Nehru 4. Fundamental Duties 5. Delhi in 1857- Mirza Ghalib 6. Raja's Diamond – R. L. Stevenson 7. Tree – Tina Morris UNIT II Comprehension-Unseen Passage UNIT III Paragraph writing UNIT IV Vocabulary UNIT V Grammar 1. Direct and Indirect Speech 2. Modals

	3. Infinitives and Gerunds 4. Synthesis
Reference	Prescribed Text- English Language and Indian Culture. Bhopal: M. P. Hindi Granth Academy.

Foundation Course II –General Tamil-I
Credits: 3

Course Code: FC-2

Objectives	7.1 To enable the students to acquire basic skills in functional language . 7.2 To develop independent reading skills and reading for appreciating the literary works 7.3 To internalize grammar rules so as to facilitate fluency in speech and writing 7.4 To develop functional and creative skills in language. 7.5 To develop value of liberalism and an insight into the cultural heritage of the region which remains embodied in the literary output of the region . Transaction mode : Lecture cum discussion , group discussion ;, panel discussion , seminar group work , library work.
Syllabus	Unit I: Descriptive grammar – Sandhi Ref: Marathi Literature Unit II: Functional Language Group Discussion: Introduction-Definition-Characteristics-types of discussions-round table-symposium-panel-lecture forum etc.-relevance of group Discussions – Exercises Conversation: Defination-styles of conversation-formats of conversation-telephonic conversation, etc-Exercises Reference: Efective Group Discussion – Theory and Practice Gloria J. Galanes, McGraw Hill Company (Pblishers). Unit III: Poetry:Modern MarathiPoetry An Anthology of Marathi Poetry (For First Year Degree Classes) SPPU (F Y B A) Unit IV: Prose: Collection of Short Stories -----– (Collection of Short Stories)
Reference	

Foundation Course II - General German-I

Credits: 3

Course Code: FC-2

To be Prepare?

Course Name: Elective I - Physics-I

Credits: 5(Theory 3+2 Practical)

Course Code: SS-1

Objective:	1. Acquaint themselves with different mathematical techniques and concepts useful in the study of physics. 2. Differentiate between scalar and vector fields by giving examples in physics. 3. Explain the physical significance of gradient of scalar fields and divergence and curl of vector fields. 4. Understand the solutions of differential equations of two and three variables and relate those with applications in physics. 5. Solve problems on applications of Newton's laws of motion, the solution of a single particle under central force field and to a system of particles. 6. Understand Kepler's laws of planetary motion and generalize it to satellites. 7. Solve problems of rigid and deformable bodies under gravitational, tensile and compression forces. 8. Understand the concept of surface tension and viscosity.
Syllabus	Unit-1 Mathematical Background Review of vector product of two vectors; triple vector product; concept of field; gradient of a scalar field and its geometrical interpretation; divergence and curl of a vector field; line, surface and volume integrals; flux of a vector field; Gauss's divergence theorem; Green's theorem and Stokes theorem. Functions of two and three variables; partial derivatives; geometrical interpretation of partial derivatives of functions of two variables; total differential of a function of two and three variables; higher order derivatives and their applications. Unit-2 Mechanics Motion in a uniform field; components of velocity and acceleration in different coordinate systems (Cartesian and Polar only); uniformly rotating frame; centripetal acceleration; pseudo forces; coriolis force and its applications; Foucault pendulum Motion under central force; Kepler's law; gravitational law and field; potential due to a spherical body; Gauss and Poisson equations for gravitational self-energy. Unit-3 Mechanics of rigid bodies

	System of particles; Constraints, degrees of freedom; center of mass; Centre of mass and laboratory coordinates, equation of motion; conservation of linear and angular momentum; conservation of energy; rocket propulsion; elastic and inelastic collisions. Rigid body motion; rotational motion; moments of inertia; calculation of moment of inertia of some regular bodies (rod, lamina, disc and sphere); principal moments and axes; Gyroscope. Unit-4 Properties of matter Elasticity; small deformations; Hook's law; elastic constants for an isotropic solid; bending moments; bending of beams; beams supported at both the ends, cantilever, torsion of a cylinder, and shearing forces; Poisson's ratio; relation between different elastic moduli; elastic fatigue Unit-5 Fluid Mechanics Kinematics of moving fluids, equations of continuity, Euler's equation, Bernoulli's theorem; streamline and turbulent flow. Poiseulle's law. Capillary tube flow, viscosity and viscous fluids; Reynolds's number; Stokes law. Surface tension and surface energy, molecular interpretation of surface tension, pressure on a curved liquids surface, wetting.
Reference	Latest editions of Young and Freedman, University Physics, Addison- Wesley Cutnell and Johnson, Physics, Wiley India Ghosh, R.K., The Mathematics of Waves and Vibrations, Macmillan

Course Name: Elective I - Computer Science –I:
Credits: 5(Theory 3+2 Practical)

Course Code: SS-1

Objective:	
Syllabus	
Reference	

Course Name: Elective II - Chemistry-I

Credits: 5 (Theory 3+2 Practical)

Course Code: SS-2

Objective:	(i) acquire the background of mathematical knowledge needed for better understanding of chemical principles and derivations and also to apply in solving problems. (ii) illustrate how a scientific model can be constructed based on the experimental observations of the behaviours of gases and to explain the properties in terms of microscopic organization. (iii) explain the properties of liquid state using inter- molecular forces and to differentiate the colloidal state from true solutions in terms of size of the particles and to relate this attribute with their properties with the number of particles to the collegative properties. (iv) appreciate the importance of phenomenon of colloidal chemistry in daily life. (v) explain the importance of quantum chemistry in the developing the model of the atom. (vi) acquire competency to predict the patterns in the properties exhibited by the elements. (vii) acquire the knowledge of correlating the properties of matter in the solid state to the structure. (viii) explain the macroscopic behaviour in terms of microscopic properties. (ix) enumerate the factors affecting the complexation behaviour of the species.
Syllabus	Instructional Strategy: The teacher in addition to the lecture method may also use assignment-cum-discussion mode for transaction of such topics which the learner has already learnt in the higher secondary stage. The use of ICT in transaction of solid state may also be adopted by the teacher. In describing the shape of molecules and the interplay of Intermolecular forces as they affect the properties of the substances, the teacher may explore the possibility of the use of Ausubel's advance organizer model. Unit-I Mathematical Concepts Logarithmic relations, curve sketching, linear graphs and calculation of slopes, differentiation of functions like kx, ex, xn, sin x, log x; maxima, partial differentiation and reciprocity relations. Integration of some useful/relevant functions; permutations and combinations. Factorials.

Probability.
Gaseous States
Postulates of kinetic theory of gases, deviation from ideal behavior, van der Waals equation of state.
Critical Phenomena: PV isotherms of real gases, continuity of states, the iso-therms of van der Waals equation, relationship between critical constants and van der Walls constants, the law of corresponding states, reduced equation of state.
Molecular velocities: Root mean square, average and most probable velocities.
Qualitative discussion of the Maxwell's distribution of molecular velocities, collision number, mean free path and collision diameter. Liquefaction of gases (based on Joule-Thomson effect).
Liquid State & Colloids
Intermolecular forces, structure of liquids (a qualitative description).
Structural differences between solids, liquids and gases.
Liquid Crystal : Difference between liquid crystal, solid and liquid. Classification, structure of nematic and cholestric phases. Thermography and seven segment cell.

Unit-II **Atomic Structure**

Idea of de Broglie matter waves, Heisenberg uncertainty principle, atomic orbitals, Schrodinger wave equation, significance of and , quantum numbers, radial and angular wave functions and probabillity distribution curves, shapes of s, p, d orbitals. Aufbau and Pauli exclusion principles, Hund's multiplicity rule. Electronic configurations of the elements, effective nuclear charge.

Periodic Properties

Atomic and ionic radii, ionization energy, electron affinity and electronegativity-definition, methods of determination or evaluation, trends in periodic table and applications in predicting and explaining the chemical behaviour.

Unit-III **Solid State**

Definition of space lattice, unit cell.
Laws of crystallography-(i) Law of constancy of interfacial angles (ii) Law of rationality of indices (iii) Law of symmetry, Symmetry elements in crystals. X-ray diffraction by crystals. Derivation of Bragg equation. Determination of crystal structure of NaC1, KC1 and CsC1 (Laue's method and powder method).

Unit-IV **Chemical Bonding-Part I**

Convalent Bond-Valence bond theory and its limitations, directional characteristics of covalent bond, various types of hybridization and shapes of simple inorganic molecules and ions. Valence shell electron pair repulsion (VSEPR) theory to NH3, H3O+, SF4, CIF3, ICI2- and H2O. MO theory, homonuclear and heteronuclear (CO and NO) diatomic molecules, multicenter bonding in electron deficient molecules, bond strength and bond energy, percentage ionic character from dipole moment and electronegativity difference.
Weak Interactions-Hydrogen bonding, van der Waals forces.

	Unit-V Chemical Bonding-Part II & s-Block Elements Ionic Solids-Ionic structures, radius ratio effect 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. 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 aryls.
Reference	1. Atkins, P.W. & Julio De Paula , Physical Chemistry , Oxford University Press 2 Silbey, R.J. and Alberty , R.A.. , Physical Chemistry John Wiley & Sons, Inc. 3 Castellan, G.W. Physical Chemistry ,Narosa Publishing House 4. Coulson ,C.A., Valence, Oxford University Press 5. Chanda , Manas ,Chemical Bonding ,TMH Publication 6. Raj Gurudeep, Advanced Physical Chemistry , Goel Publishing House 7. Puri, Sharma & Pathania , Physical Chemistry ,Shoban Lal Nagin Chand & Company 8. Rakshit , P.C. , Physical Chemistry, New Age International 9. Lee , J.D. ,Inorganic Chemistry , ELBS 10. Cotton & Willkinson , Inorganic Chemistry, Wiley International

Course Name: Elective II - Informatics Practices-I

Credits: 5 (Theory 3+2 Practical)

Course Code: SS-2

Objective:	
Syllabus	
Reference	

Course Name: Elective III - Botany-I for Theory

Credits: 5 (Theory 3+2 Practical)

Course Code: SS-3

Objective:	To gain understanding of classification and structural and functional organization of viruses, bacteria, algae, fungi and bryophytes.
Syllabus	Unit I Viruses : Discovery, structure, classification reproduction and diseases caused. Bacteria : Structure, classification, nutrition, reproduction and economic importance and a general account of cyanobacteria and mycoplasmas. Unit II Algae : General characters, classification and economic importance. Important features in life history of

	Chlorophyta : Volvox, Oedogonium , Coleochaete Xanthophyta : Vaucheria Phaeophyta : Ectocarpus, Sargassum Rhodophyta : Polysiphonia Unit III Fungi : General characters, classification and economic importance. Important features in life history of Mastigomycotina : Pythium, Phytophthora Zygomycotina : Mucor Ascomycotina : Saccharomyces, Eurotium, Peziza Unit IV Fungi (Contd.) Basidiomycotina : Puccinia, Agaricus Deuteromycotina : Cercospora, Colletotrichum General account of Lichens Unit V Bryophyta General characters, outline classification of Bryophyta. Structure and life history of Hepaticopsida : Marchantia Anthocerotopsida : Anthoceros Bryopsida : Funaria
Reference	1. Vashishta, B.R. and A.K. Sinha 2007. Fungi .S. Chand and Co. Ltd. 2. Thakur, Anil K. and Susheel K. Bassi 2007. Diversity of Microbes & Cryptogams. S. Chand & Co. Ltd. 3. Vashishta, B.R., A.K. Sinha and V.P. Singh. 2005. Algae . S. Chand & Co. Ltd. 4. Ingraham, John L. and Catherine A. Ingraham. 2004 . Introduction to Microbiology. 3rd edition. Thomson Asia P. Ltd. 5. Sharma, O.P.1992. Text Book of Thallophytes Tata McGraw Hill Publishing Co. 6. Sharma, P.D.1991. The Fungi, Rastogi & Co. Meerut 7. Dube, H.C.1990. An Introduction to Fungi Vikas Publishing House Pvt. Ltd. 8. Puri, P. 1980. Bryophyta Atma Ram & Sons Delhi Clifton, A. 1958. Introduction to Bacteria McGraw Hill & Co. New York

Course Name: Elective III - Botany-I for Practical

Credits: 5 (Theory 3+2 Practical)

Course Code: SS-3

Objective:	• To develop skills of staining of lower organism. • To impart skills of temporary and permanent slide preparations (i) To enhance ability to identify the lower organisms (ii) To familiarize the students with diseases and their causative agents.
Syllabus	1. Study of the genera included under algae and fungi. 2. Study of morphology, reproductive structures and anatomy of the examples cited in theory under Bryophyta. 3. Observation of disease symptoms in hosts infected by fungi, viruses and mycoplasma. Section cutting of diseased material and identification of the pathogens as per the theory syllabus. 4. Gram staining of bacteria (milk, curd, root nodules). 5. Study of crustose, foliose and other types of lichen thalli.
Reference	1. Vashishta, B.R. and A.K. Sinha 2007. Fungi .S. Chand and Co. Ltd. 2. Thakur, Anil K. and Susheel K. Bassi 2007. Diversity of Microbes & Cryptogams. S. Chand & Co. Ltd. 3. Vashishta, B.R., A.K. Sinha and V.P. Singh. 2005. Algae . S. Chand & Co. Ltd. 4. Ingraham, John L. and Catherine A. Ingraham. 2004 . Introduction to Microbiology. 3rd edition. Thomson Asia P. Ltd. 5. Sharma, O.P.1992. Text Book of Thallophytes Tata McGraw Hill Publishing Co. 6. Sharma, P.D.1991. The Fungi, Rastogi & Co. Meerut 7. Dube, H.C.1990. An Introduction to Fungi Vikas Publishing House Pvt. Ltd. 8. Puri, P. 1980. Bryophyta Atma Ram & Sons Delhi 9. Clifton, A. 1958. Introduction to Bacteria McGraw Hill & Co. New York

Course Name: Elective III - Zoology-I for Theory

Credits: 5 (Theory 3+2 Practical)

Course Code: SS-3

Objective:	To gain knowledge of classification of invertebrates phyla; structure, general organization of representative animals from different phyla of lower non-chordates.
Syllabus	Unit 1: PROTOZOA a. General characters and classification of phyla upto classes with examples. b. Structural organization of Paramaecium. c. Brief outline of the life history of Plasmodium d. Host Parasite relationship Unit 2: PORIFERA & COELENTERATA a. General characters & classification of phyla upto classes with examples.

	b. Structural organisation of Sycon & canal system in general c. Structural organization and life history of obelia. geniculatum Unit 3: PLATYHELMINTHES & ASCHEL MINTHES a. General characters & classification of phyla upto classes with examples. b. Structural organization & Life history of Fasciola hepatica. c. Structural organization & Life history of Ascaris. Unit 4: ANNELIDA a. General characters & classification of phyla upto classes with examples. b. Structural organisation of Pheritima posthuma Unit 5: General Topics a. Protozoan diseases b. Polymorphism in coelenterata c. Coral reefs d. Brief account of Morphological Peculiarities and Pathogenesis of human nematodes - Ascaris, Ancylostoma, Dracunculus, Enterobius, Wutchereria, Trichinella spiralis.
Reference	1. Baijal & Saini: A textbook of Zoology; Arun Prakashan 2. Barringtom, Invertebrate structure and function (Nelson) I, II 3. D.C. Yadav: Prayogic Jantu Shashtra **4. Hyman L.H,:Invertebrate Vol. I & II; (McGraw-Hill) I, II** 5. Kotpal: Invertebrate Zoology ; Rastogi Publication Meerut 6. Kotpal R.L. Agarwal S.K: Modern Text Book of Zoology (Invertebrate); Rastogi Publication Meerut 7. Lal S.S: Practical Zoology Invertebrate I, II 8. Majupuria T.C:Invertebrate Zoology; Pradeep Publications, Jullundar **9. Parker and Haswell W.T: Invertebrate Zoology (Marshall, William)** **10 R.S. Saini: A textbook of Zoology; Pushpa Rajan Prakashan, Allahabad** 11 Rastogi, Veer bala: A manual for practical invertebrate Zoology and Cytology; Kedarnath, Ram Nath & Co. , Meerut **12 S.N. Prasad: The Invertebrates; Kitab Mahal, Allahabad** 13. Veer Bala Rastogi : Manual of Practical Invertebrate; Kedarnath, Ram Nath &Co. Meerut.

Course Name: Elective III - Zoology-I for Practical
Credits: 5 (Theory 3+2 Practical) Course Code: SS-3

Objective:	To develop in the students the skills of staining, dissection of animals and identification of animals and their habitat.
Syllabus	Study of representative examples of different phyla (classification and general characters) as prescribed in the theory syllabus. a. Protozoa b. Porifera c. Coelenterata d. Platyhelminthes e. Aschelminthes f. Annelida 2. Study of prescribed type / species by whole mount: Obelia colony, gemmules, spicules of sponges, Fasciola hepatica

	3. Glycerin mount of some suitable materials (stained or unstained as specified), septal nepheridia, setae and ovary of earthworm, Parapodia of neries. 4. Study of Protozoans in pond water. 5. Dissection of Earthworm Major dissection - Nervous system - Reproductive system - Alimentary canal of Earthworm - Digestive system - Minor dissection - Spermetheca of Earthworm - Ovary of Earthworm Septal Nephridia Scheme of Practical Examination
Reference	Baijal & Saini: A textbook of Zoology; Arun Prakashan 2. Barringtom, Invertebrate structure and function (Nelson) I, II 3. D.C. Yadav: Prayogic Jantu Shashtra **4. Hyman L.H,:Invertebrate Vol. I & II; (McGraw-Hill) I, II** 5. Kotpal: Invertebrate Zoology ; Rastogi Publication Meerut 6. Kotpal R.L. Agarwal S.K: Modern Text Book of Zoology (Invertebrate); Rastogi Publication Meerut 7. Lal S.S: Practical Zoology Invertebrate I, II 8. Majupuria T.C:Invertebrate Zoology; Pradeep Publications, Jullundar **9. Parker and Haswell W.T: Invertebrate Zoology (Marshall, William)** **10 R.S. Saini: A textbook of Zoology; Pushpa Rajan Prakashan, Allahabad** 11 Rastogi, Veer bala: A manual for practical invertebrate Zoology and Cytology; Kedarnath, Ram Nath & Co. , Meerut **12 S.N. Prasad: The Invertebrates; Kitab Mahal, Allahabad** 13. Veer Bala Rastogi : Manual of Practical Invertebrate; Kedarnath, Ram Nath &Co Meerut.

Course Name: Elective III - Mathematics-I for Theory
Credits: 5 (Theory 3+2 Practical) Course Code: SS-3

Objective:	
Syllabus	1) Sets (4 Lectures) 1.1 Power set of a set, Product of two sets. 1.2 Equivalence relations, partitions of sets, Equivalence classes. 2) Functions (4 Lectures) 2.1 Definition of a function. Domain, co-domain and the range of a function. Review of injective, surjective and bijective functions, Composition of functions. Invertible functions and the inverse of a function. 2.2 Binary operations. 3) Integers (14 Lectures) 3.1 Well Ordering Property (W.O.P) for N.

	3.2 Divisibility in Z: Definition and elementary properties. Division Algorithm, G.C.D.and L.C.M of two integers. Basic properties of G.C.D. including G.C.D. for any two integers a and b if it exists, is unique, and can be expressed as ua+vb. Euclidean Algorithm. 3.3 Primes. Euclid‟s Lemma, Unique Factorization Theorem. 3.4 Congruences: Definition and elementary properties. The set Zn. Fermat‟s Theorem. Euler phi-function. Addition modulo n , multiplication modulo n and its properties. 4) Complex Numbers (10 Lectures) 4.1 Addition and multiplication of complex numbers, Modulus and amplitude of a complex number. Real and imaginary parts and the conjugate of a complex number. Geometric representation of the sum, difference, product and quotient of two complex numbers as well as of the modulus, amplitude and the conjugate of a complex number. 4.2 De-Moivre‟s Theorem. Roots of unity. Solutions of the equation wn = z. 5) Polynomials (4 Lectures) 5.1) i) The set Q[x] of polynomials in one variable with rational coefficients. Division Algorithm (without proof). G.C.D of two polynomials(without proof). ii)Remainder Theorem, Factor Theorem(with proof). iii)Relation between the roots and the coefficients of a polynomial. Examples. Section –II 6) Analytical Geometry of Two Dimensions (8 Lectures) 6.1) Change of axes: translation and rotation. 6.2) Conic Sections: General equation of second degree in two variables. Reduction to standard form. Centre of conic. Nature of conic. 7) Analytical Geometry of Three Dimensions (12 Lectures) 7.1) Review of Co-ordinates in 3-space. Direction cosines and direction ratios. 7.2) Every linear equation in x.y,and z represents a plane. 7.3) Equations of coordinate planes. Normal form of equation of a plane.Plane passing through three non-collinear points. Intercept form of equation of a plane. Distance of a point from a plane. Distance between parallel planes. 7.4) Systems of planes. Bisector planes. 7.5) Equations of a line in various forms. Symmetric and unsymmetric forms of the equations of a line. Line passing through two points. 7.6) Angle between a line and a plane. Perpendicular distance of a point from a plane. Condition for two lines to be coplanar. 7.3) Skew lines and shortest distance between skew lines. 8) Sphere: (6 Lectures) 8.1) Equation of a sphere in different forms, plane section of a sphere, Equation of a circle. Sphere through a given circle. Intersection of a sphere and a line. Equation of tangent plane to standard sphere and general sphere. 9) System of Linear Equations : (10 lectures) 9.1) System of m linear equations in n unknowns; Homogeneous systems, Non homogeneous system, Matrix form of System of Equations 9.2) Echelon form; row reduced echelon form of a matrix 9.3) Definition of rank of a matrix. Examples. 9.4) Gauss Elimination Method. 9.5) Consistency of a system of non homogeneous equations; Condition of consistency i.e. for AX = B, $\rho[A,B] = \rho[A]$ (without proof).
Reference	1) Complex Variables and Applications : Ruel. V.Churchill; McGraw Hill Co. 2) Elementary Number Theory : David Burton ; Tata McGraw Hill (Walter Rudin Series), Indian Edition. 3) Matrices : Shanti Narayan; S.Chand & Co. N.Delhi 4) Analytical Geometry of Two and Three Dimensions : Qazi Zameeruddin; Naros Publ..

Course Name: Elective III - Mathematics-I for Practical

Credits: 5 (Theory 3+2 Practical)

Course Code: SS-3

Objective:	
Syllabus	1) There will be four Practical slots (each of 45 minutes) per week, two slots for Paper I and two for Paper II. (24 Practical slots for Paper I and 24 practical slots for Paper II per term in any one term) OR one 3 hour Practical session for each batch of 20 students per week 2) A question bank consisting of 100 problems in all for the whole year, distributed in four Sections: 50 questions for each term (25 questions on Paper I and 25 on Paper II) will be the course work for this paper. Question Bank will be prepared by a Sub-Committee to be appointed by the Board of Studies in Mathematics. Question Bank shall be ready by first week of June, 2008. 3) The College will conduct the written Practical Examination of 80 marks at least 15 days before the commencement of the Main Theory Examination. There will be no external examiner. The written practical exam will be of the duration of 3 hours and the question paper will be as follows: Q1. (a) Any 1 out of 2 worth 10 marks on Paper I(first term). (b) Any 1 out of 2 worth 10 marks on Paper II.(first term). Q2. Any 4 out of 5 each of 5 marks on Paper I. Q3. Any 4 out of 5 each of 5 marks on Paper II. Q4. (a) Any 1 out of 2 of 10 marks on Paper I(second term). (b) Any 1 out of 2 worth 10 marks on Paper II(second term). In Q2 and Q3, there will be either 2 questions from first term and 3 questions from the second term or vice versa. 4) Each student will maintain a journal to be provided by the College at cost. The student will submit certified journal at the time of the Practical Examination. There will be 20 marks for internal assessment, which will include marks for journal and attendance. 5) 60 percent of the questions for the written practical examination will be exclusively set from the Question Bank provided. Questions from the Question Bank (meant for practical course) should NOT be asked in the University Theory Examinations. 6) The Question Bank shall be changed once every three years. 7) A Guideline as to the number of slots per week to be allotted for each topic per paper is as under:- N.B. :- In each term 12 practicals will be held including 2 revision practicals. Each practical can either be conducted in one session of 3 hours or it can be spread out over 4 slots of 45 mins each per week. Hence the total number of slots per term for the practicals is 48. Paper-I: Algebra and Geometry Sr.No. Topic 1 Sets 02 2 Functions 02 3 Integers 06 4 Complex Numbers 06 5 Polynomials 04 6 Revision 04 Total 24 Paper-II: Calculus. Sr.No Topic 1 The Real Numbers 04

	2 Sequences of Real Numbers 06 3 Limits 04 4 Continuous Functions 06 5 Revision 04 Total 24 Paper-I: Algebra and Geometry Sr.No Topic 1 Geometry of Two Dimensions 06 2 Geometry of three dimensions 06 3 Sphere 02 4 System of linear equations 06 5 Revision 04 Total 24 Paper-II: Calculus. Sr.No Topic 1 Continuous Functions on intervals 08 2 Differentiation 12 3 Revision 04 Total 24
Reference	1) Complex Variables and Applications : Ruel. V.Churchill; McGraw Hill Co. 2) Elementary Number Theory : David Burton ; Tata McGraw Hill (Walter Rudin Series), Indian Edition. 3) Matrices : Shanti Narayan; S.Chand & Co. N.Delhi 4) Analytical Geometry of Two and Three Dimensions : Qazi Zameeruddin; Naros Publ..

Course Name: Basics in Education:

Credits: 4

Course Code: CC-1

Credits	
Objectives	* To understand nature and meaning of education * To understand determinants of education * To understand and identify different ways of knowing and forms of knowledge * To appreciate and establish relationship between different facets of knowledge * To develop a critical understanding about the nature of school knowledge * To distinguish and there by establish linkages between school knowledge and local knowledge * To appreciate normative character of education and teaching * To establish connections between textural knowledge with contextual knowledge * To understand and appreciate how different educational thinkers at different historical junctures conceived and conceptualized education
Syllabus	Unit I: Education: Conceptual Framework - Education: Concept, Meaning, Nature, and Modes/Agencies of Education - Principles of Education

- Education a Normative Act: Aims of Education-Socio-cultural, politico-economic and historical analysis
- Determinants of Purpose and Process of Education: Community, Religion, State and Market

Unit II: Understanding Knowledge

- Knowledge: Meaning, Nature, and Sources
- Knowing: Meaning, Nature, and Ways
- Different facets of Knowledge and their Relationship: Particular/Local-Universal; Concrete-Abstract; Practical- Theoretical
- Manifestation of Knowledge: Local, Contextual, Textual, and Institutional
- Knowledge and Wisdom, Information

Unit III: School and Education

- School: Meaning and Nature
- Functions of School: Cognitive, Socio-cultural, Politico-economic and Normative.

  A critical understanding of:
  * Institutionalization of knowledge,
  * Disciplinary knowledge,
  * Authoritative knowledge.

- Knowledge in text-book: Nature and Limitations
- Critical study of text-book:
  * as the Custodian of knowledge,
  * as an Authority over knowledge

Unit IV: Trends in Education Theory and Practice: Indian

* Basic Education (M.K. Gandhi)
* Integral Education (Sri Aurobindo Ghosh)
* Liberationist Pedagogy (Rabindranath Tagore)
* Man Making Education (Sri Vivekananda)

Unit V: Trends in Education Theory and Practice: Western

* Idealist Notion of Education (Plato)
* Naturalistic Concept Education (Rousseau)

	* Humanization of Education (Pestalozzi) * Instrumental and Pragmatic Education (John Dewey) A Reflective study of contemporary education and it's philosophical foundations. Transactional Modes: • Lecture-cum discussion • Readings on Epistemologies • Observational studies • Analysis of textual knowledge • Critical/Reflective study of contemporary aims of education, and their determinants. • Local knowledge and school knowledge: A critical understanding of relationship. (Practicum) • Observational and critical study on how text-book determines every activity of teacher and learner and teaching and evaluation in school. (A critique on text-book culture in school)
Reference	1. Agrawal, A (1995). 'Dismantling the Divide Between Indigenous and Scientific Knowledge', Development and Change, 26:413-39 2. Ant Weiler, C. (1998). 'Low Knowledge and Local Knowing: An Anthropological Analysis of Contested "Cultural Products" in the Context of Development. Anthropos, 93:46-94. 3. Berger, P. and T. Luckmann (1966). The Social Construction of Reality. A Treatise in Sociology of Knowledge. Penguine Books, London. 4. Bernstein(1971), 'On Classification and Framing of Educational Knowledge', in class, codes and control, volume:3: Towards a Theory of Educational Transmission, Second edition (1977) edited by M.F.D. Young. 5. Butchvarov,P.(1970), The Concept of Knowledge: Evanston, Illinois: North Western University Press. 6. Chomsky, N(1986). Knowledge of Language, Prager, New York. 7. Datta, D.M. (1972). Six ways of Knowing. Calcultta University Press, Calcultta. 8. Dewey, John ( ) Experience and Education. 9. Keddie, N.(1971) : Classroom Knowledge, in. M.F.D Young. 10. Krishna Murthy, J. (1947) On Education, Orient Longman, New Delhi. 11. Kumar Krishna (1991) Political Agenda of Education Sage Publication, India Pvt. Ltd., New Delhi. 12. Kumar Krishna (1988), Origin of India's Textbook Culture', Comparative Education, 32(4): 452-65. 13. Kumar Krishna (1996), 'Agriculture, Modernization and Education: The contours of a point of Departure'. Economic and political weekly,31 (35-37)

2367-373

14. Kumar Krishna (1996). Learning From Conflict, Orient Longman, New Delhi.
15. Mani, R.S. (1964). Educational Ideas and Ideals of Gandhi and Tagore, New Book Society, New Delhi.
16. Manoj Das (1999). Sri Aurobindo on Education, National Council for Teacher Education, New Delhi.
17. Margaret (1999). The Open Classroom: A Journey Through Education, Orient Longman, New Delhi.
18. Philips, D.C. (Ed)(2000). On Behalf of The National Society for the Study of education (NSSE). Constructivism in Education. Opinions and Second Opinion on Controversial Issues. Part – I, The University of Chicago Press, Chicago.
19. Peters,R.S.(1967). The Concept of Education, Routledge, U.K.
20. Prema Clarke (2001). Teaching & Learning: The Culture of pedagogy, Sage Publication, New Delhi.
21. Steven H. Cahn (1970). The Philosophical Foundation of Education, Harper & Row Publishers, New York.
22. Sykes, Marjorie (1988): The Story of Nai Talim, Naitalim Samiti: Wardha.

Course Name: Education for Peace & Human Rights:

Credits: 2

Course Code: AC-1

Objectives	Aim of the Course (Education for Peace) Education is preparation for participation in the democratic processes of society as an ethical and compassionate adult. It should enable students to develop a vision of peace as a dynamic social reality at micro (personal, home and family) and macro levels, (society, national, global) marked by conflicts arising out of the diverse needs and aspirations of the individuals and diverse groups-regional, religious, linguistic, marginalized etc. which need to be maintained by reconciled with dignity and justice for all. Peace education is about developing awareness in the education system particularly teachers, of the issues and challenges to peace which result in direct violence, as well as, indirect forms of violence as neglect, humiliation, denial of freedom and rights to individuals or groups or societies. It aims at building attitudes, values, skills and competencies and, developing commitment for conflict resolution. Foundations of peace in the society lie on respect for values of peace-compassion, caring, and cooperation, which complement Constitutional values of freedom justice, equality, intercultural harmony, secularism, human rights, social responsibilities ecological balance. The starting point for this change are transformed and empowered teachers who having identified challenges to peace in their own conflicts, biases and stereotypes and, the conflicts inherent in the structure and processes of school and society, could work for a change. This course aims at broadening notions of trainee teachers about peace and peace education, their relevance and connection to inner harmony as well as harmony in social relationships across individuals and groups based on constitutional values. The course also proposes to enable teachers for reflection on the attitudes that generate conflicts at personal and social levels and learning skills and strategies of resolving

	these conflicts. The contents also focus on strengthening self by continual reflection leading to reduction in stereotypes, and transcending barrier of identity and socialization. Thus transformed trainee teachers will be enabled to orient curricular and educational processes, find creative alternatives which nurture and promote peace building capabilities among students and counter the negative influence of media and the local community to weed out negative effects by influencing parents, families, and local community. The course transaction must include activities for experiential awareness of peace as a reality at personal and school levels modeled by teacher educators. It should enable them to develop attitudes and skills for resolving conflicts in creative manner and reflect on school, curricula, textbooks and pedagogical processes from peace perspective. The teacher educators must involve prospective teachers in understanding role of media and local community on them. Peaceful solutions to the real issues facing trainee teachers may be discussed. Objectives To enable teacher trainees to acquire knowledge, attitudes, values, skills and competencies to: ▪ Become aware of role of education in building peace as dynamic social reality. ▪ Understand and resolve conflicts within, and mediate others'. ▪ Empower themselves and transcend barriers of identity. ▪ Use pedagogical skills and strategies in and out of classroom for promoting peace at school level. ▪ Act as agency to promote peace in the local community influencing school. Objectives : (Human Rights) 1. To respect for human dignity. 2. To understand the basic freedom of the individual and classify broadly. 3. To know the brief history of development of human rights. 4. To fully appreciate that the citizen's fundamental rights protect the Human Rights Act, 1993. 5. To understand NPE with reference to women, SC, ST, minorities and physically challenged. 6. To set up cell to nurture the culture of Human Rights in Schools and Colleges. 7. To aim at setting up an integrated and egalitarian society.
Syllabus	Unit 1: Understanding peace as a dynamic social reality – (Education for Peace) ▪Awareness of relevance of peace ➢ Challenges to peace by the increasing stresses, conflicts, crimes, terrorism, violence and wars resulting in poor quality of life. Awareness of choices in responding to crises in personal, social and professional life. ▪Peace contexts; underlying assumptions, processes and imperatives. Peace is a dynamic reality. It involves acknowledgment and redressal of the concerns of various groups and reconciliation of the conflicts, if any. The

individuals, groups and societies have needs and concerns which are urgent. There is need for and their fulfillment. Negative peace is repression of these, while fulfillment builds peace within individuals as well as, in the society.

▪Peace values vis-à-vis constitutional values: Importance of the attitudes, beliefs and values of peace viz., compassion, cooperation, love, etc. that foster inner peace and Constitutional values of justice, equality, freedom, respect for differences and ecological resources that ensure peace in society.

▪Foundations of peace: Pre-requisites to peace in the society are compassionate and ethical decision making and intercultural cultural harmony, responsible citizenship, respect for secular and democratic ideals based on non-violence, respect for differences socio-economic, gender, etc. life style in harmony with sustainable development.

▪Approaches to peace education

▪Highlights of various philosophies of peace, Gandhi, Krishanamurthy , Aurobindo, Vivekananda, Rabindranath Tagore, Gijubhai Badheka, the Dalai Lama, initiatives at national and international levels.

Unit 2: Understanding conflicts, underlying personal – social processes and mediation, and transformation of conflict `

▪Nature of conflict-Incompatibility of needs, aspirations; desires and resulting conflicts at different levels in society: intrapersonal, interpersonal, organizational, interstate, global.

▪Understanding the role of social conditions and processes that sustain conflict: limited resources, poverty, political, economic, socio-cultural and ecological conditions, environmental resources viz., water, forests, energy etc.

▪Developing capabilities for mediation and conflict transformation:

- Skills and strategies needed for conflict resolution.
- Listening to conflicting parties
- Awareness of own identity, cultural underpinning, and communication skills
- Awareness of context of the conflict,
- Commitment to mediate.
- Looking for alternative strategies and creative solutions to overcome/ transform conflicts.

Unit 3: Empowerment of self through critical self reflection

- Awareness of the influence of social milieu on self.
- Understanding adequate self as a product of positive experiences of caring, warmth and appreciation in the family, school, neighbourhood etc. which promote healthy discipline, shunning violence.
- Negative experiences generate stress, anger aggression.
- Yoga, meditation, anger/stress management, as practices that restore positive physical health and attitudes.

- Nurturing capabilities for critical self reflection; transcending past negative experiences, and developing skills of communication: listening to others, sharing feelings, descriptive non-judgmental feedback, empathizing, trusting.

- Increasing awareness of role of self in

- Discipline, self management
- Reducing prejudices, biases and stereotypes and building multicultural orientation and,
- Nurturing ethical behaviour, positivity, non-violence, love and caring, compassion.
- Habitual self reflection by using daily journal on experiences.

Unit 4: Orienting education for peace building

- Critical reflection on the curricular processes

Awareness of opportunities inherent in curriculum for introducing

- Healthy discipline practices in and outside classroom, for their fairness to different gender, caste and cultural groups, child rights/human rights, and ameliorative approach to discipline rather than punitive.
- Symbols, activities and other structures in the school that reflect a multi-cultural ambience.
- Experiences of different cultural identities, issues, challenges, conflicts in the neighbourhood, or country and global levels with regard to resources, opportunities of poverty, level, political issues etc.

- Critical pedagogy of Peace Education
  - Challenging the traditional models of learning to constructivist approaches in teaching.
  - Rethinking authority relations from democratic perspective: promoting dialoging, and, developing capabilities for decision making.
  - Understanding social justice in local context–its implications for beliefs, attitudes, and values and school/social practices and conflict resolution at all levels.
  - Awareness of pedagogical skills and strategies for removing tensions, examination fear, stress, corporal punishment, violence and conflicts at school level.
  - Compassion, love and caring, mindfulness in all transaction of avoid hurt, humiliation, degrading over academic, personal social and culture matters. Non-evaluative orientation empathetic founds academic and discipline problems.

- Becoming peace teacher- acquisition of relevant knowledge, attitudes, values and skills
  - Development of listening skills for dialogue- listening to verbal and non-verbal content of messages, developing awareness of feelings and expressions in massages,; skills of questioning, paraphrasing and providing feedback that is, non judgmental, sensitivity to socio-economic, cultural, gender, caste differences.
  - Skills of giving emotion support for encouraging, genuine appreciation and cooperation. Understanding importance of confidentiality of students' personal issues and problems that invite embarrassment or ridicule.

- Pedagogical skills for orientation of subject content and teaching-learning experience in classroom for promoting peace.
  - Awareness of the epistemic connection of subject content with peace values – e.g. Language (effective communication), Science (objectivity, flexibility) Social Science (democratic ethos, constitutional values, and multi-culturalism, conflicts, violence and war ,links with challenges to regional and local conflicts),Maths (precision)
  - Using textbook contents for highlighting values of peace, particularly anti peace messages indirect or hidden.

- Humanistic approach to evaluation

- Belief in worth of all pupils irrespective of academic talents.
- Adopt broad based assessment taking in multiple talents, emphasize success rather than failure, enable enemy pupil to experience success in some area.

- Becoming agency for peace in the school organization and surrounding local community.
- Awareness of the cultural characteristics of the local community around school and quality of its linkages – parenting styles, disciplinary practices, economic conditions, linguistic background, domestic violence, attitudes toward education etc.
- Inspiring movements for health, yoga, effective parenting, and communication skill building, mediating conflicts in and around school.
- Awareness and orientation of students' attitudes towards balanced media exposure.

Unit 5:Evaluation of the peace building processes

Understanding importance of skills and strategies of assessment of the peace building process in terms of attitudes, values, skills and strategies at school level – motivation and sustenance of efforts, sharing experiences towards peace building, reviewing strategies.

- Making assessment visible through objective indicators, planning and recording change in cultural ethos and individuals. Understanding motivational through sharing progress, influence of assessment.
- Developing commitment and willingness for receiving feedback, and review of strategies.
- Visible and objection indicators of peace process inherent in the cultural ethos of organizations, individuals, and ambience.
  - Identification of visible indicators inherent in the cultural ethos of the organization could be non-authoritarian work culture marked by meetings, frequent discussions, analogue and reconciliation/non-exclusion of any group of students or teachers on the basis of opinions, caste, gender, education, socio-economic-cultural background etc. indicators; conflicts reconciled, divergent groups involved in dialogue, heterogeneity of members on various boards etc.
  - Individual level indicator includes behaviours expressing inner peace and positive relationship e.g. Access and interaction of principal with teachers, access of teachers to students, perception of teachers/principal as fair etc.

Syllabus: (Human Rights)

Unit-1

Concern for Human Rights and Fundamental Freedom – the task of protection and promotion of human rights – Basic freedom of the individual interpreted as minimal Broad classification of rights such as civil and Political and economic, social and cultural.

Unit-2

Human rights consciousness the magna carta in 1215 AD Universal declaration of human rights, December 1948 – subsequent declaration like International congers on human rights 1968 international congress in Vienna organized by UNESCO in 1978, seminar on the teaching of human rights at Geneva in 1988 and united Nations, world conference in human rights in Vienna in 1993 which inspired UN to declare UN declare for human rights education from 1995 to 2004.

	Unit-3 Fundamental rights of citizens like equality of law freedom from discrimination, freedom of speech and explosion National Human Rights commission constructed in 1993 which become protection of Human rights Act 1993. Unit-4 Special Stern on National system of Education with reference to women, SC, ST, minorities physically challenged and +ation. Unit-5 Concept of National Integration and international Understanding – Tools and Teaching of Collecting data and knowledge of research methodology etc. Unit-6 Human rights arises and violations – handed labour child labour, infancide, gender discrimination etc. – Free legal cells and their functions – National integrally and upholding of constitutional on obligations. Unit-7 Setting up of Human rights will in schools and Colleges in a phased manner to cover all institution – A project coordinator to function under the head of institution and the advisory committee Equipment of NCTE in this regard for conducting courses through colleges and DIET – documentation centre by NCTE for reference and research. Unit-8 Child is an asset for the development of a nation – awareness and appreciation of children needs thoughts and adults view in this regard – physical mental, emotional growth of an individual child – Rights to life and education – derail of rights and child labours. Unit-9 Setting up of an integrated and egalitarian society – Awareness regarding socialism among students and teacher – Democratic socialism and Gandhism model of socialization. Unit-10 ➢ Education in India is secular non-denominational-secular education is for knowledge and spirits of an objective and tolerant manner and not for faith and religion ideas-secular culture based an rational outlook is to be developed
Reference	Dalai, Lama 1980. Universal Resposibility and the Good Heart. Library of Tibetan Works & Archives, Dharamshala, Dist. Kangra. H.P. Dalai, Lama 2000 Transforming the Mind, translated by Dr. Thupten Jinpa, edited by

Dominique Side & Dr. Thupten Jinpa, Thorsons, London

Gangrade K.D (2001). Religion and Peace, A Gandhian Perspective, Gandhi Smriti and Darshan Samiti, New Delhi.

Harris, I.M. 1998. Peace Education. McFarland, North Carolina, NCERT, New Delhi.

Kaur, B. 2006. Teaching of Peace and Conflict and Pride - School Histories of the Freedom Struggle in India. Penguin Books India Pvt, Ltd., New Delhi.

Kumar, K. 2006. Peace Lines. Penguin Publications, New Delhi, (In Press).

Kumar, K. (2007). Shanti Shiksha Aur Gandhi. (in Hindi) Maharishi Valmiki College of Education, Delhi University.

Krishnamurti, J. 1997. The Flame of Attention. Krishnamurti Foundation Trust Ltd., London.

Ministry of Human Resource Development. 1993. Learning Without Burden: A Report of the Advisory Committee, (MHRD), Department of Education, New Delhi.

NCERT 2005. National Curriculum Framework. NCERT, New Delhi.

Prasad, D (2005), Education for Living Creatively and Peacefully. Spark India Hyderabad, AP.

Hant, T. N. (2004). Being Peace , Nice Printing Press, Delhi

UNESCO (2001). Learning the Way to Peace - A Teacher's Guide to Peace Education. A.S. Balasooriya, UNESCO, New Delhi

UNESCO (2002). Learning to Be: A Holistic and Integrated Approach to Value Education for Human Development. Bangkok.

Valson, T. (.2006). Living in Harmony: A Course on Peace and Value Education. Oxford, New Delhi.

Journals
Journal of the Krishnamurti School. Krishnamurti Foundation of India, 124-126, Green ways Road, RA Puram, Chennai-600028.

Awakening Ray, by Gnostic Centre.

Reference for Human Rights

1. Human Rights – International Challenges – Vol. 1 & 2 – Justice Ranganath Misra.

2. Human Rights in a Developing Society, Sen Sankar, APH Publishing Corporation.
3. Human Rights and the Law Jawwal, P.S., APH Publishing Corporation.

4. Human Rights, Commitment and Betrayal, Chitkara, M.G., APH Publishing Corporation.

Course Name: Learning Resources

Credits: 2

Course Code: AC-2

Credits	
Objectives	
Syllabus	Unit: 2 Learning resources and preparation of materials • Role of language in science • Preparation and use of learning aids contextually. • Audio-visual materials – chart, models, films, and filmstrips, radio, TV, supplementary books, handbooks, laboratory guide, science kits etc. • Field trips, national parks, study tours, community as a resource site for learning, physics. • Self-learning materials- worksheets. • ICT in learning physical science, websites on physical science, interactive websites, on line learning, and preparation of projects using ICT. • Use of science labs- facilities, equipments, materials, and manuals, science records. • Unit planning and lesson planning. • Science exhibitions, contextual activities (Environmental day, Earth day, science day, etc.). • STS connections • Enhancing professional competency of physical science teachers through action research, participation in seminars, developing write-ups for research communication. • Learning beyond textbook
Reference	

Course Name: Communication Skills - I (Soft Skills)

Credits: 2

Course Code: AC-3

Credits	
Objectives	
Syllabus	Unit III: Communication • Meaning and nature of communication • Process of communication: elements and cycle • Types of communication • Barriers in communication • Role of media in communication: Dale's cone of experience • Instruction as a communication process
Reference	

Course Name: Work Education -1 Computers

Credits: 2

Course Code: AC-4

Objective:	1.Describe computers, their functions and role in office automation. 2.List different input. output and storage mediums of computers. 3.Create files, folders and use accessories on machine
Syllabus	UNIT I: Office Automation: Office Automation and Role of Computers in office Automation. UNIT II: Computer Fundamentals: Classification of Computers, input, output and storage devices. Evolutionary Trend of Micro Processor- PC to Pentium. . Sequential Operation for switching on and off computers. Precaution and care in use of Computers. UNIT III: Software: Concepts and Classification of Software – system and Application Software. UNIT IV: Introduction to Operating System: Operating- Function/ Internal and External commands. Window operating System. Desktop of the Windows. UNIT V: Create Files: Creating files and f older, Use of Accessories- calculator, pencil, paint-brush etc.
Reference	1. Practice Manual for Computers in office Automation Publishing by R.I.E, Bhopal.

Course Name: Work Education -1 Agriculture

Credits: 2

Course Code: AC-4

Objective:	
Syllabus	Identification and study of gardening tools, equipments, seasonal flowers, Ornamental trees. Shrubs, Climbers, Creepers & Indoor plants. Unit II Knowledge of preparation of Seed bed, Transplanting of Seedlings, Potting, Repotting, various methods of plant propagation, Training, Pruning, Staking & Desuckring etc. Unit III: Principles of design and layout along with their different styles, various types, Important parts & special features of Ornamental Garden.

	Unit IV: Commercial Cultivation of Rose, Chrysanthemum, gladiolus, marigold and other flower species with reference to Improved varieties, propagation methods nutrition and irrigation requirements with Pre and post harvest management practices. Unit V: Establishment and maintenance of lawn in ornamental garden. **Scheme of Examination** Time: 3 hours — M.Marks: 25 (Internal Exam) 1. Identification of seasonal flowers, trees, shrubs, climbers, garden tools with comments - 05 marks 2. Drawing layout Plan of a Ornamental Garden - 05 marks 3. Knowledge of different styles, various types, important parts & special features of ornamental garden - 05 marks 4. Cultivation of Important Ornamental Plants - 05 marks 5. Viva & Practical Record - 05 marks Total 25 marks
Reference	1. Gardening in India, Bose, T.K. and Mukherjee; Oxford & IBH, New Delhi 2. Floriculture and landscaping, Bose, T.K. and Maiti R.G; Naya Prakash Calcutta. 3. Floriculture in India,. Ramdhawa, G.S. & Mukhopadhyay, A.K; Allied Publishers, New Delhi. 4. Introductory Ornamental Horticulture, Arora, J.S; Kalyani publishers, New Delhi. 5. Planning & Planting Design for Home Gardens, Desai, B.I. , I.C.A.R., New Delhi 6. Flowering Trees. Randhwa, M.S; N.B.T., New Delhi 7. Garden Flowers, Swarup V; N.B.T., New Delhi 8. Home Gardening , Trivedi , P; I..C.A.R., New Delhi. 9. Rose, Pal, B.P., I.C.A.R., New Delhi 10. lfCt;Wka ,o iq"iksRiknu] nqcs ,oa flag;] Hakkjrh Hk.Mkj cMkSr esjBa 11 m?Aku foKku] JhokLro] ,l0; ,l0 lsUVªzzy cqd gkml jk;iqj 12 x`g okfVdk] JhokLro] ,l0 ,l0; lsUVzzy cqd gkml jk;iqj

Semester II

Course Name: Foundation Course II – General English II:

Credits: 3

Course Code: FC-1

Objective:	
Syllabus	UNIT I 1. Where The Mind is without Fear – R. Tagore 2. The Ideals of Indian Art – K. Bharatha Iyer 3. The Wonder that was India – A. L. Basham 4. The Heritage of Indian Art – Kapila Vatsyayan 5. Life in Vedic Literature – Krishna Chaitanya 6. The Ramayana and the Mahabharata 7. Freedom Movements in India – Sudhir Chandra UNIT II Comprehension- Unseen Passage UNIT III Letter Writing – (a) Business Letters (b) Informal Letters (c) Applications UNIT IV Vocabulary (Textual) UNIT V Grammar (Textual) 1. Simple, Compound and Complex Sentences 2. Clauses 3. Tenses 4. Voice
Reference	Prescribed Text- English Language and Indian Culture. Bhopal: M. P. Hindi Granth Academy

Foundation II - General MarathiII

Credits: 3

Course Code: FC-2

Objectives	□ To enable the students to acquire basic skills in functional language . □ To develop independent reading skills and reading for appreciating the literary works □ To internalize grammar rules so as to facilitate fluency in speech and writing □ To develop functional and creative skills in language. □ To develop value of liberalism and an insight into the cultural heritage of the region which remains embodied in the literary output of the region .
Syllabus	Unit I: Aspects of Style Styles of writing Idioms, Pharases and Proverbs Reference: Unit II: Functional Language: News Reporting: Characteristics-Definition-language of news reporting-model of news reporting-patterns-role of media in news reporting –exercises. Interview: Characteristics-definition-preparation for interview-various types of

	interviews (business-employment-literary etc)-exercises References: i) Fundamentals of journalism, Report Writing and editing by R. Thomas Berner, Maruette Books LLC, Washington. ii) The perfect Interview by Max Eggert, Random House, UK. Unit III: Medieval Poetry Marathi Selection of poems r – Selection of poems An Anthology of Marathi Poetry For First Degree Classes SPPU BA Unit IV:Collection of Essays
Reference	

Foundation II - General German II
Credits: 3

Course Code: FC-2
To be prepare
Course Name: Elective - I – Physics –II
Credits: 5 (Theory 3+2 Practical)

Course Code: SS-I

Objective:	1. Acquaint themselves with concepts of electric field, electric flux, electric potential, dielectrics and polarization vector. 2. Understand coulomb's law, Gauss's law Ampere's law, Faraday's law and Lorentz force. 3. Solve the problems on Coulomb's law, Ampere's law and Gauss's law. 4. Understand Ampere's law and its applications. 5. Interpret that a bar magnet has a surface distribution of solenoidal current Review the kinetic theory of gases. 6. Finds expression for specific heat. 7. Explain the concept of mean free path and derive expressions for transport phenomena in gasses.
Syllabus	Unit-1 Electrostatics Coulombs law in vacuum expressed in vector form; calculations of E for simple distributions of charges at rest, dipole and quadrupole fields, work done on a charge in an electrostatic field expressed as a line integral, conservative nature of the electrostatic field, Laplace and Poisson equations in electrostatics and their applications, Electric potential ϕ, $E = -\nabla \phi$, torque on a dipole in a uniform electric field and its energy, flux of the electric field, Gauss's law and its application for finding E for symmetric charge distributions, Gaussian pillbox, fields at the surface of a conductor, screening of E field by a conductor, Energy of a system of charges. Unit-2 Dielectrics and capacitors

	Dielectrics; parallel plate capacitor with a dielectric, dielectric constant, polarisation. Solutions to boundary-value problems-conducting and dielectric spheres in a uniform electric field displacement vector D, molecular interpretation of Claussius-Mossotti equation, boundary conditions satisfied by E and D at the interface between two homogenous dielectrics, illustration through a simple example. Unit-3 Magnetostatics Force on a moving charge, Lorentz force equation and definition of B, force on a straight conductor carrying current in a uniform magnetic field, torque on a current loop, magnetic dipole moment, angular momentum and gyromagnetic ratio. Biot and Savart's law, calculation of B in simple geometrical situations, Ampere's law; field due to a magnetic dipole, magnetization current, magnetization vector, magnetic permeability (linear cases), Magnetic shell, uniformly magnetised sphere; interpretation of a bar magnet as a surface distribution of solenoidal current. Unit-4 Ideal Gas Kinetic model; deduction of Boyle's law; interpretation of temperature; Brownian motion; estimation of the Avagadro number; Equi-partition of energy; specific heat of monatomic gas; extension to di- and tri-atomic gases; Behavior of gases at low temperatures; adiabatic expansion of an ideal gas, applications to atmospheric physics. Transport phenomenon in gases; mean free path; collision cross sections; estimates of molecular diameter, transport of mass, momentum and energy, dependence of mean free path on temperature and pressure Unit-5 Real gases Review of real and van der Waals gas; equation of state; reduced equation of state; nature of van der Waals forces; comparison with experimental P-V curves; The critical constants gas and vapour; Joule expansion of ideal and van der Waals gas, Joule coefficient, J-T cooling. Boyle temperature and inversion temperature; survey of liquefaction of gases; review of the use of low temperature phenomenon.
Reference	Halliday,D., and Resnik,R., Physics, John Wiley Eastern Ltd., New-Delhi. Reitz and Milford, Electricity and Magnetism, Addison –Wesley Mahajan and Rangwala, Electricity and Magnetism, Tata McGraw-Hill

Course Name: Elective - I – Computer Science – II

Credits: 5 (Theory 3+2 Practical)

Course Code: SS-I

Objective:	
Syllabus	
Reference	

Course Name: Elective -II – Chemistry – II

Credits: 5 (Theory 3+2 Practical)

Course Code: SS-2

Objective:	After the end of the 2nd semester the students should be able to: * get the knowledge of basic concept of organic chemistry, like the tetravalency of Carbon, the concept of hybridization, the concept of resonance, hyperconjugation, and aromaticity. * strengthen the knowledge regarding the nomenclature of organic compounds. * explain the properties of organic compounds in terms of the structure of the functional groups. * Acquire knowledge regarding the directional characteristics of covalent bond and discuss the stereochemistry of organic compounds centering around the directional characteristics of the covalent bond. * highlight the importance of the study of kinetics in elucidation of mechanism of organic reactions. * explain the reactions in organic chemistry in terms of free radical mechanism, substitution reactions, addition reactions and molecular rearrangement pattern. * Acquire knowledge regarding the role of aryl radical as it affects the properties of organic compounds. * develop competency to explain the chemistry of organic compounds in terms of comparative behaviour of alkyl and aryl compounds. Instructional Strategy: The teacher while discussing the stereochemistry may use ball and stick model to focus the clarity in concept formation. While adopting the lecture technique, the teacher may make the presentation of subject matter interesting by adopting the structural approach (high lighting importance of reaction mechanism

	in the teaching of organic chemistry). In the subject treatment of open chain and closed chain compounds and alkyl and arlyl derivatives the teacher may take the help of comparative organizers (a type of advance organizer).
Syllabus	**Unit-I Structure and Bonding** Hybridization, bond lengths and bond angles, bond energy, localized and delocalized chemical bond, van der Walls interactions, inclusion compounds, clatherates, charge transfer complexes, resonance, hyperconjugation, aromaticity, inductive and field effects, hydrogen bonding. Mechanism of Organic Reactions Curved arrow notation, drawing electron movements with arrows, half-headed and double-headed arrows, homolytic and heterolytic bond breaking. Types of organic reactions, Energy consideration. Reactive intermediates (carbocations, carbanions, free radicals, carbenes, arynes and nitrene with examples). Assigning formal charges on intermediates and other ionic species. Methods of determination of reaction mechanism (product analysis, intermediates, isotope effects, kinetic and stereochemical studies). **Unit-II Stereochemistry of Organic Compounds** Concept of isomerism. Types of isomerism. Optical isomerism-elements of symmetry, molecular chirality, enantiomers, sterogenic centre, optical activity, properties of enantiomers, chiral and achiral molecules with two stereogenic centres, diastereomers, threo and erythro diastereomers, meso compounds, resolution of enantiomers, inversion, retention and racemization. Relative and absolute configuration, sequence rules, D & L and R & S systems of nomenclature. Geometric isomerism-determination of configuration of geometric isomers. E & Z system of nomenclature, geometric isomerism in oximes and alicyclic compounds. Conformational isomerism-conformational analysis of ethane and n-butane; conformations of cyclohexane, axial and equatorial bonds, conformation of mono substituted cyclohexane, derivatives. Newman projection and Sawhorse formulae, Fischer and flying wedge formulae.Difference between configuration and conformation. **Unit-III Alkanes and Cycloalkanes** IUPAC nomenclature of branched and unbranched alkanes, the alkyI 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, methods of formation, chemical reactions, Baeyer's strain theory and its limitations. Ring strain in small rings (cyclopropane and cyclobutane); theory of strainless rings. The case of cyclopropane ring : banana bonds. Arenes and Aromaticity Nomenclature of benzene derivatives. The aryI group. Aromatic nucleus and side chain. Structure of benzene : molecular formula and Kekule structure. Stability and carbon-carbon bond lengths of benzene, resonance structure, MO

	picture. Aromaticity : the Huckel rule, aromatic ions. Aromatic electrophilic substitution-general pattern of the mechanism, role of (and complexes). Mechanism of nitration, halogenation, sulphonation mercuration and Friedel-Crafts reaction. Energy profile diagrams. Activating and deactivating substituents, orientation and ortho/para ratio. Side chain reactions of benzene derivative, Birch reduction. Methods of formation and chemical reactions of alkylbenzenes, alkyny benzenes and bipheny. **Unit-IV Alkenes, Cycloalkenes, Dienes and Alkynes** Nomenclature of alkenes, methods of formation, mechanisms of dehydration of alcohols and dehydrohalogenation of alky1 halides, regioselectivity in alcohol dehydration. The Saytzeff rule. Hofmann elimination, physical properties and relative stabilities of alkenes. Chemical reactions of alkenes-mechanisms involved in hydrogenation, electrophilic and free redical additions, Markownikoff's rule, hydroboration-oxidation with KMnO4, Polymerization of alkenes. Substitution at the allylic and vinylic positions of alkenes. Industrial applications of ethylene and propene. Methods of formation, conformation and chemical reactions of cycloalkenes. Nomenclature and classification of dienes : isolated, conjugated and cumulated dienes. Structure of allenes and butadiene, methods of formation, polymerization. Chemical reactions-1, 2 and 1, 4 additions. Diels-Alder reaction. Nomenclature, structure and bonding in alkynes. Methods of formation. Chemical reactions of alkynes, acidity of alkynes. Mechanism of electrophilic and nucleophilic addition reactions, hydroboration-oxidation, metal-ammonia reductions, oxidation and polymerization. **Unit-V AlkyI and AryI Halides** Nomenclature and classes of alky1 halides, methods of formation, chemical reactions. Mechanisms of nucleophilic substitution reactions of alky1 halides, SN2 and SN1 reactions with energy profile diagrams. Polyhalogen compounds : chloroform, carbon tetrachloride. Methods of formation of ary1 halides, nuclear and side chain reactions. The addition-elimination and the elimination-addition mechanisms of nucleophilic aromatic substitution reactions. Ralative reactivities of alky1 halides vs ally1, viny1 and ary1 halides. Synthesis and uses of DDT and BHC. Freons.
Reference	1. Paula Yurkanics Bruice, Organic Chemistry, Pearson Education, Ltd. 2. Morison and Boyd, Organic Chemistry, Prentice Hall 3. Solomons and Fryhle, Organic Chemistry, WILEY International 4. Carey, Francis A., Organic Chemistry, Tata Mc Graw Hill 5. Eliel, Earnest, L., / Wilen, Samuel H., Stereo chemistry of organic compounds, John Willey & Sons, 2004. 6. Tiwari K.S., Vishnoi, N.K., A Test book of Organic Chemistry, VIKAS Publishing House. 7. Agarwal, O.P.,Organic Chemistry, Reactions and Reagents, Goel Publishing House, Meerut. 8. Bhal , Arun & Bhal, B.S., Organic Chemistry, S. Chand & Company

Course Name: Elective - II – Informatics Practices – II

Credits: 5 (Theory 3+2 Practical)

Course Code: SS-2

Objective:	
Syllabus	
Reference	

Course Name: Elective - III – Botany – II for Theory

Credits: 5 (Theory 3+2 Practical)

Course Code: SS-3

Objective:	To enable the students to have an understanding about origin of life types, and detailed structure of cell inclusions
Syllabus	Unit I : Origin of life and organisation of cell General account of origin of life, Structural concept of a cell – prokaryotic and eukaryotic organisation, cell types Unit II : Structure and function of cell organelles Golgi bodies, cytoskeleton, ER, peroxisome, vacuoles, plastids, mitochondria, ribosome. Cell envelopes : Plasma membrane – different models; function; cell wall – structure and function. Unit III : Structure and function of nucleus General organisation of nucleus, ultrastructure of nuclear membrane and nucleolus. Chromosome – organisation, morphology, centromere, telomere. Chromosome alterations – deletions, duplications, translocations, inversions, variation in chromosome number – aneuploidy, polyploidy. Unit IV : Nucleic acids : DNA Discovery of DNA as genetic material, its structure and types. DNA replication in prokaryotes and eukaryotes, structure of nucleosome. Satellite and repetitive DNA. Unit V : Nucleic acid : RNA and cell division Structure, types (m-RNA, t-RNA, r-RNA) and function of RNA. Cell division : Cell cycle, mitosis and meiosis
Reference	1. Kleinsmith, L.J. and Kish, V.M. 1995 Principles of Cell and Molecular Biology. Harper Collins College Publishers, New York, USA 2. Lodish, H. Berk, A. Zipursky, S.L. Matsudaira, P.Baltimore, D. and Darnell J.2000. Molecular Cell Biology. W.H.Freeman & Co. New York, USA 3. Baltimore. D. and Darnell, J.2000 Molecular Cell Biology. W.H. Freeman & Co. New York, USA 4. Gunning, B.E.S. and Steer M.W.1996. Plant Cell Biology, Structure and Function Jones and Bartlett Publishers Boston Massachusetts

	5. Harris, N and Oparka, K.J.1994. Plant Cell Biology. A practical approach IRL Press Oxford U.K. 6. Sharma A.K. and Sharma. A 1999 Plant Chromosomes: Analysis, Manipulation and Engineering Harwood Academic Publishers Australia. 7. Watson, James D, T.A. Baker, S.P. Bell, A. Gann, M. Levine, R. Losick. 2004. Molecular Biology of the Gene, 5th edition, Pearson Education. 8. Gupta, P.K. 2006-07, Cell and Molecular Biology, 3rd edition, Rastogi Publication

Course Name: Elective - III – Botany – II for Practical

Credits: 5 (Theory 3+2 Practical)

Course Code: SS-3

Objective:	• To develop skills of staining and slide preparations of lower and higher organims. • To impart understanding of internal structures and their organization. • To develop the skills for the preparation of smear for studying of all division.
Syllabus	To study cell structure from onion leaf peels; demonstration of staining and mounting methods. 2. Comparative study of cell structure in onion cells, Hydrilla and Spirogyra. Study of cyclosis in Tradescantia staminal cells. 3. Study of plastids to examine pigment distribution in plants (e.g. Cassia, Lycopersicon and Capsicum). 4. Examination of electron micrographs of eukaryotic cells with special reference to organelles. 5. Study of electron micrographs of viruses, bacteria, cyanobacteria and eukaryotic cells for comparative cellular organisation. 6. Examination of various stages of mitosis and meiosis using appropriate plant material (e.g. onion root tips, onion flower buds).
Reference	1. Kleinsmith, L.J. and Kish, V.M. 1995 Principles of Cell and Molecular Biology. Harper Collins College Publishers, New York, USA 2. Lodish, H. Berk, A. Zipursky, S.L. Matsudaira, P.Baltimore, D. and Darnell J.2000. Molecular Cell Biology. W.H.Freeman & Co. New York, USA 3. Baltimore. D. and Darnell, J.2000 Molecular Cell Biology. W.H. Freeman & Co. New York, USA 4. Gunning, B.E.S. and Steer M.W.1996. Plant Cell Biology, Structure and Function Jones and Bartlett Publishers Boston Massachusetts 5. Harris, N and Oparka, K.J.1994. Plant Cell Biology. A practical approach IRL Press Oxford U.K. 6. Sharma A.K. and Sharma. A 1999 Plant Chromosomes: Analysis, Manipulation and Engineering Harwood Academic Publishers Australia. 7. Watson, James D, T.A. Baker, S.P. Bell, A. Gann, M. Levine, R. Losick. 2004. Molecular Biology of the Gene, 5th edition, Pearson Education. 8. Gupta, P.K. 2006-07, Cell and Molecular Biology, 3rd edition, Rastogi Publication

Course Name: Elective - III – Zoology – II for Theory

Credits: 5 (Theory 3+2 Practical)

Course Code: SS-3

Objective:	To enable students to understand in respect of invertebrates – the organizational hierarchies and complexities; the evolutionary trends in external morphology and internal structures: Identification & classification with examples: To enable them to understand various modes of adaptations in animals.
Syllabus	Unit 1: ARTHROPODA a. General characters & classification of Phylum upto classes with examples. b. Structural organization of Prawn, c. Structural organisation of Scorpion d. Mouth parts of Insects. Unit 2: MOLLUSCA a. General characters & classification of Phylum upto classes with examples. b. Structural organization of Pila. c. Nervous system of Mollusca (comparative study) Torsion & Detorsion in Gastropods. Unit 3: ECHINODERMATA a. General characters & classification of Phylum upto classes with examples. b. External features and water vascular system in starfish. c. Comparative study of larvae of Arthropods & Mollusca. Unit 4: LOWER CHORDATA a. General characters & classification of Phylum upto classes with examples. b. Hemichordata – External features & affinities. c. Urochordata - Type study of Hardmania d. Celphalochordata – Type study of Amphioxus Unit 5: GENERAL TOPICS a Retrogressive metamorphosis in Hardmania during development b Affinities of Balanoglossus with Echinoderms and chordates. c. Economic Importance of Insects d. Sting apparatus of Scorpion e. Neurogenic heart in Periplaneta f. Open circulatory system in Periplaneta
Reference	1. Baijal & Saini: A textbook of Zoology; Arun Prakashan 2. Barrington: Invertebrate structure and function (Nelson) I, II 3 Bharmrah, H.S. Juneja K: Introduction to Protochordates; Anmol Publication, New Delhi

	4 C.S.I.R. (Special, supplement) wealth of India Fisheries 5. D.C. Yadav: Prayogic Jantu Shashtra 6. Hyman L.H: Invertebrate Vol. I & II; (McGraw-Hill) I, II 7. Jordan and Nigam: Animal Biology; Hindustani Book Depot, Lucknow 8. J.Z. Young: The life of vertebrates; Oxford University Press 9. Kotpal, R.L: Invertebrate Zoology ; Rastogi Publication Meerut 10. K.S. Bhatia : Protochordates 11.. Kotpal R.L. Agarwal S.K: Modern Text Book of Zoology (Invertebrate); Rastogi Publication Meerut **12. Lal S.S: Practical Zoology; Invertebrate I, II** **13. Majupuria T.C: Invertebrate Zoology; Pradeep Publications, Jullundar** 14. Newman, H.H: Phylum chordata; Satish Book Enterprises Agra 15. Parker and Haswell W.T: Invertebrate Zoology Vol.I ; (Mac Millan) 16. Rastogi, Veer bala: A manual for practical invertebrate Zoology and Cytology; Kedannath, Ram Nath, Meerut 17. Rastogi, Veerbala: Chordata Zoology; Kedarnath, Ramnath & Company Meerut. **18. R.S. Saini: A textbook of Zoology; Pushpa RajnPrakashan, Allahabad.** **19. S.N. Prasad: The Invertebrates; Kitab Mahal, Allahabad.** 20 Satguru Prasad & B.N. Pandeyl: Invertebrate Zoology **21 Satguru Prasad & B.N. Pandey: Classification** 22. Veer Bala Rastogi: Manual of Practical Invertebrate; Kedarnath, Ramnath Publication, Meerut 23. Veer Bala Rastogi: Practical of Vertebrate Zoology; Kedarnath, Ramnath & Co., Meerut.

Course Name: Elective - III – Zoology – II for Practical

Credits: 5 (Theory 3+2 Practical)

Course Code: SS-3

Objective:	To develop the students the skills of staining (temporary & permanent), dissection and identification of animals.
Syllabus	Study of representative examples of different phyla (classification and general characters – Arthropoda, Mollusca, Echinodermeta, Lower chordates. 2. Study of prescribed type species by whole mounts or sections (Permanent slides) – Arthropods, Mollusca, Echinodermata and lower chordata. 3. Temporary and/ or permanent stained preparation of Larvae of Arthropods, Echinoderms, Mollusca, mouthparts of Arthropods, osphredium and ctendium of Mollusca, Booklungs of Scorpion, Amphioxus Silpa, Doliolum, Oiekopleura. (whole mount) Dissection (Major) : Nervous system of Prawn and Pila . 5. Dissection (Minor): - Statocyst of Prawn. Cockroach mouth part, ctenidium of Pila, Redula of Pila, Neural ganglia Herdmania, wheel organ of Amphioxus.

Reference	Baijal & Saini: A textbook of Zoology; Arun Prakashan 2. Barrington: Invertebrate structure and function (Nelson) I, II 3 Bharmrah, H.S. Juneja K: Introduction to Protochordates; Anmol Publication, New Delhi 4 C.S.I.R. (Special, supplement) wealth of India Fisheries 5. D.C. Yadav: Prayogic Jantu Shashtra 6. Hyman L.H: Invertebrate Vol. I & II; (McGraw-Hill) I, II 7. Jordan and Nigam: Animal Biology; Hindustani Book Depot, Lucknow 8. J.Z. Young: The life of vertebrates; Oxford University Press 9. Kotpal, R.L: Invertebrate Zoology ; Rastogi Publication Meerut 10. K.S. Bhatia : Protochordates 11.. Kotpal R.L. Agarwal S.K: Modern Text Book of Zoology (Invertebrate); Rastogi Publication Meerut **12. Lal S.S: Practical Zoology; Invertebrate I, II** **13. Majupuria T.C: Invertebrate Zoology; Pradeep Publications, Jullundar** 14. Newman, H.H: Phylum chordata; Satish Book Enterprises Agra 15. Parker and Haswell W.T: Invertebrate Zoology Vol.I ; (Mac Millan) 16. Rastogi, Veer bala: A manual for practical invertebrate Zoology and Cytology; Kedannath, Ram Nath, Meerut 17. Rastogi, Veerbala: Chordata Zoology; Kedarnath, Ramnath & Company Meerut. **18. R.S. Saini: A textbook of Zoology; Pushpa RajnPrakashan, Allahabad.** **19. S.N. Prasad: The Invertebrates; Kitab Mahal, Allahabad.** 20 Satguru Prasad & B.N. Pandeyl: Invertebrate Zoology **21 Satguru Prasad & B.N. Pandey: Classification** 22. Veer Bala Rastogi: Manual of Practical Invertebrate; Kedarnath, Ramnath Publication, Meerut 23. Veer Bala Rastogi: Practical of Vertebrate Zoology; Kedarnath, Ramnath & Co., Meerut.

Course Name: Elective - III – Mathematics- II for Theory

Credits: 5 (Theory 3+2 Practical)

Course Code: SS-3

Objective:	
Syllabus	1. The Real Numbers : [8 lectures i. Algebraic and order properties of R ii. Absolute Value and the Real Line iii. The Completeness Property of R iv. Applications of the Supremum Property 2. Sequences of Real Numbers : [20 lectures i. Sequences and their Limits ii. Limit Theorems iii. Monotone Sequences iv. Subsequences and Bolzano - Weierstrass Theorem

	v. The Cauchy criterion vi. Properly divergent sequences vii. Introduction to infinite series 3. Limits [8 lectures i. Limits of Functions ii. Limit Theorem iii. Some Extensions of Limit Concepts Section – II 4 Continuous Functions [16 lectures i. Continuous Functions ii. Combinations of Continuous Functions iii. Continuous functions on intervals 5 Differentiation [20 i. The Derivative ii. The Mean Value Theorem iii. L"Hospital"s Rules iv. Successive Differentiation v. Taylor"s Theorem
Reference	Text Books : 1. Introduction to Real Analysis by Robert G. Bartle and Donald R. Sherbert, Third Edition, John Wiley and Sons, 2002 Sections : First Term : 2.1, 2.2, 2.3, 2.4, 3.1 to 3.7 , 4.1, 4.2, 4.3 Second Term : 5.1, 5.2, 5.3, 6.1, 6.2, 6.3, 6.4 2. Differential Calculus, Shantinarayan, 7th Edition, S. Chand and Co. Publication Chapter 5 Reference Books : 1. A Course in Calculus and Analysis by Sudhir Ghorpade and Balmohan Limaye, Springer 2006. 2. Principles of Mathematical Analysis, W. Rudin, Third Edition, McGraw Hill, 1976

Course Name: Elective III - Mathematics-II for Practical

Credits: 5 (Theory 3+2 Practical)

Course Code: SS-3

Objective:	
Syllabus	1) There will be four Practical slots (each of 45 minutes) per week, two slots for Paper I and two for Paper II. (24 Practical slots for Paper I and 24 practical slots for Paper II per term in any one term) OR one 3 hour Practical session for each batch of 20 students per week 2) A question bank consisting of 100 problems in all for the whole year, distributed in four Sections: 50 questions for each term (25 questions on Paper I and 25 on Paper II) will be the course work for this paper. Question Bank will be prepared by a Sub-Committee to be appointed by the Board of Studies in Mathematics. Question Bank shall be ready by first week of June, 2008. 3) The College will conduct the written Practical Examination of 80 marks at least 15 days before the commencement of the Main Theory Examination. There will be no external examiner. The written practical exam will be of the duration of 3 hours and the question paper will be as follows: Q1. (a) Any 1 out of 2 worth 10 marks on Paper I(first term). (b) Any 1 out of 2 worth 10 marks on Paper II.(first term). Q2. Any 4 out of 5 each of 5 marks on Paper I. Q3. Any 4 out of 5 each of 5 marks on Paper II. Q4. (a) Any 1 out of 2 of 10 marks on Paper I(second term). (b) Any 1 out of 2 worth 10 marks on Paper II(second term).

	In Q2 and Q3, there will be either 2 questions from first term and 3 questions from the second term or vice versa. 4) Each student will maintain a journal to be provided by the College at cost. The student will submit certified journal at the time of the Practical Examination. There will be 20 marks for internal assessment, which will include marks for journal and attendance. 5) 60 percent of the questions for the written practical examination will be exclusively set from the Question Bank provided. Questions from the Question Bank (meant for practical course) should NOT be asked in the University Theory Examinations. 6) The Question Bank shall be changed once every three years. 7) A Guideline as to the number of slots per week to be allotted for each topic per paper is as under:- N.B. :- In each term 12 practicals will be held including 2 revision practicals. Each practical can either be conducted in one session of 3 hours or it can be spread out over 4 slots of 45 mins each per week. Hence the total number of slots per term for the practicals is 48. Paper-I: Algebra and Geometry Sr.No. Topic 1 Sets 02 2 Functions 02 3 Integers 06 4 Complex Numbers 06 5 Polynomials 04 6 Revision 04 Total 24 Paper-II: Calculus. Sr.No Topic 1 The Real Numbers 04 2 Sequences of Real Numbers 06 3 Limits 04 4 Continuous Functions 06 5 Revision 04 Total 24 Paper-I: Algebra and Geometry Sr.No Topic 1 Geometry of Two Dimensions 06 2 Geometry of three dimensions 06 3 Sphere 02 4 System of linear equations 06 5 Revision 04 Total 24 Paper-II: Calculus. Sr.No Topic 1 Continuous Functions on intervals 08 2 Differentiation 12 3 Revision 04 Total 24
Reference	1) Complex Variables and Applications : Ruel. V.Churchill; McGraw Hill Co. 2) Elementary Number Theory : David Burton ; Tata McGraw Hill (Walter Rudin Series), Indian Edition. 3) Matrices : Shanti Narayan; S.Chand & Co. N.Delhi 4) Analytical Geometry of Two and Three Dimensions : Qazi Zameeruddi Narosa Publ..

Course Name: Teacher and School Education in India

Credits: 4

Course Code: CC-2

Objective:	1. To understand the development of educational system in India 2. To analyze the salient features of various systems of education in India 3. To analyze the structure and organization of school education in India 4. To understand the role and functions of central, regional, state, district, and local educational bodies 5. To understand the constitutional provisions and policy recommendations of school education 6. To understand the concept of an organization and analyze school as a formal organization 7. Explain organizational behavior in the context of school system 8. To understand various management functions of the school system 9. To develop the competencies in planning and organizing various school related activities 10. To understand the qualities and competencies of a teacher 11. To explore various professional development avenues available to the teacher 12. To understand the process of action research.
Syllabus	UNIT I 1. Where The Mind is without Fear – R. Tagore 2. The Ideals of Indian Art – K. Bharatha Iyer 3. The Wonder that was India – A. L. Basham 4. The Heritage of Indian Art – Kapila Vatsyayan 5. Life in Vedic Literature – Krishna Chaitanya 6. The Ramayana and the Mahabharata 7. Freedom Movements in India – Sudhir Chandra UNIT II Comprehension- Unseen Passage UNIT III Letter Writing – (a) Business Letters (b) Informal Letters (c) Applications UNIT IV Vocabulary (Textual) UNIT V Grammar (Textual) 1. Simple, Compound and Complex Sentences 2. Clauses 3. Tenses 4. Voice
Reference	Prescribed Text- English Language and Indian Culture. Bhopal: M. P. Hindi Granth Academy

Course Name: Learning Resources: Effective use in Class Rooms

Credits: 2

Course Code: AC-2

Objective:	
Syllabus	Unit: 2 Learning resources and preparation of materials • Role of language in science • Preparation and use of learning aids contextually. • Audio-visual materials – chart, models, films, and filmstrips, radio, TV, supplementary books, handbooks, laboratory guide, science kits etc. • Field trips, national parks, study tours, community as a resource site for learning, physics. • Self-learning materials- worksheets. • ICT in learning physical science, websites on physical science, interactive websites, on line learning, and preparation of projects using ICT. • Use of science labs- facilities, equipments, materials, and manuals, science records. • Unit planning and lesson planning. • Science exhibitions, contextual activities (Environmental day, Earth day, science day, etc.). • STS connections • Enhancing professional competency of physical science teachers through action research, participation in seminars, developing write-ups for research communication. • Learning beyond textbook
Reference	

Communication Skills - II (Proficiency in Class Rooms):

Credits: 2

Course Code: AC-3

Course Name: Work Education -II Computers

Credits: 2

Course Code: AC-4

Objects	1.Feed text letters, applications and tables on computers using all figures with speed and accuracy. 2. Apply various computer manipulations on the documents. 3. Take a hard and soft copy of the documents. 4. Give preliminary idea of modern media.
Syllabus	UNIT I: Introduction to Word Processing: Concept, Creating Document- Using MS word; Entering or Feeding Text; Familiarities and effective use of key Board- Standard, numeric, curser control and function keys and their operations. UNIT II: Practice of key board and dealing with files: Practice on Home, Upper and Lower rows without looking keyboard and using all fingers. Saving a Document in file. Retrieval of

	existing files. UNIT III: Formatting & Document: Editing the Text- Copy, cut and paste, insert, delete and overwriting; Styles- bold, italic and underline; Fonts- size, Spacing, Alignments, Spell and Grammar Check, Change of case, Find and Replace, Adding Bullets, Numbers and Boarders. UNIT IV: Inserting: Inserting table, picture and graphics; Header and Footer, Page break, Page number, Mail Merge and taking copy. UNIT V: Modern Media: Power point and Excel World Wide Web, Interest Browsing, Email, Introduction to E- Commerce.
Reference	Practice Manual for Computers in office Automation Publishing by R.I.E, Bhopal.

Course Name: Work Education -II Agriculture

Credits: 2

Course Code: AC-4

Objects	
Syllabus	Unit I Kitchen gardening – Importance, Establishment & Management Unit II Identification and Cultivation of Vegetable crops suitable for kitchen gardening viz: Pea, Carrot, Onion, Okara, Chilli and Radish etc Identification and Cultivation of Fruit Crops suitable for kitchen gardening viz. Citrus, Papaya, Banana, Grape and Mango etc. Unit III: Applied knowledge of common manures, fertilizers their uses and methods of application Knowledge of common pesticides and their uses in kitchen garden. Unit IV: Fruit preservation – Principles of Fruit preservation Different methods of fruit preservation Causes of Spoilage & their remedies Unit V: Preparation of Some fruit products; Jam, Jelly, Squashes, Ketchup & Pickles **Scheme of Examination** M.Marks: 25 Time: 3 hours (Internal Exam) 1. Identification of Seasonal Vegetables and Fruit Crops with Comments. - 05

	2. Drawing layout plan of a kitchen garden - 05 3. Principles and different methods of fruit preservation - 05 4. Preparation methods of Jam, Jelly, Ketchup, Sauce and pickles - 05 5. Viva and Practical Record - 05 Total - 25 marks
Reference	Hand book of Horticulture; I.C.A.R., New Delhi 1. Preservation of fruits and vegetables, Girdharlal Sidhapa ; I.C.A.R; New Delhi 1. Fruit & vegetable preservation Industries in India, Bhutani, R.C.; C.F.T.R.I.; Mysore. 2. Vegetable production in India, Chauhan,.D.V.S.; Ram Prasad and Sons, Agra 3. Commercial fruits; Singh, S.P.; Kalyani Publishers, New Delhi 5. Instant Horticulture; Gupta, S.N.; Naik, K.B; Jain Brothers] New Delhi 6. lCth foKku% Mk0 zissEkukFk (Hkk] d`0 v0 l0 ubZ fnYyh 8 m?Aku foKku] fljksgh gjsUnz flag] ch0ds0 izdk'Au] cMkSr] esjB 9 m?kku foKku] JhokLro] ,l0 ,l0 lsUVªzzy cqd gkml] jk;iqj 10 Qyksa ,oa lfCt;ksa dk ifjj{k.k] [Aqjfn;k] nyir flag] Hkk] dw0 v0 l0] ubZ fnYyh 11 Qy ifjj{k.k nhfidk] JhokLro] ,l0 ,l0 lsUVªzzy cqd gkml] jk;iqj

Course Name: Work Education -1 Electrical / Electronics

Credits: 2

Course Code: AC-4

Objects	
Syllabus	Unit 1: Fuse and its importance, General guideline for fuse, rated and melting current of fuse, types of fuse. Earthing and its importance and their types. Earthing resistance, fuse and earthing materials, different types of wiring connection like stair case, Go-down, Call bell connection etc. Connection of Lamp and Switch. Unit 2: Measuring instruments such as voltmeter, Ammeter, wattmeter, multimeter, Energy meter, working principal, measuring techniques and precaution during their operation in electrical circuits. Unit 3: Electronics, Electronic components like wire wound resistor, carbon resistor, capacitor, Diode, LED, Speaker/Ear phone, Transistor, transforms, coil (Inductor), colour code of carbon resistance etc. Method of their Testing. Unit 4: Formation of P-N junction diode, forward and reverse biasing characteristics and application. Formation of P-N-P and N-P-N junction transistor, biasing and its applications. Propagation of Radio – T.V. Waves, Block diagram of

	Radio and TV receivers, A.F Amplifies, modulation and oscillation, frequency response, simple amplifier circuits. Unit 5: House appliances repairing like Heater, Electrical Press, Electrical kettle, Fan, Cooler, Mixer, Decoration light. Construction of battery eliminator for full wave and half wave rectification, PA system. Timer, water level Indicator, Regulated power supply.
Reference	

Course Name: Gender issues in schools (Education)

Credits: 2

Course Code: AC-15

Objects	The syllabus on Gender Issues in Education is based on the philosophy of National Curriculum Framework (NCF) 2005 that focuses on equality, social justice and respect for diversity as well as dignity and right of children from different social backgrounds. It attempts to treat gender as a human issue and not as a women's issue. The approach followed in the course is based on the position paper on Gender Issues in Education wherein it is stated that gender should not be treated as an add on approach but as a cross cutting edge in all disciplinary areas. The course will also enable students to understand key concepts related to gender and how they operate in reality through various institutions. As has rightly been pointed out in the position paper pedagogical and curricular changes cannot be realized without the teacher who is at the forefront of the teaching learning process. This course will provide an opportunity for pupil teachers to reflect at their own socialization processes and will enable them to integrate their experiences with the content of different disciplines. The broad course outline would promote self-esteem and self confidence, stimulate critical thinking and develop in learners the abilities to question power relations, enable them to access resources, especially to an expanding framework of information and knowledge, ability to analyse options available in making informed choices, challenge relations of power and enable girls to take control of their lives and assert their rights as independent human. This course will enable the students to: • Develop basic understanding and familiarity with key concepts - gender, gender perspective, gender bias, gender stereotype, empowerment, gender parity, equity and equality, patriarchy and feminism • Understand the gradual paradigm shift from women studies to gender studies and some important landmarks in connection with gender and education in the historical and contemporary period • Learn about gender issues in school, curriculum, textual materials across disciplines, pedagogical processes and its intersection with class, caste, culture, religion and region • Understand how Gender, Power and Sexuality relate to education (in terms of access, curriculum and pedagogy)
Syllabus	Unit I

Gender Issues: Key Concepts

In this unit the students will develop an understanding of some key concepts and terms and relate them with their context in understanding power relations

1.1 Gender, Gender Perspective, Sex, Sexuality, Patriarchy, Masculinity and Feminism

1.2 Gender Bias, Gender Stereotyping and Empowerment

1.3. Equity and Equality in relation with caste, class, culture, religion, ethnicity, disability and region.

Suggested Practicum

- Preparation of project on key concepts and relating it with the social context of the pupil teacher.
- Analysis of textual materials from the gender perspective
- Identify gender bias and gender stereotype in textual materials.
- Organizing debates on equity and equality cutting across gender, class, caste, culture, ethnicity and religion

Unit II

Gender Studies: paradigm shift

In this Unit Students will develop an understanding of the paradigm shift from women studies to gender studies based on the historical backdrop. They would be able to construct critically the impact of policies, programmese and schemes for promotion of gender equality and empowerment.

2.1 Paradigm shift from Women's Studies to Gender Studies

2.2 Historical Backdrop

Some land marks from 'Our Pasts'- Social reform movement of the 19th & 20th centuries with focus on women's experiences of education.

2.3 Contemporary Period - Recommendations of Policy Initiatives Commissions and Committees. Schemes, Programmes and Plans.

Suggested Practicum

- Preparation of projects on critical analysis of recommendations of commissions and polices on capacity building and empowerment of girls/women, How these initiatives have generated in the formation of women collectives and has helped in encouraging grassroot mobilization of women such as the Mahila Samakhya Programme.
- Project on Women Role Models in various field s with emphasis on women in unconventional roles.

Unit III

Gender, Power and Education

In this unit the students will develop an understanding of different theories on gender and education and relate it to power relations. The institutions involved in socialization processes would be analysed to see how socialization practices impacts power relations and identity formation

3.1 Theories on Gender and Education: Application in the Indian context

- Socialization Theory
- Gender Difference
- Structural Theory
- Deconstructive Theory

3.2 Gender Identities and Socialization practices: In

- Family
- Schools
- Other Formal and Informal Organizations

3.3 Power Relations in Society in the context of gendered division of labour

3.4 Schooling of Girls: Inequalities and Resistances (Issues of access, retention and exclusion.

Suggested Practicum

- Discussion on Theories on Gender and Education with its application in the Indian context
- Project on Analysing the Institution of the family
  - Marriage, Reproduction
  - Sexual division of labour and resources
- Debates and Discussions on violation of rights of girls and women
- Analysis of video clipping on portrayal of women
- Collection of folklores reflecting socialization processes

Unit IV

Gender Issues in Curriculum

Student will build on the previous two units to understand how gender relates to education and schooling. In this Unit the students will be able to understand on how school as an Institution addresses gender concern in curriculum, textual materials & pedagogy. It will enable the student to draw linkages between life skills and sexuality.

4.1 Gender, Culture and Institution: Intersection of class, caste and religion

4.2 Curriculum and the Gender Question

4.3 Construction of Gender in Curriculum Framework since independence: An Analysis

4.4 Gender and the hidden curriculum

4.5 Gender in Text and Context(textbooks inter-sectionality with other disciplines, classroom processes including pedagogy)

4.6 Teacher as an agent of change

4.7 Life skills and sexuality

Suggested Practicum

- Preparation of indicators on participation of boys and girls in heterogeneous schools-public, private, aided and managed by

	religious denominations • Preparation of tools to analyse reflection of gender in curriculum • Preparation of checklist to map classroom processes in all type of schools • Felid visits to schools to observe the schooling processes from a gender perspective Unit V Gender, Sexuality, Sexual harssement & Abuse The unit will enable students to apply the conceptual tools learnt regarding gender and sexuality to understand issues related to Sexual Harassment at different places and Child Sexual Abuse. 5.1 Linkages and differences betweens Reproductive Rights and Sexual Rights 5.2 Development of Sexuality including Primary influences in the lives of Children (such as gender, body image, role models) 5.3 Perception of society towards women's body: Carrying the load of family prestige 5.4 Sites of Conflict: Social and Emotional 5.5 Understanding the importance of addressing sexual harassment at workplace, in family, neighborhood and other formal and informal institutions. 5.6 Agencies perpetuating violence: family, school, work place and media (print and electronic). 5.7 Institutions redressing sexual harassment and abuse.
Reference	• Project on how student perceive sexuality and their own body images. It would also focus on how gender identities are formed • Debate on how they perceive role models in their own lives. • Preparing Analytical Report on portrayal of women in print and electronic media Mode of Assessment • Assignments • Field based Project • Application based short answer essay type questions so that it can evaluate the creative and reflective abilities of the potential teachers Bibliography Report of the CABE Committee on Girl's Education and the common School System (MHRD, New Delhi, June 2005) Available in English and Hindi. National Curriculum Framework NCERT 2005 Gender Issues in Education, Position Paper, NCERT, 2006 Bhasin, Kamla. 2000. Understanding Gender. New Delhi: Kali for

	Women. Bhasin, Kamla. 2004. Exploring Masculinity. New Delhi: Women Unlimited. Bringing Girls Centrestage: Strategies and Interventions for Girls' Education in DPEP, MHRD, New-Delhi, 2000 Chakravarti, Uma Gendering Caste Through a Feminist Lens, 2003 Mandira Sen for Stree, an imprint of Bhatkal and Sen, 16 Southern avenue, Calcutta 700026 Chanana, Karuna. 1985. 'The Social Context of Women's Education in India, 1921-81,'in New Frontiers of Education, July-September. New Delhi: 15 (3):1-36.

Semester - III

Course Name : Foundation Course I – General English III

Credits: 3

Course Code: FC-1

Objects :	Distribution of Marks 1. Four short questions are to be set from Unit I. Two questions are to be attempted. Each question will carry 5 marks. 5 x2 = 10 2. Students are required to attempt five questions based on the given unseen passage. Each question will carry 2 marks. 5 x2 = 10 3.Out of three topics, students are required to write a report on any one topic only. 1x 6 = 06 4. Students are required to frame sentences with the words chosen from the prescribed text. 1 x 6 = 06 5. Students are required to answer questions on grammar based on the prescribed text. 1x 8= 08
Syllabus	UNIT I 1. O Captain! My Captain! - Walt Whitman 2. What is Science ? - George Orwell 3. The Dilemma of the Scientist - J. Bronowski 4. The Origin of Science - Will Durant 5. The Luncheon - Somerset Maugham 6. The Last Leaf - O' Henry 7. Major Ancient Indian Scientists - Adapted UNIT II Comprehension - Unseen Passage UNIT III Report Writing UNIT IV Vocabulary UNIT V Grammar

Reference	Prescribed Text- English Language and Indian Culture. Bhopal: M. P. Hindi Granth Academy

Course Name : Foundation Course II – General Tamil III

Credits: 3

Course Code: FC-2

Objects :	□ To enable the students to acquire basic skills in functional language . □ To develop independent reading skills and reading for appreciating the literary works □ To internalize grammar rules so as to facilitate fluency in speech and writing □ To develop functional and creative skills in language. □ To develop value of liberalism and an insight into the cultural heritage of the region which remains embodied in the literary output of the region .
Syllabus	Unit I: Functional Language: Letter Drafting – Types of letters- Emails -language of letters- letters of famous people-exercises Essay Writing- Characteristics –Definition-Format- format of essay-types of essays (literary, scientific etc)-models, exercises Reference: A Handbook of Writing Activities, Prasaranga, University of Bangalore. Unit II :Translation from English to Tamil: References: Mozhi Peyarppiyal Siva Shanmugam, Annam Publiications, Siva Gangai (T.N) About Translation by Peter Newmark, Multilanguage Motters, Clavedon, UK. B) Aspect of translation by K V V L Narasimha Rao, CIIL, Mysore Unit III : Medieval Literature Thirukkural ii) Silappathikaram An Anthology of Tamil Poetry (for Second Year Degree Classes) University of Mysore, Mysore. Unit IV :Novel Onpadhu Rypaai Nottu Ekkattut Thangal, Chennai 600 017
Reference	

Course Name : Foundation Course II – General Hindi III

Credits: 3

Course Code: FC-2

तमिलनाडु केन्द्रीय विश्वविद्यालय
हिन्दी विभाग
एकीकृत निष्णात, बी.ए., बी.एससी एवं बी.एड. कार्यक्रम
द्वितीय भाषा 'हिन्दी' – पाठ्यक्रम

तृतीय सत्र
प्रयोजनमूलक हिन्दी और अनुवाद

इकाई–1 **प्रयोजनमूलक हिन्दी**
परिभाषा एवं स्वरूप,
विभिन्न प्रयुक्तियाँ

इकाई–2 **अनुवाद – परिभाषा और प्रकार**
वर्तमान संदर्भ में अनुवाद की उपयोगिता
हिन्दी और कम्प्यूटर

इकाई–3 **कार्यालयीन हिन्दी पत्राचार**
i. सरकारी पत्र
ii. सरकारी पत्र – भेद, प्रकार
iii. कार्यालयीन शब्दावली
iv. कार्यालयीन पत्रों के अनुवाद का अभ्यास

इकाई–4 **राजभाषा हिन्दी : विविध आयाम**
i. हिन्दी की सांविधानिक स्थिति
ii. संपर्क भाषा के रूप में हिन्दी

इकाई–5 **हिन्दी का अंतर्राष्ट्रीय संदर्भ**
i. हिन्दी और जन संचार माध्यम
ii. परियोजना कार्य
क) भारतीय मानचित्र के अंतर्गत हिन्दी क्षेत्र 'क', 'ख', 'ग' को दर्शाना।
ख) वैश्विक मानचित्र के अंतर्गत हिन्दी भाषा की स्थिति को दर्शाना।

Course Name : Elective I Physics III

Credits: 5 (Theory 3+2 Practical)

Course Code: SS-1

Objects :	1 Describe historical development of laws of thermodynamics. 2 Appreciate the concept of probability. 3 Develop and understand the statistical basis of thermodynamics 4 Explain the fundamental difference between classical and quantum statistics. 5 Appreciate the concept of indistinguishability of particles. 6 Understand Bose-Einstien and Fermi-Dirac statistics.

	7 Appreciate the physical significance of E and B vectors and their role in the electromagnetic wave propagation. 8 Explain the concept of Poynting Vector 9 Derives and applies Maxwell's equations.
Syllabus	Unit-1 The laws of thermodynamics: The Zeroth law; various indicator diagrams; work done by and on the system; first law of thermodynamics; internal energy as a state function and other applications; reversible and irreversible changes; Carnot cycle and its efficiency; Carnot theorem and the second law of thermodynamics; Different versions of the second law; practical cycles used in internal combustion engines; entropy; principle of increase of entropy; The thermodynamic scale of temperature; its identity with the perfect gas scale; impossibility of attaining the absolute zero; third law of thermodynamics. Unit-2 Thermodynamic relationships and Liquification of gases Thermodynamic relationships: Thermodynamic variables; extensive and intensive, Clausius - Clapeyron heat equation; thermodynamic potentials and equilibrium of thermo dynamical systems. Principle of regenerative cooling and of cascade cooling, liquefaction of hydrogen and helium, refrigeration cycles, meaning of efficiency, cooling due to adiabatic demagnetization, production and measurement of very low temperatures. Unit-3 The statistical basis of thermodynamics Probability and thermodynamic probability; principle of equal a priori probabilities; probability distribution and it's narrowing with increase in number of particles; The expressions for average properties; accessible and inaccessible states; distribution of particles with a given total energy into a discrete set of energy states. Equilibrium before and after two systems in thermal contact, bridge with macroscopic physics; probability and entropy; Boltzmann canonical distribution law and its applications; rigorous form of equipartition of energy. Unit-4 Maxwellian distribution of speeds in an ideal gas Distribution of speeds and of velocities, experimental verification, distinction between mean, rms and most probable speed values, Doppler broadening of spectral lines. Transition to quantum statistics, 'h' as a natural constant and its implications, cases of particles in a one-dimensional box and one-dimensional harmonic oscillator. Indistinguishability of particles and its consequences; Bose-Einstien, and Fermi-Dirac conditions; Fermi level and Fermi energy. elementary idea of Bose-Einstein condensation, thermodynamic behaviour of an ideal Fermi gas. Unit-5 Time Varying Fields and Electromagnetic Waves Electromagnetic induction; Faraday's law; electromotive force, $\varepsilon = \int E.dr$; mutual and self inductance; transformers; energy in a static magnetic field; Maxwell's displacement current; Maxwell's equations; electromagnetic field energy density. The wave equation satisfied by E and B; plane electromagnetic waves in vacuum; Poynting vector; reflection at a plane boundary of dielectrics; polarization by reflection; reflection and refraction at the boundary of two dielectrics; and total internal reflection; Faraday effect; waves in a conducting medium; reflection and

	refraction by the ionosphere.
Reference	Laud, Introduction to Statistical Mechanics, Macmillan Griffith,D.J., Introduction to Electrodynamics, Pearson Education Pvt. Ltd., New Delhi. Tiwari, K.K., Electricity and Magnetism, S. Chand & Co., New Delhi.

Course Name : Elective I – Computer Science III

Credits: 5 (Theory 3+2 Practical)

Course Code: SS-1

Objects :	
Syllabus	
Reference	

Course Name: Elective - II – Chemistry – III

Credits: 5 (Theory 3+2 Practical)

Course Code: SS-2

Objective:	(i) make a comparative study of group 13-17 elements and rationalize the importance of comparative study. (ii) explain the structure and properties of the compounds of p-block elements including noble gas family particularly keeping focus on the recent discoveries. (iii) acquire the knowledge of characteristic properties of transition elements and explain the properties in terms of oxidation states exhibited by the elements. (iv) compare the chemistry of first, second and third transition series elements and explain the stereo chemistry associated with complexes. (v) appreciate to learn the theories involved in coordination chemistry and judge their comparative contribution in the study of complexes. (vi) explain the principles involved in the extraction of elements and correlate this with the thermodynamical principles. (vii) acquire the knowledge of characteristic properties shown by lanthanides and actinides and utilize the knowledge in the isolation of lanthanides. (viii) appreciate the similarities between later actinides and later lanthanides. (ix) construct the knowledge of different theories of acids and bases and judge the wider applicability of Lewis concept. (x) appreciate to gain knowledge of some non-queans solvents line ammonia and liquid sulpher dioxide and compare them with aqueous system. Instructional Strategy: To handle the study of descriptive chemistry, the teacher should highlight the role of structures as they affect the trends in properties. To make the subject matter

	presentation interesting and lucid in approach, the chemistry associated with the elements be discussed in terms of the trend in oxidation states exhibited by the respective elements. The subject treatment of isolation of elements be highlighted in the framework of thermodynamic principles. The different theories proposed to discuss the coordination compounds be dealt with in terms of their need and limitations. To discuss the acid base system and the chemistry of non aqueous solvents the possibility of the use of Ausubel's Advanced Organizer model should be explored by the teacher.
Syllabus	Unit-I p-Block Elements Part-I Comparative study (including diagonal relationship) of group 13-17 elements, compounds like hydrides, oxides, oxyacids and halides of group 13-16, hydrides of boron-diborane and higher boranes, borazine, borohydrides. p-Block Elements Part-II & Chemistry of Noble Gases Fullerenes, carbides, fluorocarbons, silicates (Structural principle), tetrasulphur tetranitride, basis properties of halogens, interhalogens. Chemical properties of the noble gases, chemistry of xenon, structure and bonding in xenon compounds. Unit-II Chemistry of Elements of First Transition Series : Characteristic properties of d-block elements. properties of the elements of the first transition series, their binary compounds sush a Carbides, Oxides and Sulphides. Complexes illustrating relative stability of their oxidation states, coordination number and geometry. Chemistry of Elements of Second and Third Transition Series : General characteristics, comparative treatment with their 3d-analogues in respect of ionic radii, oxidation states, magnetic behaviour, spectral properties and stereochemistry. Unit-III A. Coordination Compounds Werner's coodination 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. B. Oxidation and Reduction Use of redox potential data-analysis of redox cycle, redox stability in water-Frost. Latimer and Poubaix diagrams. Principles involved in the extraction of the elements. Unit-IV A. Chemistry of Lanthanide Elements :- Electronic structure, oxidation states and ionic radii and lanthanide contraction, complex formation, occurrence and isolation, lanthanide compounds. B. Chemistry of Actinides : General features and chemistry of actinides, chemistry of separation of Np, Pu and Am form U, similarities between the later actinides and the later lanthanides. Unit-V A. Acids and Bases : Arrhenius, Bronsted- Lowry, the Lux-Flood, solvent system and Lewis concepts of acids and bases. B. Non-aqueous Solvents : Physical properties of a solvent, types of solvents and their general characteristics, reactions in non-aqueous solvents with reference to liquid NH3 and liquid SO2.
Reference	1. Cotton, F.A. , G. Wilkerson, G. and Gaus, P.L. , Basic Inorganic Chemistry;

	John Wiley and Sons, New York. 2. Lee, J.D. , Concise Inorganic Chemistry ELBS 3. Sharpe, A.G., Inorganic Chemistry ,ELBS 4. Malik, Madan and Tuli; Modern Inorganic chemistry; S. Chand and Company Ltd. 5. Donglas, Bodie, E., Concepts and Models of Inorganic chemistry 6. Malik, Madan and Tuli; Advanced Inorganic Chemistry S. Chand and Company Ltd. 7. Huheey, James E; Inorganic Chemistry 4th Ed - New Delhi: Peareon Education. 8. Manku, G.S., ,Theoretical principles of Inorganic Chemistry, Tata McGraw – Hill Publishing Company, New Delhi 9. Soni P.L., Textbook in Inorganic chemistry (a modern approach) Sultan Chand and Sons, New Delhi:

Course Name : Elective II – Informatics Practices III

Credits: 5 (Theory 3+2 Practical)

Course Code: SS-2

Objects :	
Syllabus	
Reference	

Course Name : Elective III – Botany III for Theory

Credits: 5 (Theory 3+2 Practical)

Course Code: SS-3

Objects :	(i) To provide an understanding of structural and functional organisation of pteridophytes, gymnosperms and angiosperms and their evolutionary trends. (ii) To enable the students to be familiar with diversity of plant habit and their basic body plan.
Syllabus	Unit I Pteridophyta : General characteristics and outline classification. Important characteristics of Psilopsida, Lycopsida, Sphenopsida and Pteropsida. Structure and reproduction in Rhynia, Lycopoduim, Selaginella, Equisetum, Pteris and Marsilea. Stelar system, in pteridophytes. Unit II Gymnosperms: General characteristics of gymnosperms and their outline classification.

	Evolution and diversity of gymnosperms. Origin of seed habit, geological time scale, fossilisation and fossil gymnosperms. Unit III Gymnosperms : Morphology of vegetative and reproductive parts, anatomy of root, stem and leaf, reproduction and life cycle of Pinus, Cycas and Ephedra. Unit IV Angiosperms : Origin and evolution, fossil angiosperms, brief characteristics of angiosperms, primitive angiosperms (Magnoliaceae and Winteraceae) Unit V The basic body plan of a flowering plant – modular type of growth. Diversity in plant form in annuals, biennials and perennials. Convergence of tree habit in gymnosperms, monocotyledons and dicotyledons, trees – largest and longest lived organisms.
Reference	- Sharma, O.P. 1990, Text Book of Pteridophyta Mcmillan India Ltd. - Bhatnagar, S.P. and Moitra, A.1996 Gymnosperms, New Age International Ltd.; New Delhi - Gifford, E.M. and Foster, A.S., 1988, Morphology and evolution of Vascular plants, W.H. Freeman & Company, New York - Sundera Rajan, S.2003. Plant Morphology. Annual Publication Pvt. Ltd. New Delhi - Vashishta, B.R. 2003. Pteridophyta, S. Chand & Co. New Delhi - Vashishta, B.R. 2005. Gymnosperms. S. Chand & Co. New Delhi - Sporne, K.R. The Morphology of Pteridophyta. Hutchinson, London - Raizada & Sahani, Gymnosperms, FRI Publication - Singh V., Pande, P.C. and Jain D.K. 2004 Diversity and Systematics of Seed Plants, Rastogi Publication - Singh V. Pande, P.C. and Jain D.K. 2004. Structure, Development and Reproduction in Angiosperms, Rastogi Publications - Naik V.N. 1984 Taxonomy of Angiosperms. Tata McGraw-Hill Publishing Company Limited, New Delhi

Course Name : Elective III – Botany III for Practical

Credits: 5 (Theory 3+2 Practical)

Course Code: SS-3

Objects :	) To develop the skills of section cutting and double staining of vascular plants. ii) To provide field experiences to students for studying plant habits and basic body plan.
Syllabus	Study of morphology, reproductive structures and anatomy of Rhynia, Lycopodium, Selaginella, Equisetum, Pteris and Marsilea. 2. Cycas : (i) Habit, armour of leaf bases on the stem, very young leaf (circinate vernation) and old foliage leaves, bulbils, male cone, microsporophyll, Megasporophyll, mature seed.

	(ii) Study through slides – normal root (T.S.), stem (T.S.), Ovule (L.S.) microsporophyll. (iii) Study through hand sections or dissections – coralloid root (T.S.), Rachis (T.S.), leaflet (T.S.). 3. Pinus : (i) Habit, long and dwarf shoot showing cataphylls and scale leaves, T.S. of wood showing growth rings, male cone, Ist year, 2nd year and 3rd year female cones, winged seeds. (ii) Study through permanent slides – root (T.S.), female cone (L.S.), ovule (L.S.), embryo (W.M.) showing polycotyledonous condition. (iii) Study through hand sections or dissections – young stem (T.S.), old stem (wood) (T.L.S. and R.L.S.), needle (T.S.), male cone (L.S.), male cone (T.S.), pollen grains (W.M.). 4. Ephedra : (i) Habit and structure of whole male and female cones. (ii) Permanent slides – female cone (L.S.). (iii) Hand sections/dissections-node (L.S.), internode (T.S.) macerated stem to see vessel structure; epidermal peel mount of vegetative parts to study stomata, male cone (T.S. and L.S.) pollen grains. 5. Study of any commonly occurring dicotyledonous plant (for example Solanum nigrum or Kalanchoe) to understand the body plan and modular type of growth. 6. Life forms exhibited by flowering plants (by a visit to a forest or a garden) Study of tree like habit in cycads, bamboos, banana traveller's tree (Ravenala madagascariensis) or Yucca and comparison with true trees as exemplified by conifers and dicotyledons.
Reference	- Sharma, O.P. 1990, Text Book of Pteridophyta Mcmillan India Ltd. - Bhatnagar, S.P. and Moitra, A.1996 Gymnosperms, New Age International Ltd.; New Delhi - Gifford, E.M. and Foster, A.S., 1988, Morphology and evolution of Vascular plants, W.H. Freeman & Company, New York - Sundera Rajan, S.2003. Plant Morphology. Annual Publication Pvt. Ltd. New Delhi - Vashishta, B.R. 2003. Pteridophyta, S. Chand & Co. New Delhi - Vashishta, B.R. 2005. Gymnosperms. S. Chand & Co. New Delhi - Sporne, K.R. The Morphology of Pteridophyta. Hutchinson, London - Raizada & Sahani, Gymnosperms, FRI Publication - Singh V., Pande, P.C. and Jain D.K. 2004 Diversity and Systematics of Seed Plants, Rastogi Publication - Singh V. Pande, P.C. and Jain D.K. 2004. Structure, Development and Reproduction in Angiosperms, Rastogi Publications - Naik V.N. 1984 Taxonomy of Angiosperms. Tata McGraw-Hill Publishing Company Limited, New Delhi

Course Name: Elective III – Zoology III

Credits: 5 (Theory 3+2 Practical)

Course Code: SS-3

Objects :	Students will be able to gain knowledge of content classification and structure and function of various organ systems of chordates.
Syllabus	Unit 1 : General Characters and Classification of Phylum chordata upto orders with examples. Unit 2: CYCLOSTOMATA & PISCES: Salient features of a. Petromyzon with special reference to external morphology, digestive, respiratory and circulatory systems. b. Comparison of Petromyzon with Myxine c. Affinities & special characters of cyclostomes. d) Scoliodon:- External morphology, digestive, circulatory, respiratory, nervous & Urinogenital systems & sense organs. Unit 3: AMPHIBIANS & REPTILES a. Structural organization of Frog. (type study) b. Structural organization of Uromastrix (type study) Unit 4: BIRDS & MAMMALS c. Structure & general organization of Pigeon (type study) c. Structural & general organization of Rabbit. (type study) d. Perching Mechanism & plight adaptation in Birds (Type study) Unit 5: GENTERAL TOPICS a. Parental care, metamorphosis & neotony in Amphibians. b. Identification of Poisonous & nonpoisonous snakes c. Biting mechanisms, venom & antivenom d. Affinities of Prototheria and Metatheria e. Air Bladder & its importance in Fishes. f. Migration in Birds.
Reference	1. C.S.I.R. (Special supplement) wealth of India Fisheries 2. D.R. Griffin: Bird Migration (Double day, Garden city, U.S.A) 3 Jhingeran V.G. : Fish and fisheries of India. 4. Jordan E.L., Chordate Zoology; S. Chand & Company Ltd. Ram Nagar, NewDelhi 5 Jordan and Nigam: Animal Biology; Hindustani Book Depot, Lucknow 6. J.Z. Young:The life of vertebrates; Oxford University Press 7 Kent: Comparative anatomy of vertebrates; The C.V. Mosry Company, Tokyo 8 K.G. Gharpurey: Snakes of India & Pakistan; Popular Prakashan Bombay 9 Khanna, S.S.: An introduction of Fishes, Central Book Depot, Allahabad 10 Kingsley: Outlines of comparative anatomy of vertebrates; Central Book Depot, Allahabad. 11. Majupuria, T.C: Chordate Zoology; Pradeep Publication, Jullunder 12. Newman, H.H: Phylum chordata, Satish Book Enterprises Agra. 13. Parkar and Haswell W.T: (Rev. Ed.) Vol. I & II, A Text Book of Zoology Vertebrates; Edited by Marshall William 14. P.J. Deoras: Snakes of India; National Book Trust India, New Delhi 15. Rastogi, Veerbala : Chordata Zoology; Kedarnath, Ramnath & Company Meerut.

	16. Singh Sardar: Bee Keeping in India 17. Shukla and Upadhyay: Economic Zoology 18. Salim Ali: Common birds; B.N.H. Oxford III 19. Veer Bala Rastogi: Practical of Vertebrate Zoology; Kedarnath, Ramnath & Co., Meerut 20. T.S. Romer:The Vertebrate body ; Vakils, Ferres & Simons, Bombay. 21. Weichert: Element of Choralate Anatomy; (Mc. Graw hills).

Course Name: Elective - III – Zoology – III for Practical

Credits: 5 (Theory 3+2 Practical)

Course Code: SS-3

Objects :	
Syllabus	
Reference	

Course Name : Elective III/Mathematics III

Credits: 5 (Theory 3+2 Practical)

Course Code: SS-3

Objects :	To develop the students the skills of staining & mounting of materials, Identification of animals & their histology, and dissection of animals.
Syllabus	1. Study of representative examples of Phylum character (classification and general accounts) of following groups classes of chordates. a. Agnatha b. Pisces c. Amphibia d. Reptilia e. Aves f. Mammals 2. Study of permanent slides of different organs of vertebrate as per theory syllabus 3 Dissection of Scoliodon, Frog & Rat Major Dissection a. Afferent & Efferent Arteries of Scoliodon b. Cranial nerves of Scoliodon c. Cranial nerves of Frog. d. Exposure of different systems like digestive, circulatory, reproductive systems of rat. **Minor Dissection**

	a.Internal ear of scoliodon b.Ampulla of Lorenzinea of scoliodon c. Reproductive system of Frog. 4 Field visit to study aquatic vertebrate/ terrestorial vertebrates/ visit to a Zoology garden
Reference	1. C.S.I.R. (Special supplement) wealth of India Fisheries 2. D.R. Griffin: Bird Migration (Double day, Garden city, U.S.A) 3 Jhingeran V.G. : Fish and fisheries of India. 4. Jordan E.L., Chordate Zoology; S. Chand & Company Ltd. Ram Nagar, NewDelhi 5 Jordan and Nigam: Animal Biology; Hindustani Book Depot, Lucknow 6. J.Z. Young:The life of vertebrates; Oxford University Press 7 Kent: Comparative anatomy of vertebrates; The C.V. Mosry Company, Tokyo 8 K.G. Gharpurey: Snakes of India & Pakistan; Popular Prakashan Bombay 9 Khanna, S.S.: An introduction of Fishes, Central Book Depot, Allahabad 10 Kingsley: Outlines of comparative anatomy of vertebrates; Central Book Depot, Allahabad. 11. Majupuria, T.C: Chordate Zoology; Pradeep Publication, Jullunder 12. Newman, H.H: Phylum chordata, Satish Book Enterprises Agra . 13. Parkar and Haswell W.T: (Rev. Ed.) Vol. I & II, A Text Book of Zoology Vertebrates; Edited by Marshall William 14. P.J. Deoras: Snakes of India; National Book Trust India, New Delhi 15. Rastogi, Veerbala : Chordata Zoology; Kedarnath, Ramnath & Company Meerut. 16. Singh Sardar: Bee Keeping in India 17. Shukla and Upadhyay: Economic Zoology 18. Salim Ali: Common birds; B.N.H. Oxford III 19. Veer Bala Rastogi: Practical of Vertebrate Zoology; Kedarnath, Ramnath & Co., Meerut 20. T.S. Romer:The Vertebrate body ; Vakils, Ferres & Simons, Bombay. 21. Weichert: Element of Choralate Anatomy; (Mc. Graw hills).

Course Name : Learner, Learning and Cognition

Credits: 4

Course Code: CC-3

Objects :	• To understand human learning as an interactive process • To understand cognitive abilities and processes. • To Reflect on their own implicit understanding of the nature and kinds of learning • To understand the nature and meaning of creativity and to foster creativity among children • To gain an understanding of different theoretical perspectives on learning with a focus on motivation.

	• To understand, appreciate and create a constructivist learning environment.
Syllabus	Unit I: Learning: Psychological Perspective - Concept, Meaning and Nature of Learning - Distinctiveness of Human Learning - Behaviouristic and Cognitive Perspectives of Learning with special reference to Skinner & Bruner - Social cognitive view of learning (Bandura) - Constructivist view of learning: Concept & Principles - Educational Implications Unit II: Cognition - Meaning of Cognition - Structure and Process of Cognition - Sensation, Attention and Perception - Memory: Sensory Memory, Short Term Memory (STM) and Long Term Memory (LTM) - Information retrieval and forgetting - Concept formation and problem solving - Teachers' Role in facilitating information processing Unit III: Intelligence and Creativity (A) Intelligence: Concept and nature - Structure of Intellect (SOI)(Guilford) - Multiple Intelligences (Gardner) - Emotional Intelligence (Goleman) - Measurement of Intelligence: critical analysis - Educational Implications (B) Creativity - Creativity: Concept and nature - Creative thinking Process - Characteristics of a Creative Person - Fostering Creativity - Schooling and Creativity Unit IV: Motivation and Learning - Motivation: Concept and nature Intrinsic and Extrinsic Motivation - Theory of Self Actualization (Maslow) Theory of Achievement Motivation (McClelland and Atkinson) and their educational significance - Motivating Students: Teachers Role and Strategies Unit V: Creating Constructivist Learning Environment Creating environment for - - Learner as active meaning maker - Situated Learning - Cognitive Apprenticeship

	- Cognitive Negotiation - Social Mediation - Experiential Learning - Cooperative Learning - Teacher's Role in Constructivist Learning Situation * Teacher as co-learner * Teacher as facilitator Transactional Modes: - Class presentations - Readings and class discussions - Assignments - Exercise on learning, creativity, memory, and problem solving - Guest presentations - Video presentations on learning theory - Simulations/role play of constructivist approaches - Classroom observation to study the current teaching-learning practices Practical Work • Practical work specified in II Year Semester I to be continued
Reference	1. Ambron, S.R. (1981). Child Development, Holt Rinehart & Winston, New York. 2. Anita Woolfolk (2004). Educational Psychology, Pearson Education, New Delhi. 3. Atkinson, Richard C. et.al. (1983). Introduction to Psychology. Harcourt Brace Johanovich Inc. New York,. 4. Barry and Johnson (1964). Classroom Group Behavior, Macmillan New York. 5. Bhargava, Mahesh (1994). Introduction to Exceptional Children, Sterling Publishers Pvt. Ltd. New Delhi. 6. Benjafield, J.G. (1992). Cognition, Prentice Hall, Englewood Cliffs. 7. Bourne, L.E. (1985): Psychology: Its Principles and Meaning Holt, Rinehart Land Winston, New York. 8. Brown, J.S., Collins A and Dugrid, P (1989). Situated Cognition and the Culture of Learning, Educational Researcher; 32-42. 9. Christian, Jyoti (1984). Classroom Group Dynamic, Anu Books, Meerut. 10. Cruickshank, W.M. (1980). Psychology of Exceptional Children and Youth. N.J. Prentice Hall. 11. DeCecco, John P. (1977). The Psychology of Learning and Instruction Prentice Hall of India Pvt. Ltd., New Delhi. 12. Gardner, Howard (1989). Frames of Mind. The Theory of Multiple Intelligences, Basic Books, New York. 13. Gardner, Howard (1991). The Unschooled Mind, Basic Books, New York. 14. Gessel, A.L. & Allagh, F.H.(1946). The Child from Five to Ten, Harper & Brothers, New York. 15. John. W. Santrock (2006). Educational Psychology, Tata McGraw-Hill Publishing Company Limited, New Delhi. 16. Hurlock, E.B., (1964). Child Development, Mcgraw Hill Book Co. New York.

	17. Klausmeier, Herbert, J. (1985). Educational Psychology. Harper and Row, New York. 18. Kochar, S.K. (1989). Guidance and Counselling in College and Universities, Sterling Publishers Pvt. Ltd., New Delhi. 19. Lindgren, H.C. (1980). Educational Psychology in the Classroom Oxford University Press, New York. 20. Luria, A.R. (1976). Cognitive Development. Its Culotural and Social Foundations. Havward University Press, Cambridge, Mass. 21. Pasricha, prem, (1976). Guidance and Counselling in India Education NCERT, New Delhi. 22. Rosser, Rosemary A. (1993). Cognitive Development: Psychological and Biological Perspectives, Allyn dand Bacon:USA 23. Smith Ronald E. Sarason, I.G. and Sarason, Barbara R. (1982). Psychology: The Frontiers of Behaviour. Harper and Row Pub. New York. 24. Shrivastava, G.N.P. (1985). Recent Trends in Educational Psychology. Agra Psychological Research Cell, Belanganj, Agra 25. Shrivastava, G.N.P. (1986). Recent Trends in Personality study. Agra Psychological Research Cell, Balangunj, Agra. 26. Shrivastava, G.N.P. (1999). Shiksha Manovigyan, Naveen Vikkchardharayen Concept Publishing Company, New Delhi. 27. Wolfolk, A. (1987). Educational Psychology, Prentice Hall, Englewood Cliffs.

Course Name : Inclusive Education Practices in Schools

Credits: 2

Course Code: AC-5

Objects :	
Syllabus	
Reference	

Course Name : Learning Psychology: Practical

Credits: 2

Course Code: AC-6

Objects :	
Syllabus	
Reference	

Course Name : Use of ICT for Effective learning

Credits: 2

Course Code: AC-7

Objects :	
Syllabus	
Reference	

Course Name : Assessment for Learning – I

Credits: 2

Course Code: AC-8

Objects :	Assessment (and evaluation) is integral to school education and more specifically to teaching-learning. Since education in schools presupposes certain aims and objectives, it is crucial for teachers to be aware of how the progress and growth of students is to be assessed. This in turn implies that teachers become cognizant of what dimensions of growth or learning are to be assessed, what means are available to them for this purpose, and what effects are likely to flow from various kinds of assessment. This Course – as its title suggests - proposes that student-teachers become conscious of the distinction between assessment for learning and assessment of learning. Whereas both have their place in school education, a constructivist paradigm indicates a shift in emphasis towards the former. The course intends to enlarge current perspectives on assessment and evaluation, and enable student-teachers to view student learning along multiple dimensions. It brings a specific focus on assessment of subject-based learning, as well as processes of feedback and reporting, which are among the core competencies needed by teachers. A critical review of the examination system and the assessment practices that derive from this is also felt to be a necessary component of the course; so that student-teachers may learn to evolve more flexible and richer forms of assessment, even as they respond to current examination practices. The Course will thus enable student-teachers to: ▪ Gain a critical understanding of issues in assessment and evaluation (from a constructivist paradigm) ▪ Become cognizant of key concepts such as formative and summative assessment, evaluation and measurement, test, examination ▪ Be exposed to different kinds and forms of assessment that aid student learning ▪ Become the use of a wide range of assessment tools, and learn to select and construct these appropriately ▪ Evolve realistic, comprehensive and dynamic assessment procedures that are able to keep the whole student in view.
Syllabus	Unit 1: Overview of Assessment and Evaluation • Perspective on assessment and evaluation of learning in a constructivist paradigm • Distinction between ‘Assessment of learning’ and ‘assessment

for learning'

- Purposes of assessment in a 'constructivist' paradigm:
  - engage with learners' minds in order to further learning in various dimensions
  - promote development in cognitive, social and emotional aspects
- Critical review of current evaluation practices and their assumptions about learning and development
- Clarifying the terms
  - assessment, evaluation, test, examination, measurement
  - formative and summative evaluation
  - continuous and comprehensive assessment
  - Grading

Unit 2: What is to be assessed?

- Dimensions and levels of learning
  - Retention/recall of facts and concepts; application of specific skills
  - manipulating tools and symbols; problem-solving; applying learning to diverse situations
  - Meaning-making propensity; abstraction of ideas from experiences; seeing links and relationships; inference; analysis; reflection
  - originality and initiative; collaborative participation; creativity; flexibility
- Contexts of assessment
  - subject-related
  - person-related

Unit 3: Assessment of subject based learning

- Enlarging notions of 'subject-based learning' in a constructivist perspective
- Assessment tools

- kinds of tasks: projects, assignments, performances
- kinds of tests and their construction
- observation of learning processes by self, by peers, by teacher
- self-assessment and peer-assessment
- constructing Portfolios

Quantitative and qualitative aspects of assessment: appropriate tools for each

Unit 4: Teacher competencies in evolving appropriate assessment tools

- visualizing appropriate assessment tools for specific contexts, content, and student
- formulating tasks and questions that engage the learner and demonstrate the process of thinking; scope for original responses
- evolving suitable criteria for assessment
- organizing and planning for student portfolios and developing rubrics for portfolio assessment
- using assessment feedback for furthering learning

Unit 5: Data Analysis, Feedback and Reporting

- Statistical tools- percentage, graphical representation, frequency

	distribution, central tendency, variation, normal distribution, percentile rank, correlation and their interpretation • Feedback as an essential component of formative assessment ▪ use of assessment for feedback; for taking pedagogic decisions ▪ Types of teacher feedback (written comments, oral); peer feedback ▪ Place of marks, grades and qualitative descriptions • Developing and maintaining a comprehensive learner profile • Purposes of reporting: to communicate ▪ progress and profile of learner ▪ basis for further pedagogic decisions • Reporting a consolidated learner profile
Reference	• Baker, B, Costa, A., & Shalit, S. (1997). The norms of collaboration: Attaining communication competence. In A. Costa & R. Liebmann (Eds.), The process-centered school: Sustaining a renaissance community (pp. 119-142). Thousand Oaks, CA: Corwin. • Black, P., Harrison, C., Lee, C., Marshall, B, & William, D. (2004). Working inside the black box: Assessment for learning in the classroom. Phi Delta Kappan, 86 (1), 8- 21. • Bransford, J., Brown, A.L., & Cocking, R.R. (Eds.). (2000). How people learn: Brain, mind, experience, and school. Washington, DC: National Academy Press. • Burke, K. (2005). How to assess authentic learning (4th Ed.). Thousand Oaks, CA: Corwin. Burke, K., Fogarty, R., & Belgrad, S (2002). The portfolio connection: Student work linked to standards (2nd Ed.) Thousand Oaks, CA: Corwin. • Carr, J.F., & Harris, D.E. (2001). Succeeding with standards: Linking curriculum, assessment, and action planning. Alexandria, VA: Association for Supervision and Curriculum Development. • Danielson, C. (2002). Enhancing student achievement: A framework for school improvement. Alexandria, VA: Association for Supervision and Curriculum Development. • Gentile, J.R. & Lalley, J.P. (2003). Standards and mastery learning: Aligning teaching and assessment so all children can learn. Thousand Oaks, CA: Corwin. • Guskey, T.R., & Bailey, J.M. (2001). Developing grading and reporting systems for student learning. Thousand Oaks, CA. Corwin. • NCERT(1985). Curriculum and Evaluation, New Delhi:NCERT • Norris N.(1990) Understanding Educational Evaluation, Kogan Page Ltd. • Natrajan V.and Kulshreshta SP(1983). Assessing non-Scholastic Aspect Learners Behaviour, New Dlehi: Association of Indian Universities. • Newman, F.M. (1996). Authentic achievement: Restructuring schools for intellectual quality. San Francisco, CA: Jossey-Bass. • Nitko, A.J. (2001). Educational assessment of students (3rd ed.). Upper Saddle River, NJ: Prentice Hall. • Singh H.S.(1974) Modern Educational Testing. New Delhi: Sterling Publication • Thorndike RL and Hagen (1977). Measurement and Evaluation in Psychology ar Education.

Semester - IV

Course Name: Foundation Course I – General English IV

Credits: 3

Course Code: FC-1

Objects :	Distribution of Marks 1. Four short questions are to be set from Unit I. Two questions are to be attempted. Each question will carry 5 marks. 5 x2 = 10 2. Students are required to attempt five questions based on the given unseen passage. Each question will carry 2 marks. 5 x2 = 10 3.Students are required to expand the ideas, in about 100-125 words, contained in a given topic. Three topics will be given, out of which they are required to expand only one. 5 x 1 = 05 4. Students are required to frame sentences with the words chosen from the prescribed text. 5 x 1 = 05 5. Students are required to answer questions on grammar based on the prescribed text. 10x 1= 10
Syllabus	UNIT I 1. Ramanujan - C.P. Snow 2. J.C. Bose - Aldous Huxley 3. Human Rights 4. The Axe - R. K. Narayan 5. Water - Dr. C.V. Raman 6. Stopping by the Woods on a Snowy Evening - Robert Frost UNIT II Comprehension- Unseen Passage UNIT III Expansion on an idea UNIT IV Vocabulary (textual) UNIT V Grammar (textual)
Reference	Prescribed Text- English Language and Indian Culture. Bhopal: M. P. Hindi Granth Academy

Foundation Course II – General Tamil IV

Credits: 3

Course Code: FC-2

Objects :	□ To enable the students to acquire basic skills in functional language .

	□ To develop independent reading skills and reading for appreciating the literary works □ To internalize grammar rules so as to facilitate fluency in speech and writing □ To develop functional and creative skills in language. □ To develop value of liberalism and an insight into the cultural heritage of the region which remains embodied in the literary output of the region .
Syllabus	Unit I: Functional Language: Precise Writing: Characteristics-definition-steps to précis writing – models-exercise Book Reviewing: characteristics-definition-format-models-exercises Reference: A Handbook of writing Activities, Prasaranga, University of Bangalore. Unit II :Technical Writing Definition-characteristics-format-models-Language used in the writing-Terminology-Process of writing-planning of document-Styles of writing-Technologies of writing-exercises. Reference Book: a) Language in Science M S Thirumalai Geetha Book House, Mysore b) Technical Report Writing Today – Danel G.Riordan, 19-A, Ansari Road, New delhi 110 002. Unit III:Ancient Poetry: Nedunal Vaadai 2) Kalithogai An Anthology of Tamil Poetry (for Second Year Degree Classes) University of Mysore, Mysore. Unit IV : Drama Tanneer tanneer-komal Swaminathan, Vaanathi Pathippagan, 13, Deenadayalu Street. T. Nagar, Chennai 600 017
Reference	

Foundation Course II – General Hindi IV

Credits: 3

Course Code: FC-2

तमिलनाडु केन्द्रीय विश्वविद्यालय
हिन्दी विभाग
एकीकृत निष्णात, बी.ए., बी.एससी एवं बी.एड. कार्यक्रम
द्वितीय भाषा 'हिन्दी' – पाठ्यक्रम

चतुर्थ सत्र
आधुनिक हिन्दी गद्य साहित्य

इकाई–1 आधुनिक हिन्दी गद्य साहित्य की प्रवृत्तियाँ

इकाई–2 नाटक

'अंधेरी नगरी' (भारतेन्दु हरिश्चन्द्र)

इकाई–3 निबंध

'शिवशंभू के चिट्ठे' (बालमुकुंद गुप्त)

इकाई–4 कहानी

(क) 'उसने कहा था' (चंद्रधर शर्मा 'गुलेरी')
(ख) 'ईदगाह' (प्रेमचंद)
(ग) 'भोलाराम का जीव' (हरिशंकर परसाई)

इकाई–5 संस्मरण

'घीसा' (महादेवी वर्मा)

इकाई–6 उपन्यास

'त्यागपत्र' (जैनेन्द्र कुमार)

Course Name : Elective I – Physics IV

Credits: 5 (Theory 3+2 Practical)

Course Code: SS-1

Objects :	1. Explain the phenomena pertaining to the concept of waves, their relationship in various forms and propagation. 2. Explain formation of images and various defects of images. 3. Discuss the phenomena of interference, diffraction and polarization of light. 4. Design experiments to observe different optical phenomena and relate them with daily life.
Syllabus	Unit-1 Oscillations Free oscillations of simple systems; small oscillation approximation; solutions;

damped oscillation, forced oscillation and resonance; linear and transverse oscillations of a mass between two springs; Diatomic molecule; reduced mass concept.

Free oscillations of system with two degrees of freedom; normal modes, longitudinal and transverse oscillation of coupled masses and energy transfer between modes;

Waves in Media: Speed of transverse waves in a uniform spring; speed of longitudinal waves in a fluid; energy density and energy transmission in waves; group velocity and phase velocity,

Superposition of waves: Linear homogenous equations and the superposition principle, beats

Unit-2

Geometrical Optics

Fermat's Principle: Principle of extremum path, General theory of image formation: cardinal points of an optical system, general relationships, thick lens and lens combinations. Lagrange equation of magnification, telescopic combinations, telephoto lenses and eyepieces, Matrix method in paraxial optic-thin lens formula,

Aberration in images: Chromatic aberrations, achromatic combination of lenses in co tact and separated lenses. Monochromatic aberrations and their reductions, the aplantic points of a sphere and other applications, aspherical mirrors and Schmidt corrector plates, oil immersion objectives, meniscus lens

Unit-3

Wave optics and Interference

Reflection and Refraction from Huygens' principle; interference of light: The principle of superposition, two-slit interference, coherence requirement for the sources, optical path retardations, lateral shift of fringes, Rayleigh refractometer and other applications, localized fringes; thin films, applications for precision measurements for displacements, Newton's ring.

Haidinger fringes: Fringes of equal inclination. Michelson interferometer, its application for precision determination of wavelength, wavelength difference and the width of spectral lines.

Unit-4

Fresnel diffraction and fraunhoffer diffraction

Fresnel diffraction: Fresnel half-period zones, plates, straight edge and rectilinear propagation.

Fraunhofer diffraction: Diffraction at a slit, half period zones, phasor diagram and the intensity distribution, diffraction at a circular aperture and a circular disc, resolution of images, Rayleigh criterion, resolving power of telescope and microscopic systems, outline of phase contrast microscopy, Holography and simple applications.

Unit-5

Diffraction gratings and Polarisation

Diffraction at N parallel slits, intensity distribution, plane diffraction grating, reflection grating, and blazed grating, resolving power of a grating and comparison with resolving powers of prism.

Double refraction and optical rotation: Refraction in uni-axial crystals, its theory. phase retardation plates; double image prism; rotation of plane of polarization, origin of optical rotation in liquids and in crystals; optical activity.; production and detection of linearly and circularly polarised light; Fresnel theory; Principles of fibre

	optics
Reference	1. Ghatak, Physical Optics 2. Sears and Zemanski, Optics and Atomic Physics 3. Goyal, R.P., Unified Physics,Shivlal Agrawal and Co., Indore.

Course Name : Elective I – Computer Science IV

Credits: 5 (Theory 3+2 Practical)

Course Code: SS-1

Objects :	
Syllabus	
Reference	

Course Name: Elective - II – Chemistry – IV

Credits: 5 (Theory 3+2 Practical)

Course Code: SS-1

Objective:	(i)	acquire the knowledge of basic terms involved in thermo-dynamics and assess their significance in study of the thermodynamics.
	(ii)	develop the mathematical form of first law of thermodynamics from law of conservation of energy and appreciate the application of this law in Joule-Thompson effect and various thermo chemical laws.
	(iii)	develop the concept of entropy by Carnot cycle and examine it as a criteria of spontaneity and equilibrium.
	(iv)	Comprehend the concept of free energy change and chemical potential and correlate the free energy change with feasibility of any physical and chemical process.
	(v)	Judge the importance of Clausicus Clapeyson equation in the study of various processes.
	(vi)	Understand Gibb's phase rule equation and apply this equation to one component and two component systems.
	(vii)	Get acquaintance with the importance of critical solution temperature for some partially miscible liquids.
	(viii)	Correlate electrical conductance with various parameters that affect this and learn the application of conductivity measurement in determining certain important physical parameters.

	(ix) Visualize the difference between reaction velocity and mechanical velocity and appreciate to learn the techniques to determine the reaction velocity. (x) Correlate reaction rate and temperature and carefully examine the development of some theories based on this correlation. Instructional Strategy: In teaching thermodynamics the teacher should make a conscious effort to convey the importance of mathematical modelling of concepts in physical sciences. Intentional cognitive conflict at times may also be used as a teaching strategy particularly in the transaction of Joule-Thomson effect. The use of concept attainment model may be practiced while discussing various enthalpies. The use of Inductive and deductive approach may be practiced in dealing with the Le-Chatelier Principle. Use of ICT may be made in the transaction of phase equilibrium. The practice of experimental approach may be highlighted while discussing: Distribution Law, conductance and its applications and ascertaining the kinetic parameters of some reactions cooperative learning may be practiced in dealing with chemical equilibrium.
Syllabus	I Thermodynamics – I Definition of thermodynamic terms: system, surroundings etc. Types of systems, intensive and extensive properties. State and path functions and their differentials, Thermodynamic process. Concept of heat and work. First Law of Thermodynamics: statement, definition of internal energy and enthalpy. Heat capacity, heat capacities at constant volume and pressure and their relationship. Joule's law-Joule-Thomson coefficient and inversion temperature. Calculation of w, q, dU & dH for the expansion of ideal gases under isothermal and adiabatic conditions for reversible process. Thermochemistry: standard state, standard enthalpy of formation-Hess's Law of heat summation and its applications. Heat of reaction at constant pressure and at constant volume. Enthalpy of neutralization. Bond dissociation energy and its calculation from thermo-chemical data, temperature dependence of enthalpy. Kirchhoff's equation. II Thermodynamics – II (A) Second law of thermodynamics: need for the law, different statements of the law. Carnot cycle and its efficiency, Carnot theorem. Thermodynamic scale of temperature. Concept of entropy: entropy as a state function, entropy as a function of V & T, entropy as a function of P & T, entropy change in physical change, Clausius inequality, entropy as a criteria of spontaneity and equilibrium. Entropy change in ideal gases and mixing of gases. Third law of thermodynamics: Nernst heat theorem, statement and concept of

residual entropy, evaluation of absolute entropy from heat capacity data. Gibbs and Helmholtz functions; Gibbs function (G) and Helmholtz function (A) as thermodynamic quantities, A & G as criteria for thermodynamic equilibrium and spontaneity, their advantage over entropy change. Variation of G and A with P, V and T.

(B) Chemical Equilibrium

Equilibrium constant and free energy. Thermodynamic derivation of law of mass action. Le Chatelier's principle.

Reaction isotherm and reaction isochore-Clapeyron equation and Clausis – Clayron equation, applications.

III Phase Equilibrium

Statement and meaning of the terms – phase, component and degree of freedom, derivation of Gibbs phase rule, phase equilibria of one component system – water, CO2 and S systems.

Phase equilibria of two component system – solid-liquid equilibria, simple eutectic – Bi-Cd, Pb-Ag systems, desilverisation of lead.

Solid solutions – compound formation with congruent melting point (Mg-Zn) and incongruent melting point, (NaCl-H2O), (FeCl3-H2O) and CuSO4H2O) system. Freezing mixtures, acetone-dry ice.

Liquid – liquid mixtures – Ideal liquid mixtures, Raoult's and Henry's law. Non-ideal system-azeotropes-HCl-H2O and ethanol – water systems.

Partially miscible liquids – Phenol-water, trimethylamine-water, nicotine-water systems. Lower and upper consolute temperature. Effect of impurity on consolute temperature.

Immiscible liquids, steam distillation.

Nernst distribution law – thermodynamic derivation, applications.

IV Electrochemistry – I

Electrical transport-conduction in metals and in electrolyte solutions, specific conductance and equivalent conductance, measurement of equivalent conductance, variation of equivalent and specific conductance with dilution.

Migration of ions and Kohlrausch law, Arrhenius theory of electrolyte dissociation and its limitations, weak and strong electrolytes, Ostwald's dilution law its uses and limitations Debye-Huckel-Onsager's equation for strong electrolytes (elementary treatment only). Transport number, definition and determination by Hittorf method and moving boundary method.

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

V Chemical Kinetics

Definition of rate of reaction, factors influencing the rate of a reaction-

	concentration, temperature, pressure, solvent, light and catalyst. Reaction order, mathematical expression for zero order, first and second orders. Determination of order of reactions-half-life, differential, intergration and isolation methods. Radioactive decay as an example of first order reaction. Ex-perimental methods of kinetics: conductometric, potentiometric and spectrophotometric (elementary ideas). Simple collision theory, expression for the rate constant (without derivation). Transition state theory based on thermodynamic equilibrium. Expression for rate constant involving equilibrium
Reference	1. Glastone, S., Chemical Thermodynamics East - West Publication 2. Glastone ,S., Physical Chemistry – East – West Publication 3. Atkins,P.W., & Paula,J.D., Physical Chemistry , Oxford Press 4. Silby,R.J., and Alberty,R.A., Physical Chemistry John Wiley & Sons. Inc. 5. Gurudeep Raj, Advanced Physical Chemistry Goel Publication 6. Puri, Sharma & Pathania, Physical Chemistry Soban Lal Nagin Chand & Company 7. Rakshit,P.C., Physical Chemistry New Age International 8. Laidler, K.J., Chemical Kinetics T.M.H Publication

Course Name : Elective II – Informatics Practices III

Credits: 5 (Theory 3+2 Practical)

Course Code: SS-2

Objects :	
Syllabus	
Reference	

Course Name : Elective III – Botany IV for Theory

Credits: 5 (Theory 3+2 Practical)

Course Code: SS-3

Objects :	To enable the students to analyse patterns of inheritance, structural and functional aspects of genes and their application in the study of biotechnology.
Syllabus	Unit I Mendelian genetics : Mendel's is law of inheritance, linkage and crossing over, allelic and non allelic interactions. Unit II Gene expression : Structure of gene, transfer of genetic information, genetic code, ribosomes transcription, translation, protein synthesis, regulation of gene expression in prokaryotes and eukaryotes, proteins, 1D, 2D and 3D structure. Unit III Genetic variation : Mutations – spontaneous and induced, transposable genetic elements, DNA damage and repair

	Extranuclear genome : Presence and function of mitochondrial and plastid DNA plasmids. Unit IV Genetic engineering : Tools and techniques of DNA recombinant technology, cloning vectors, genomic and e-DNA library, techniques of gene mapping and chromosome walking. Unit V Biotechnology : Functional definition, cellular totipotency, basic aspect of plant tissue culture, differentiation and morphogenesis. Biology of Agrobacterium, Vectors for gene delivery and marker genes. Salient achievements in crop biotechnology.
Reference	- Gardner, E.J. Principles of Genetics, John Wiley and Sons Inc. New York - Snustad, D.P. and Simmons, M.J., 2000, Principles of Genetics. John Wiley & Sons Inc. USA - Atherly, A.G. Girton J.R., and Mc Donald, J.F. 1999, The Science of Genetics, Saundero College Publishing, Fort Worth USA - Stent, G.S., 1986, Molecular genetics, CBS Publications - Wolfe S.L., 1993, Molecular and Cell Biology, Wadsworth Publishing Co., California, USA - Russel P.J., 1998, Genetics, The Benjamin/Cummings Publishing Co. Inc., USA - Ablerts, B. Bray, D., Lewis, J. Raff M., Roberts, K and Watson I.D., 1999, Molecular Biology of Cell, Garland Publishing Co. Inc. New York. USA - Dixon, R.A., 1987, Plant Cell Culture, A Practical approach IRL, Press Oxford - Smith, R.H., 2000, Plant Tissue Culture, Techniques and Experiments, Academic Press New York - Kumar, U. 2003, Methods in Plant Tissue Culture. 2nd edition, Agrobios, India - Dwivedi, Padmanabh. 2004. Plant Tissue Culture, Scientific Publishers (India) - Watson, James D., T.A. Baker, S.P. Bell, A.Gann, M.Levine, R.Losick 2004. Molecular Biology of the Gene. 5th edition, Pearson Education - Gupta, P.K. 2006-07, Cell and Molecular Biology. 3rd edition, Rastogi Publication .

Course Name : Elective III – Botany IV for Practical

Credits: 5 (Theory 3+2 Practical)

Course Code: SS-3

Objects :	i) To develop the skills for the preparation of inheritance pattern. ii) To impart the skills of isolation of DNA iii) To familiarize the students with the technique of micro propagation and isolation of protoplast.
Syllabus	1. Working out the laws of inheritance using seed mixtures/flowers. 2. Working out the mode of inheritance of linked genes from test cross and/or F2 data. 3. Isolation of DNA from plant material.

	4. Isolation of protoplasts from different plant tissues. 5. Demonstration of the technique of micropropagation.
Reference	- Gardner, E.J. Principles of Genetics, John Wiley and Sons Inc. New York - Snustad, D.P. and Simmons, M.J., 2000, Principles of Genetics. John Wiley & Sons Inc. USA - Atherly, A.G. Girton J.R., and Mc Donald, J.F. 1999, The Science of Genetics, Saundero College Publishing, Fort Worth USA - Stent, G.S., 1986, Molecular genetics, CBS Publications - Wolfe S.L., 1993, Molecular and Cell Biology, Wadsworth Publishing Co., California, USA - Russel P.J., 1998, Genetics, The Benjamin/Cummings Publishing Co. Inc., USA - Ablerts, B. Bray, D., Lewis, J. Raff M., Roberts, K and Watson I.D., 1999, Molecular Biology of Cell, Garland Publishing Co. Inc. New York. USA - Dixon, R.A., 1987, Plant Cell Culture, A Practical approach IRL, Press Oxford - Smith, R.H., 2000, Plant Tissue Culture, Techniques and Experiments, Academic Press New York - Kumar, U. 2003, Methods in Plant Tissue Culture. 2nd edition, Agrobios, India - Dwivedi, Padmanabh. 2004. Plant Tissue Culture, Scientific Publishers (India) - Watson, James D., T.A. Baker, S.P. Bell, A.Gann, M.Levine, R.Losick 2004. Molecular Biology of the Gene. 5th edition, Pearson Education - Gupta, P.K. 2006-07, Cell and Molecular Biology. 3rd edition, Rastogi Publication .

Course Name: Elective III – Zoology IV for Theory

Credits: 5 (Theory 3+2 Practical)

Course Code: SS-3

Objects :	Students will develop understanding of comparative anatomy of the chordates, reproductive strategies and gamete production among chordates and to understand basic concepts of evolutionary biology.
Syllabus	Unit 1: Comparative anatomy of (a) Integumentary, (b) Digestive and (c) Respiratory system of vertebrates. Unit 2: Comparative account of (a) Brain (b) Heart. (c) Evolution of Heart (d) Aortic arches & (e) Urinogenital duct. Unit 3. (a) Reproductive system in mammals, (b) structure of sperm & ovum. (c) Gametogenesis (Spermatogenesis & Oogenesis), & (d) fertilization. Unit 4: (a) Type of Animal Eggs, (b) Cleavage pattern, (c) development of chick embryo upto formation of primitive streak.(d) Extra embryonic membranes, (e) Placentation in mammals. Unit 5: (a) Brief account of origin of life on earth. (b) Origin of Prokaryotic and Eukaryotic cells, (c) concept of evolution (macro & micro evolution), (d) Natural selection; (e) variation & (f) concept of species & speciation.

Reference	1. Balinsky: Embryology 2. Berry A.K: Embryology 3. Dallela, Tyagi and Agarwal: Chordate embryology; Jai Prakash Nath Publication, Meerut 4. Dodson: Evolution 5. G.G. Simpson : Meaning of Evolution; (Oxford & India Book House Publishing Co., New Delhi) 6. G.L. Stebbins : Process of Organic evolution; (Prentice Hall of India, New Delhi) 7 Gorbman and Bem: Comparative endocrinology 8. J.Z. Young: Life of vertebrates; (Oxford University Press) 9 J.W. Brookbank: Developmental Biology 10. J.W. Saunder's Jr. Patterns and Principles of Animal Development 11. Kent: Comparative Anatomy of Vertebrates ; (The C.V. mosry Company, Tokyo) 12. Kingsley: Outlines of comparative anatomy of vertebrates; (Central Book Depot, Allahabad) 13. K. John : The origin of life; (Reinhold publishing Corpn) 14. Lull S: Organic Evolution 15. Manner: Comparative Embryology 16. New man H.H: Phylum chordata;. Satish Book Enterprises Agra 17. Rastogi Veerbala : Chordata Zoology; Kedarnath, Ramnath & Company, Meerut. 18. R.C. Dalela: Ecology and Evolution Strickberger, Evolution 19. R.S. Marewn: Vertebrate Embryology; (Oxford & IBM publishing Co., New Delhi) 20 Tumer C.D. and Bagnara, J.T: General Endocrinology; W.B. Saunders, London. 21. Weichert : Elements of chordate Anatomy (McGraw Hill)

Course Name: Elective III – Zoology IV for Practical

Credits: 5 (Theory 3+2 Practical)

Course Code: SS-3

Objects :	To develop the students skills of comparison of animals, anatomy & systems, embryology and osteology
Syllabus	1.Dissection and comparative study of brains of different vertebrates 2. Comparative study of permanent slides of integument and digestive tracts & Blood cells of vertebrates . 3. Comparative study of permanent slides of Chick and Frog embryo. 4. Permanent stained preparation of: - Scales of Fishes - Striped & unstriped muscles of Frog. - Squamous epithelium of Frog. 5 Comparative study of bones of Frog, Fowl and Rabbit. 6.. Study of the early developmental stages of Chick embryo

Reference	1. Balinsky: Embryology 2. Berry A.K: Embryology 3. Dallela, Tyagi and Agarwal: Chordate embryology; Jai Prakash Nath Publication, Meerut 4. Dodson: Evolution 5. G.G. Simpson : Meaning of Evolution; (Oxford & India Book House Publishing Co., New Delhi) 6. G.L. Stebbins : Process of Organic evolution; (Prentice Hall of India, New Delhi) 7 Gorbman and Bem: Comparative endocrinology 8. J.Z. Young: Life of vertebrates; (Oxford University Press) 9 J.W. Brookbank: Developmental Biology 10. J.W. Saunder's Jr. Patterns and Principles of Animal Development 11. Kent: Comparative Anatomy of Vertebrates ; (The C.V. mosry Company, Tokyo) 12. Kingsley: Outlines of comparative anatomy of vertebrates; (Central Book Depot, Allahabad) 13. K. John : The origin of life; (Reinhold publishing Corpn) 14. Lull S: Organic Evolution 15. Manner: Comparative Embryology 17. New man H.H: Phylum chordata;. Satish Book Enterprises Agra 17. Rastogi Veerbala : Chordata Zoology; Kedarnath, Ramnath & Company, Meerut. 18. R.C. Dalela: Ecology and Evolution Strickberger, Evolution 19. R.S. Marewn: Vertebrate Embryology; (Oxford & IBM publishing Co., New Delhi) 20 Tumer C.D. and Bagnara, J.T: General Endocrinology; W.B. Saunders, London. 21. Weichert : Elements of chordate Anatomy (McGraw Hill)

Course Name : Elective III/Mathematics IV

Credits: 5 (Theory 3+2 Practical)

Course Code: SS-3

Objects :	
Syllabus	
Reference	

Course Name : Human Development in Socio-Cultural Context

Credits: 4

Course Code: CC-4

Objects :	• To develop a contemporary understanding of human development: its meanings, processes and perspectives in socio cultural context

	• To acquire theoretical perspectives and develop an understanding of dimensions of human development with special reference to adolescent learners • To develop an understanding about the impact/influence of socio cultural context in shaping adolescent development • To make them cognizant of specific issues of adolescent behaviour in schools and the critical role of teacher in furthering development • To develop the competencies in dealing with children of diverse abilities
Syllabus	Unit I: Human Development and the Contexts - Human Development: Meaning, Nature and Dimensions - Role of Heredity and Environment in Development - Socio-cultural Contexts: Meaning, Nature and its Influences on Human Development * Family: Child rearing practices, Types of Family, Problem in Family (Divorce, alcoholism etc.) * Peer: Peer Status, Peer Pressure, Friendship * School: School Culture, Climate, Teacher Values * Ethnicity, Culture, and Gender * Socio Economic Status and Language - Creating a culturally compatible classroom Unit II: Dimensions of Development and Their Educational Implications * Cognitive Development (Piaget, Vygotsky & Bruner) * Psycho-Social Development (Erickson) * Moral Development (Piaget and Kohlberg) Unit III: Socio-cultural aspect of personality Development - The self, self concept, self esteem, self-efficacy, and self realization - Attitude and Interest Development - Personality, Temperament, and Traits - Character Development - Culture and Personality Unit IV: Understanding Adolescent - Nature of Adolescence: stage of development, Socio-cultural context - Characteristics and concerns of Adolescents * Biological : Physical, Sexual, Emotional * Cognitive : Abstract Thinking, Meta cognition * Psychological: Identity, Individuation, and Sense of Independence

	* Social : Adolescent expectation, Social expectation, Parental expectation, Skepticism, Peer culture, Role model * Moral & Spiritual: Conformity and non-conformity - Challenges and opportunities during adolescence: Role of Guidance and Counselling Unit V : Socio-cultural Context Shaping Human Development - Nature of Socio-culture and Environment. - Physical Environment. - Socio-cultural Practices. - Media Exposures - Economical Conditions - Access to Education and Technology - School Ethos - Community and Life - Dealing with learners from varied socio-cultural context. Transactional Modes: • Class presentations • Readings and class discussions • Assignments • Survey to study child rearing practices • Case study analysis to understand contextual influence on development • Exercises on self concept and personality development • Use of online videos related to cognitive and moral development • Case study of an adolescent Practical work : Any Three from the following: (i) Intelligence (Verbal, Non Verbal and Performance Tests) (ii) Personality (iii) Creativity (iv) Motivation (v) Learning (vi) Concept Formation (vii) Problem Solving
Reference	1. Aives, Phillippe (1962). Centuries of Childhood: A Sociology of Family Life, Knops, New York. 2. Ambron, S.R. (1981). Child Development, Holt Rinehart & Winston, New York. 3. Atkinson, Richard C. et.al. (1983). Introduction to Psychology. Harcourt Brace Johanovich Inc. New York,.

	4. Barry and Johnson (1964). Classroom Group Behavior, Macmillan New York. 5. Bhargava, Mahesh (1994). Introduction to Exceptional Children, Sterling Publishers Pvt. Ltd. New Delhi. 6. Bourne, L.E. (1985): Psychology: Its Principles and Meaning Holt, Rinehart Land Winston, New York. 7. Christian, Jyoti (1984). Classroom Group Dynamic, Anu Books, Meerut. 8. DeCecco, John P. (1977). The Psychology of Learning and Instruction Prentice Hall of India Pvt. Ltd., New Delhi. 9. Gessel, A.L. & Allagh, F.H.(1946). The Child from Five to Ten, Harper & Brothers, New York. 10. Hurlock, E.B., (1964). Child Development, Mcgraw Hill Book Co. New York. 11. Klausmeier, Herbert, J. (1985). Educational Psychology. Harper and Row, New York. 12. Kochar, S.K. (1989). Guidance and Counselling in College and Universities, Sterling Publishers Pvt. Ltd., New Delhi. 13. Lindren, H.C. (1980). Educational Psychology in the Classroom (Sixth ed.). Oxford University Press, New York. 14. Mathur S.S. (1988). A Sociological Approach to Indian Education, Vinod Prakashan, Agra. 15. Pasricha, prem, (1976). Guidance and Counselling in India Education NCERT, New Delhi. 16. Smith Ronald E. Sarason, I.G. and Sarason, Barbara R. (1982). Psychology: The Frontiers of Behaviour. Harper and Row Pub. New York. 17. Shrivastava, G.N.P. (1986). Recent Trends in Personality study. Agra Psychological Research Cell, Balangunj, Agra. 18. Shrivastava, G.N.P. (1999). Shiksha Manovigyan, Naveen Vikkchardharayen Concept Publishing Company, New Delhi.

Course Name : Assessment for Learning – II

Credits: 2

Course Code: AC-8

Objects :	Assessment (and evaluation) is integral to school education and more specifically to teaching-learning. Since education in schools presupposes certain aims and objectives, it is crucial for teachers to be aware of how the progress and growth of students is to be assessed. This in turn implies that teachers become cognizant of what dimensions of growth or learning are to be assessed, what means are available to them for this purpose, and what effects are likely to flow from various kinds of assessment. This Course – as its title suggests - proposes that student-teachers become conscious of the distinction between assessment for learning and assessment of learning. Whereas both have their place in school education, a constructivist paradigm indicates a shift in emphasis towards the former. The course intends to enlarge current perspectives on assessment and evaluation, and

	enable student-teachers to view student learning along multiple dimensions. It brings a specific focus on assessment of subject-based learning, as well as processes of feedback and reporting, which are among the core competencies needed by teachers. A critical review of the examination system and the assessment practices that derive from this is also felt to be a necessary component of the course; so that student-teachers may learn to evolve more flexible and richer forms of assessment, even as they respond to current examination practices. The Course will thus enable student-teachers to: ▪ Gain a critical understanding of issues in assessment and evaluation (from a constructivist paradigm) ▪ Become cognizant of key concepts such as formative and summative assessment, evaluation and measurement, test, examination ▪ Be exposed to different kinds and forms of assessment that aid student learning ▪ Become the use of a wide range of assessment tools, and learn to select and construct these appropriately ▪ Evolve realistic, comprehensive and dynamic assessment procedures that are able to keep the whole student in view.
Syllabus	Unit 6: Examinations system: A sociological and psychological analysis of the related issues ▪ Examination for gradation ▪ Examination for social selection and placement ▪ Impact of the prevailing examination system on student learning and stakeholders ▪ Entrance tests and their influence on students and school system Unit 7 : School-based assessment and evaluation: policies, practices and possibilities ▪ Impact of examination-driven schooling: • On Pedagogy: content-confined, information focused testing; memory-centric teaching and testing • On School culture ▪ De-linking school-based assessment from examinations: some possibilities and alternate practices **Unit 8: Examination Reform Efforts** Examination reform efforts in India based on: ➢ Secondary Education Commission (1952-53) ➢ Kothari Commission (1964-66) ➢ National Policy on Education (1986) and Programme of Action (1992) ➢ National Curriculum Frameworks developed for school education ➢ National Focus Group Position Paper on Examination Reform (Discussion should cover analysis of recommendations, implementations and the emerging concerns) **Unit 9: Directions for examination reform** ▪ Introducing flexibility in examination-taking requirements ▪ Improving quality and range of questions in exam papers

	▪ Including school-based credits ▪ Alternative modes of certification ▪ Examination Management ▪ Role of ICT in Examination Modes of Learning Engagement Some suggested modes of learning are: • Lecture-cum-discussion • Readings and presentations • Group discussions • Analysis of a range of assessment tools • Developing worksheets and other tasks for learning and assessment in one's specific subject area • Maintaining a portfolio related to the course-work and devising rubrics for assessment • Constructing a test or an examination paper in one's subject area; critical review of these • Observing, interviewing and writing comprehensive profile of a student • Simulated exercises in 'marking' and giving feedback to fellow student-teachers (on a written task); critical review of feedback • Simulated exercise in marking an examination paper in one's subject area; critical review of marking Modes of Assessment Suggested modes of assessment are: • Quality of participation in discussion • Quality of presentation • Rating of tasks taken up • Rating of critical analysis of assessment tools • Quality of assessment tools constructed • Portfolio assessment according to the rubrics • Written test • Year-end examination by University
Reference	• Baker, B, Costa, A., & Shalit, S. (1997). The norms of collaboration: Attaining communication competence. In A. Costa & R. Liebmann (Eds.), The process-centered school: Sustaining a renaissance community (pp. 119-142). Thousand Oaks, CA: Corwin. • Black, P., Harrison, C., Lee, C., Marshall, B, & William, D. (2004). Working inside the black box: Assessment for learning in the classroom. Phi Delta Kappan, 86 (1), 8- 21. • Bransford, J., Brown, A.L., & Cocking, R.R. (Eds.). (2000). How people learn: Brain, mind, experience, and school. Washington, DC: National Academy Press. • Burke, K. (2005). How to assess authentic learning (4th Ed.). Thousand Oaks, CA: Corwin. Burke, K., Fogarty, R., & Belgrad, S (2002). The portfolio connection: Student work linked to standards (2nd Ed.) Thousand Oaks, CA: Corwin. • Carr, J.F., & Harris, D.E. (2001). Succeeding with standards: Linking curriculum, assessment, and action planning. Alexandria, VA: Association for Supervision and Curriculum Development. • Danielson, C. (2002). Enhancing student achievement: A framework for school improvement. Alexandria, VA: Association for Supervision and Curriculum

	Development. • Gentile, J.R. & Lalley, J.P. (2003). Standards and mastery learning: Aligning teaching and assessment so all children can learn. Thousand Oaks, CA: Corwin. • Guskey, T.R., & Bailey, J.M. (2001). Developing grading and reporting systems for student learning. Thousand Oaks, CA. Corwin. • NCERT(1985). Curriculum and Evaluation, New Delhi:NCERT • Norris N.(1990) Understanding Educational Evaluation, Kogan Page Ltd. • Natrajan V.and Kulshreshta SP(1983). Assessing non-Scholastic Aspect Learners Behaviour, New Dlehi: Association of Indian Universities. • Newman, F.M. (1996). Authentic achievement: Restructuring schools for intellectual quality. San Francisco, CA: Jossey-Bass. • Nitko, A.J. (2001). Educational assessment of students (3rd ed.). Upper Saddle River, NJ: Prentice Hall. • Singh H.S.(1974) Modern Educational Testing. New Delhi: Sterling Publication • Thorndike RL and Hagen (1977). Measurement and Evaluation in Psychology ar Education.

Course Name : use of ICT for Effective Learning

Credits: 2

Course Code: AC-7

Objects	
Syllabus	
Reference	

Course Name : Environment Education & Disaster Management

Credits: 2

Course Code: AC-9

Objects :	(i) To provide an understanding to the students about basic aspects of the environment and its concerns. (ii) To generate awareness about the social issues of the environment. (iii) To enable the students to analyse, evaluate and draw inferences about problems and concerns related to environment. (iv) To create awareness about the legal framework for protection of environment and wild life.
Syllabus	Unit I The multidisciplinary nature of Environmental Studies: Definition, Scope and importance: Need for Public awareness. Natural resources: Renewable and Non-renewable resources and associated problems Forest resources: Use and over exploitation, deforestation, case studies, Timber extraction, mining, dams and their effects on forests and tribal people.

	Unit II Water resources: Use and over utilization of surface and ground water, floods, Drought, conflicts over water resources; dams – benefits and problems. Minerals resources: Use and over exploitation, Environmental effects of extracting and using mineral resources, case studies. Unit III Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agricultural techniques fertilizer and pesticide problems, water logging and salinity; case studies. Energy resources: growing energy needs renewable and non-renewable energy resources and use of alternative energy sources – case studies. Land resources: Land as resource, land degradation, man induced landslides. Soil erosion and desertification Role of an individual in conservation of natural resources Equitable use of resources for sustainable life-styles Unit IV Social issues and environment: From unsustainable to sustainable development Urban problems related to energy, water conservation, rain water harvesting, Watershed management. Resettlement and Rehabilitation of people: Its problems and concerns, case studies. Environmental ethics: Issues and possible solutions, case studies. Wasteland reclamation, consumerism and waste products Unit V: Environmental Acts: Environmental Protection Act. Air (prevention and control of Pollution Act) Water (prevention and control of pollution Act.) Wild life protection Act Forest conservation Act Issues involved in enforcement of environmental legislation Public awareness Human rights. Value education, HIV/AIDS. Women and Child welfare Role of Information Technology in environment and human health – case studies.
Reference	1. Asthana D.K. and Asthana Meera. 2006 A Textbook of Environmental Studies. S.Chand & Co. New Delhi. 2. Purohit, S.S. and Ranjan, R. 2005 Ecology, Environment and Pollution, Agrobios, Jodhpur. 3. Alma Peter 1993 Environmental Concern, Cambridge University Press. 4. Chadha S.K. 1992 Environmental Crisis in India. International Book Distributors Dehradun. 5. Saveland R.N. 1976. Handbook of Environmental Education. John Wiley &

	Sons, London. 6. Wright, Richard T and Nebel, Bernard J. 2002 Environmental Science: Towards Sustainable future, Prentice Hall, New Delhi. 7. Abbasi, S.A. 1998: Environmental Everyone Discovery Publishing House, New Delhi. 8. Saxena,A.B. and Anand, V.V. 008 : Essentials of Environmental Education, H.P. Bhargava Book House, Agra. 9. Saxena A.B. 1969: Education for Environmental Concerns. Radha Publications New Delhi. 10. Bharucha, E. 2005: Textbook of Environmental Studies. Universities Press. New Delhi 11. Sodhi G.S. 2005: Fundamental Concepts of Environmental Chemistry Narona Publishing House, New Delhi. 12. Chapman, J.L. & Reiss, M.J. 2004. Ecology Principles and Applications, Cambridge University Press.

Course Name: Learning Psychology

Credits: 2

Course Code: AC- 6

Objects	
Syllabus	
Reference	

Semester -V

Course Name: Elective I – Physics V/Computer Science V

Credits: 5(Theory 3+2 Practical)

Course code: SS-1

Elective I – Physics Theory V

Objectives:	After completion of this course, the students will be able to 1. Understand the phenomenon of relativity, 2. Discriminate between Galilean and special theory of relativity. 3. Explain the concept of photoelectric effect. 4. Understand the Heisenberg uncertainty principle. 5. Apply Schrodinger's equation for solving problems of harmonic oscillator and hydrogen atom. 6. Understand the importance of relativity in electrodynamics.
Syllabus :	Unit-1 Relativity Reference systems, inertial frames, Galilean invariance and conservation laws, propagation of light, Michelson-Morley experiment; search for ether. Minkowski diagram, postulates for the special theory of relativity; Lorentz transformation, length contraction, time dilation, velocity addition theorem, variation of mass with velocity, mass-energy equivalence, particle with zero rest mass; space-time diagram, four dimensional momentum vector; invariance of laws of physics Unit-2 Quantum Theory Origin of the quantum theory: Failure of classical physics to explain the phenomena such as blackbody spectrum, Wien displacement law, and Rayleigh -Jeans law; Ritz combination principle in spectra, stability of an atom. Plank's radiation law; photoelectric effect; Einstein's explanation of photoelectric effect, Bohr's quantization of angular momentum and its applications of hydrogen atom, limitations of Bohr's theory, Planck temperature and Planck energy. Radiation pressure Unit-3 Quantum Mechanics: Wave particle duality and uncertainty principle: de Broglie's hypothesis for matter waves; the concept of matter waves and group velocities, evidence for diffraction and interference of 'particles', experimental demonstration of matter waves; consequence of de Broglie's concepts; quantisation in hydrogen atom; energies of a particle in a box, wave packets, Heisenberg's uncertainty relation for p and x, its extension to energy and time. Consequence of the uncertainty relation: gamma ray microscope, diffraction at a slit and particle in a box, position of electron in a Bohr orbit. Unit-4 Schrodinger's equation: Schrodinger's equation, postulatory basis of quantum mechanics; operators, expectation values, transition probabilities, applications to particle in one and three –dimensional boxes; harmonic oscillator, rigid

	rotator; reflection at a step potential, transmission across a potential barrier, hydrogen atom. Unit-5 Relativistic Electrodynamics, Wave Guides and Antennas Magnetism as relativistic phenomenon, relativistic transformation of fields, field tensor, electrodynamics in tensor notation, relativistic potentials, Basic concepts of, transmission lines wave-guides and antennas; microwaves and their applications
Reference:	1. Griffiths, D.J., Introduction to Electrodynamics, Pearson Education Pvt. Ltd., New-Delhi. 2. Gupta, S.L. and Kumar, V., Electrodynamics, Pragati Prakashan, Meerut. 3. Goyal, R.P., Unified Physics, Shivlal Agrawal and Sons, Indore. 4. Resnik, R., Introduction to Special Relativity, John Wiley & sons, Newyork.

Physic Practical V

Objectives:	
Syllabus :	Relativity and Quantum mechanics 1. Plank's constant determination 2. e/m experiments 3. Millikan's experiment 4. Rydberg's constant – Hydrogen spectra 5. Rydberg's constant – Solar spectrum 6. Some more spectrometer experiments 7. LASER experiments 8. Babinet compensator ,Brewester's law , Polarimeter , Biprism ,Nodal slide , Resonance tube
Reference:	1) Latest version of the books may be preferred 2) Feynman,P., Lighto 3) n,R.B. and sands, M., The Feynman Lectures on Physics Vol 4) I,II,III, Narosa Publishing House, New-Delhi. Khandelwal, D.P., Oscillations and Waves, Himalaya Publishing House, Bombay. 5) Unified Physics , Shivlal Agrawal and Yugbodh Prakashan 6) Pugh, E.M. and Pugh, E.W., Principles of Electricity and Magnetism, Adison-Welsely, London. 7) Purcell, E.M., Electricity and Magnetism, Berkeley Physics Course, McGraw-Hill 8) Co., Bombay. 9) Haung, K., Statistical Physics, Wiley Eastern Ltd., New-Delhi. 10) Jenkins, F.M. and White, H.E.;Fundamentals of Optics, McGraw-Hill, Bombay. 11) Smith, F.R.S. and Thomson, J.H., Optics; John Wiley and sons, London.

	12) Main, I.G.; Vibrations and Waves, Cambridge University Press. 13) Sadiku, M.N.O., Elements of Electromagnetism, Oxford University Press 14) Halliday, D. and Resnik, R., Physics, Wiley Eastern, London. 15) Jordan, E.C.; Electromagnetic Waves and Radiating Systems, Prentice-Hall of India 16) Patel, Y.I., Verma, L.R.; Yugbodh Physics, Yugbodh Prakashan , Raipur. 17) Bapat, M.N., DS Mathur's Heat and Thermodynamics; Sultan Chand and Sons, 18) New Delhi 19) Rajam, J.B., Atomic Physics; S Chand & Co., New Delhi.

Elective I-Computer Science V

Objectives:	
Syllabus :	
Reference:	

Course Name: Elective II –Chemistry V/ Informatic Practices V

Credits: 5(Theory 3+2 Practical)

Credit: SS-2

Elective II –Chemistry Theory V

Objectives:	After completing V semester the students should be able to: (i) understand the interaction between uv and visible radiations with organic compounds and its consequences in elucidation of the structure of organic compounds. (ii) investigate the factors responsible to cause shift in the absorption maxima. (iii) appreciate to learn the applications of IR spectroscopy in detecting some common functional groups during structural elucidation. (iv) acquire the knowledge of methods of preparation and properties of monohydric, dihydric and trihydric alcohols and visualize the role of structure on the properties of these compounds. (v) acquire mastery to differentiate the chemistry of phenols from alcohols. (vi) appreciate the role of carbonyl group in determining the chemistry of aldehydes and ketones.

	(vii) acquire the knowledge of methods of preparation and chemical reactions shown by carboxylic acids. (viii) appreciate to learn the technique of conversion of carboxylic acids into its useful derivatives. (ix) differentiate open chain ethers and cyclic ethers with respect to their chemical reactions. (x) Get comprehensive knowledge about the chemistry of nitrogen containing organic compounds and their industrial and domestic applications particularly keeping in focus the preparations of dyes and drugs. Instructional Strategy: In dealing with the topic of interaction of radiations (uv, visible, IR) with matters (the carbon compounds here) the teachers should encourage the use of constructivist approach by promoting open-ended and problem solving techniques in order to enhance the thinking capacity amongst the students. Visits to some advanced laboratories in the near-by areas should be encouraged to give acquaintance to the students of the use of instrumental techniques in the elucidation of the structures of the organic compounds. The entire descriptive organic chemistry be dealt with in the light of structural parameters associated with compounds. In transaction of the reaction mechanisms the use of logistic approach and advance organizer model may be made. Seminars and posters sessions may be encouraged to discuss industrial application of organic compounds such as alcohols, phenols, esters, dyes and drugs.
Syllabus :	Unit – I Electromagnetic Spectrum : Absorption Spectra Ultraviolet (UV) absorption spectroscopy – absorption laws, (Beer-Lambert law), molar absorptivity, presentation and analysis of UV 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. Infrared (IR) absorption spectroscopy – molecular vibrations, Hooke's law, selection rules, intensity and position of IR bands, measurement of IR spectrum, fingerprint region, characteristic absorptions of various functional groups and interpretation of IR spectra of simple organic compounds. Unit – II

Alcohols

Classification and nomenclature. Monohydric alcohols – nomenclature, methods of formation of reduction of aldehydes, ketones, carboxylic acids and esters. Hydrogen bonding. Acidic nature, Reactions of alcohols.

Dihydric alcohols – nomenclature, methods of formation, chemical reactions of vicinal glycols, oxidative cleavage [Pb (OAc)4 and HIO4] and pinacol-pinacol one rearrangement. Tihydric alcohols – nomenclature and methods of formation, chemical reactions of glycerol.

Phenols

Nomenclature, structure and bonding, Preparation of phenols, physical properties and acidic character. Comparative acidic strengths of alcohols and phenols, resonance stabilization of phenoxide ion. Reactions of phenols-electrophillic aromatic substitution, acylation and carboxylation. Mechanisms of Fries rearrangement, Claisen rearrangement, Gatterman synthesis, Hauben-Hoesch reaction, Lederer-Manasse reaction and Reimer-Tiemann reaction.

Unit – III

Aldehydes and Ketones

Nomenclature and structure of the carbonyl group. Synthesis of aldehydes and ketones with particular reference to the synthesis of aldehydes from acid chlorides, synthesis of aldehydes and ketone using 1, 3-dithianes, synthesis of ketones from nitriles and from carboxylic acids. Physical properties. Mechanism of nucleophilc additions to carbonyl group with particular emphasis on benzoin, aldol, Perkin and Knoevenagel condensations. Condensation with ammonia and its derivatives. Witting reaction. Mannich reaction.

Use of acetals as protecting group. Oxidation of aldehydes, Baeyer-Villiger oxidation of ketones. Cannizzaro reaction. MPV, Clemmensen, Wolff Kishner, LiAlH4 and NaBH4 reductions. Halogenation of enolizable ketones. An introduction to □, □ unsaturated aldehydes and ketones.

Unit – IV

Carboxylic Acids

Nomenclature, structure and bonding, physical properties, acidity of carboxylic acids, effects of substituents on acid strength. Preparation of carboxylic acids. Reactions of carboxylic acids. Hell-Volhard-Zelinsky reaction. Synthesis of acid chlorides, esters and amides. Reduction of carboxylic acids. Mechanism of decarboxylation. Methods of formation and chemical reactions of halo acids, hydroxyl acids malic, tartaric and citric acids. Methods of formation and chemical reactions of unsaturated

	monocarboxylic acids. Dicarboxylic acids; methods of formation and effect of heat and dehydrating agents. Carboxylic Acid Derivatives Structure and nomenclature of acid chlorides, Esters, amides (urea) and acid anhydrides. Relative stability of acyl derivatives. Physical Properties, interconversion of acid derivatives by nucleophilic acyl substitution. Preparation of carboxylic acid derivatives, chemical reactions, mechanisms of esterification and hydrolysis (acidic and basic) Ethers and Epoxides Nomenclature of ethers and methods of their formation, physical properties. Chemical reactions- cleavage and autoxidation, Ziesel's method. Synthesis of epoxides. Acid and base-catalyzed ring opening of epoxides, orientation of epoxide ring opening, reactions of Girgnard and organolithium reagents with epoxides. Unit V Organic Compounds of Nitrogen Preparation of nitroalkanes and nitroarenes. Chemical reactions of nitroalkanes. Mechanisms of nucleophilic substitution in nitroarenes and their reductions in acidic, neutral and alkaline media. Picric acid. Halonitroa trenes: reactivity, structure and nomenclature of amines, physical properties. Stereochemistry of amines. Separation of mixture of primary, secondary and tertiary amines. Structural features effecting basicity of amines. Amine salts as phase-transfer catalysts. Preparation of alkyl and aryl amines (reduction of nitro compounds, nitriles), reductive amination of aldehydic and ketonic compounds. Gabriel-Phthalamide reaction, Hoffmann bromamide reaction. Reactions of amines, electrophilic aromatic substitution in aryl amines, reactions of amines with nitrous acid. Synthetic transformations of aryl diazonium salts, azo coupling.
Reference:	1. Bahl,Arun and Bahl B.S.,A Textbook of organic chemistry, S. Chand & Co. Ltd., New Delhi 2. Finar,I.L., Organic Chemistry, Vol. I., ELBS Ltd. 3. Hart Craine Hart, Organic Chemistry, S. Chand Co Ltd. 4. Morrison, R.T., & Boyd,R.N., Organic Chemistry, PHI Ltd. 5. Chatwal, G.R., &. Anand, S.K., Spectroscopy, HPH Ltd. 6. Sharma, Y.R., Elementary Organic Spectroscopy, S. Chand Co. Ltd. 7. Marry,J.Mc., Organic Chemistry, Brooks/Cole

Chemistry Practical V

Objectives:	

Syllabus :	Double stage preparation of two organic compounds from the list given below. (a) Aniline to acetanilide and then to p-bromo acetanilide. (b) Aniline to acetanilide and then to p-nitro acetanilide. (c) Benzoic acid to Benzoyl chloride p then to Benzamide. (d) Benzoyl choloride to Benzamide and then to benzoic acid. 2. Chromatography (A) Thin Layer Chromatography Determination of Rf values and identification of organic compounds. a. Separation of green leaf pigments (spinach leaves may by used) b. Preparation and separation of 2, 4-dinitrophenyl hydrazones of acetone, butanone, hexan-2 and 3-one using toluene and light petroleum (40:60). c. Separation of a mixture of dyes using cyclohexane and ethyl acetate (8.5:1.5). (B) Paper chromatography: Ascending and circular Determination of Rf values and identification of organic compounds. a. Separation of mixture of phenylalanine and glycine. Alanine and aspartic acid. Leucine and glutamic acid. Spray reagent ninhydrin. b. Separation of a mixture of D, L-alamine glycine, and L – Leucine using n-butanol: acetic acid: water (4:5:1). Spray reagent-aniline hydrogen phthalate.
Reference:	1. Vogel, Qualitative Inorganic Analysis, Svehla Orient Longman 2. Barsett, J., Denney, R.C., Jeffery, G.H. and. Mendham J., Vogel, Textbook of Qualitative Inorganic Analysis (revised). , ELBS. 3. Clarke, H.D., A Handbook of Organic Analysis. 4. Shrivastav, S.N. and Tondon, M.M.N., A Textbook of Practical Chemistry vol. I and II. Agra. 5. Agarwal, O.P., Advanced Practical Organic Chemistry, Goel Publishing House, Meerut. 6. Barsett, J.,Denney R.C., Jeffery, G.A. and Mendehn J., Vogel, Textbook of Quantitative Inorganic Analysis, ELBS 7. Laboratory Manual in Organic Chemistry

	8. Palit, S.R..,Dey, S.K., Practial Physical Chemistry. 9. Yadav, J.B., Advanced Practical Physical Chemistry, Goel Publishing House, Meerut. 10. Nadkarny, V.V., Kothare, A.N., Lawande, Y.V., Practical Physical Chemistry, Popular Prakashan , Bombay. 11. Palmes, W.G., Experimental Inorganic Chemistry, Cambridge 12. Bansal, R.K ., Laboratory Manual in Organic Chemistry ,Wiely Foaster Pvt. Ltd. 13. Singh, P.R ., Gupta, D.S. and Bajpai, K.S., Experimental Organic Chemistry, Vol. I & II., Tata Mc Graw Hill. 14. Vogel.,Text Book of Practical Organic Chemistry, ELBS 15. Vogel, A.I., Textbook of Quantitative Inorganic Analysis 16. Shoemaker and Garland, Experiments in Physical Chemistry 17. Daniels and Alberty et.al., Experimental Physical Chemistry

Elective II- Informatic Practices V

Objectives:	
Syllabus :	
Reference:	

Course Name: Elective III- Botany V/Zoology V/Mathematics V

Credits: 5 (Theory 3+2 Practical)

Course code: SS-3

Botany Theory V

Objectives:	1. To provide an understanding of origin, evolution and taxonomy of Angiosperms. 2. To familiarize the student, teachers with different types of locally available plants of some families.
Syllabus :	Unit I Angiosperms : Terminology for the description of vegetative parts and their modifications – root, stem, leaf and floral parts, types of fruits, ovules and seeds in semi-technical language. Unit II Angiosperm taxonomy : Brief history, aims and fundamental components (£, β & γ) taxonomy keys for identification,

	Botanical nomenclature-principles and rules; taxonomic hierarchy; type concept; principle of priority. Unit III Classification of angiosperms : Salient features of the systems proposed by Bentham and Hooker and Engler and Prantl. Major contributions of cytology, phytochemistry and taximetrics to taxonomy. Unit IV Diversity of flowering plants : Study of the following families with representative examples. Ranunculaceae, Brassicaceae, Malvaceeae, Rutaceae, Fabaceae, Apiaceae, Acanthaceae. Unit V Diversity of flowering plants : Study of the following families with representative examples. Apocynaceae, Asclepiadaceae, Solanaceae, Lamiaceae, Chenopodiaceae, Euphorbiaceae, Liliaceae and poaceae.
Reference:	Gifford, E.M. and Foster, A.S., 1988. Morphology and Evolution of Vascular plants, W.H. Freeman & Co., New York Heyood, V.H. and Moore D.M. (eds), 1984. Current concepts in Plant Taxonomy, Academic Press, London Jeffrey C.,1982 An Introduction to Plant Taxonomy, Cambridge University Press Cambridge, London Singh, G., 1999, Plant Systematic, Theory and Practice, Oxford and IBH Pvt. Ltd., New Delhi Jones, S.B. Jr. and Luchsinger, A.E., (1986), Plant systematic McGraw Hill Book Co., New York Shukla, P and Misra, S., An Introduction to Taxonomy of Angiosperm, Vikas Publishing House, New Delhi Bhattacharya, B. 2005, Systematic Botany. Narosa Publishing House, New Delhi

Botany Practical V

Objective:	• To familiarize the students with technical terms and methods of describing the plant. • To impart the skills for identification of plant and assigning to its family. • To provide the field experiences for familiarization of different plants of the families given in the syllabus
Syllabus:	Angiosperms

	Classification and description in semi-technical language of at least one plant from each family. 1. Ranunculaceae : Ranunculus, Delphinium 2. Brassicaceae : Brassica, Alyssum, Iberis, Coronopus 3. Malvaceae : Hibiscus, Abutilon 4. Rutaceae : Murraya, Citrus 5. Fabaceae : Faboideae : Lathyrus, Cajanus, Melilotus Trigonella Casesalpinoideae : Cassia, Caesalpinia Mimosoideae : I Mimosa, Acacia 6. Apiaceae : Coriandrum, Foeniculum, Anethum 7. Acanthaceae : Adhatoda, Peristrophe 8. Apocynaceae : Vinca, Thevetia, Nerium 9. Ascleppiadaceae : Calotropis 10. Solanaceae : Solanum, Withania, Datura 11. Euphorbiaceae: Euphorbia, Phyllanthus 12. Lamiaceae : Ocium, Salvia 13. Chenopodiaceae : Chenopodium, Beta 14. Liliaceae : Asphodelus, Asparagus Poaceae
Reference:	1. Gifford, E.M. and Foster, A.S., 1988. Morphology and Evolution of Vascular plants, W.H. Freeman & Co., New York 2. Heyood, V.H. and Moore D.M. (eds), 1984. Current concepts in Plant Taxonomy, Academic Press, London 3. Jeffrey C.,1982 An Introduction to Plant Taxonomy, Cambridge University Press Cambridge, London 4. Singh, G., 1999, Plant Systematic, Theory and Practice, Oxford and IBH Pvt. Ltd., New Delhi 5. Jones, S.B. Jr. and Luchsinger, A.E., (1986), Plant systematic McGraw Hill Book Co., New York 6. Shukla, P and Misra, S., An Introduction to Taxonomy of Angiosperm, Vikas Publishing House, New Delhi 7. Bhattacharya, B. 2005, Systematic Botany. Narosa Publishing House, New Delhi

Zoology V

Objectives:	Students will be able to know about structure and function of cell and cell organelles with molecular basis of life and mechanisms involved in the regulation of genetic phenomena.
Syllabus :	Unit I (a) Difference between prokaryotic and Eukaryotic cell along with their structures. (b) Cell Membrane – Unit membrane concept, structure and transport of Molecules (active and passive transport). (c) Ultra structure and function of cell organells (Endoplasmic Reticulum., Mitochondria Golgibody, Ribosomes, Lysosomes, Nucleus, Nucleolus.) Unit II : (a) Structure of DNA.,(b) Structure and types of RNA, (c) DNA Replication, (d) Transcription, (e) Protein synthesis, (f) DNA repair. Unit III: (a) Structure of chromosome.(b) Gene concept, (c) Gene expression and its regulation, (d) gene clone. Unit IV (a) Brief account of DNA Recombinant Technology. (b) Genetic Engineering and its application on Tissue culture, (c) Stem cells and its application, (d) Gene therapy, (e) Clones. Unit V: Genetics (a) Sex chromosomes and sex determination. (b) Sex linked inheritance. (c) Mutation, (d) Giant Chromosomes, (e) Gene Mapping, (f) Human Genomes.(g) Human genetic disorders.
Reference:	1. B.D. Singh : Fundamental Genetics 2. C.D. Darlington : Cytology 3. De Roberties: Cell Biology; B-I Waverly Pvt. Ltd., New Delhi **4. Dalela R.C. and Verma, B.R.: Textbook of genetics.** **5. Dalela R.C. and S.R. Verma :A textbook of cytology; (Jaiprakashnath & Co. Meerut)** **6. Glese: Cell Physiology** **7. Gardener, E.L. and Snustand D.P: Principles of Genetics** **8. Irwin H. Herskowitz : Principles of Genetics; (Little Brown & Co Boston)** **9. J.D. Burke : Cell Biology; (Scientific Book Agency Calcutta)** **10. P.K. Gupta : Genetics** **11. R.D. Dyson : Cell Biology. A molecules approach ;(Allyn & Baron, Boston)** **12. Khanna, S.S: Genetics, Heredit and Evolution; Central Book depot, Allahabad** **13. Power, C.B: Cell Biology** **14. Rastogi, Veer bala: A manual for practical invertebrate Zoology and cytology; Kedarnnath, Ram Nath, Meerut.** 15. Strickberger: Genetics 16. Swanson: The cell, Prentice Hall 17. Stan's Field: Genetics (Mc Graw hills) 18. Sambamurty : Genetics ;Naro 89 Publishing

	19. Sig Singleton : Elementary Genetics 20. Veer Bala Rastogi: Koshika Vigyan; Kedarnath, Ramnath Pub., Meerut. **21. Veer Bala Rastogi: A Text Book of Genetics** 22.Winchester, A.M: Genetics & Principles of Heredity

Mathematics V

Objectives:	• To enable the pupil teacher to: • Understand and appreciate the uses and significance of mathematics in life. • Learn successfully, various approaches of teaching mathematics and to use them judiciously. • Know the methods of planning instruction for the classroom • Construct test items in mathematics. • Appreciate and organize activities to develop aesthetic sense of mathematics. • Obtain feedback both about teaching as well as students learning • Use the tools of ICT for affective transaction of Mathematics Teaching.
Syllabus :	Unit – I Nature of Mathematics • The growth and development of mathematics. • The abstract nature of mathematics • The significance of mathematics • The two kinds of mathematicians viz., Pure and Applied. • The views and thoughts of mathematicians about the nature, scope and significance of mathematics. • The inevitable role of mathematics in school curriculum • Historical evolution of certain mathematical concepts. Unit – 2 The Structure of Mathematics. • Axiomatic systems and their classical examples from geometry and algebra • Undefined terms in mathematics • Definitions in mathematics and defining properties (conditions) in a definition. • Types of proofs in mathematics: Direct proof and Proof by contradictions. Disproof in mathematics by counter examples. • Mathematical generalization, Mathematical conjectures and proof by mathematical induction. • Distinction between proof and verification • Paradoxes and Fallacies Unit 3: Approaches to constructing knowledge in Mathematics. • Intuitive learning • Learning by guided discovery strategies • Learning by expository strategies • Learning by searching patterns

	• Conjuncture making • Learning mathematics collaboratively in groups • Self learning strategies Unit 4: Pertinent Pedagogical Issues • Analysis of Mathematical content of school textbooks • Learning of Mathematics by gifted children • Learning of Mathematics by slow learners • Mathematical modeling as a unifying theme • Venn diagrams as a tool for teaching-learning of mathematics Unit 5: ICT in Mathematics Teaching • Windows Fundamentals: Creating, editing and managing files and folders, Windows explorer, My Computer, Opening and exploring external disc/floppy, CD writing and editing. • Use of the Mathematical softwares such as M.S. Equation editor, Math type, Matlab.
Reference:	• Mosley L.E. and Boody D.M.: Mastering M.S. Office • Tawney, D.A.: Learning through Computer • O'Shea T and John S: Learning and Teaching with Computer • Roy, G: Computer Applications • What is Mathematics? An elementary approach to ideas and methods. • Richard Courant & Herbert Robbins Oxford University Press • The Art of Mathematics – Jerry P. King – Plenum Press • Techniques of Problem Solving – Steven G. Krant, Universities Press • Culture, Excitement and Relevance of Mathematics –V. Krishnamurthy, Wiley Eastern Limited. • Instructional manual for Math type, • Instructional manual for Matlab.

Course Name: Curriculum and School Programs

Credits: 4

Course Code: CC-5

Objectives:	*	To understand the concept of curriculum
	*	To make distinction between curriculum and syllabus
	*	To appreciate the various determinants of curriculum
	*	To understand the process of curriculum making
	*	To understand the difference between measurement, assessment and evaluation

	* To appreciate perspectives in assessment * To acquaint with alternative assessment procedures * To gain knowledge about different tools and techniques of assessment * To acquaint and use elementary statistics to analyze and interpret data
Syllabus:	Unit I: Concept of Curriculum * Meaning and Nature of Curriculum * Distinction between Curriculum Framework, Curriculum and Syllabus * Facets of Curriculum: Core-Curriculum, Extra-Curriculum, Co-Curriculum, and Hidden Curriculum * Curriculum at different levels: National, State, and School Unit II: Curriculum: Determinants and Development * Determinants of curriculum: Socio-political, cultural, technical and economic * Process of Curriculum Making/Development: Formulating aims, Goals and objectives, Selecting content and learning experience, Prioritization and organization of content and learning experiences * Considerations in curriculum Practice: - Nature of learner and their socio-cultural context and learning process, - Stage relevance; Educational objectives for the stage. Unit III: Assessment and Evaluation * Meaning of assessment, evaluation, and measurement * Tools and Techniques of Assessment: Techniques: observation, self assessment, peer assessment, and interview Tools: check list, anecdotal records, and diary Tests: Meaning, types- Achievement & diagnostic; Norms Referenced Tests and Criterion Referenced Test. Unit IV: Type of Evaluation * Alternative Assessment/authentic assessment - Performance Assessment: Meaning, types and process - Portfolio: meaning, types and development - Rubrics: Meaning, types and development - Functional Assessment * Formative, summative, continuous and comprehensive evaluation * Grading: Meaning, methods and advantages Unit V: Elementary Statistics * Nature of data: grouped and ungrouped; Frequency Distribution * Measure of Central Tendency: Mean, Median and Mode

Reference:	1. Deway, John. The Child and the curriculum, Unvierisy of Chicago Press, Chcago. 2. (1997). My Pedagogic Creed, in D.J. Flinders and S.J. Thorton (eds). The Curriculum Studies Reader, Rontceoge, New York. 3. Kelley, A.B. (1996). The Curricular Theory and Practice. Harper and Row, US. 4. Kumar Krishna (1997). What is Worth Teaching, Orient Longman, New Delhi. 5. Nirantar (1997). Developing a Curriculum For Rural Women, Nirawtar, New Delhi.

Course Name: Pedagogy Course (Subject I): Science-I

Credits: 4

Course Code:

Objectives:	After completion of course the students will be able: 1. Gain insight on the meaning, nature, scope and objectives of science education. 2. Recognize the fact that every child possesses curiosity about his natural surroundings. 3. Realize that science is a dynamic body of knowledge. 4. Identify and relate every day experiences with learning science. 5. Practices various approaches of teaching-learning of science. 6. Employ various techniques of transaction of science. 7. Use effectively different activities/ demonstrations/ laboratory experiences for teaching-learning of science. 8. Facilitate development of scientific attitudes in learners. 9. Construct appropriate assessment tools for evaluating science learning.
Syllabus:	UNIT – I Nature of Science Learning experiences of science in context to life Objectives of science education, role of science in removing ignorance and superstition, bringing in socio-economic changes , aims and objectives of teaching science in relation to poverty, health, equity, peace, environment, gender. Science as a domain of enquiry Observation, process skills, steps in scientific method, developing scientific attitude.

	UNIT – II Science as a dynamic body of knowledge Historical and developmental perspective of science, major scientific achievements in the physical and biological sciences: Impact on society, and futuristic views. UNIT – III Content Specific Pedagogy I Pedagogy in Science Nature of scientific disciplines, constructivist approach in learning science at various levels of school education, science as a discourse of interdisciplinary learning, communication in science learning. Pedagogy specific to disciplines The theoretical basis of school science education: Thematic approach at elementary and secondary stages with subjects specific examples such as Food and Nutrition, Air, Energy, Water ; Natural resources, Habitat; interdisciplinary approach with specific examples from textbooks diffusing disciplinary boundaries (with specific examples like kinetic theory, atomic structure.) UNIT – IV Content specific pedagogy II Development of analytic ability Analysis of the organization of relationships between concepts, laws and theories in science, erroneous concepts of scientific knowledge and remedies: learner's preconception, sources of misconception, language and misconception, effective remedies, use of ICT in teaching- learning. UNIT – V Resource utilization Learning Resources Identification of learning resource from immediate environment, formal and non-formal channels, collection of material (school specific –rural/ urban, community), exploring alternative resources, handling hurdles in utilization of resources. Resources specific to the children with special need Alternative resources for physically challenged learners; ensuring partnership in classroom and other activities, socio –economic considerations; resources for talented minorities. Topics for Internal assessment (i) Activity/Laboratory experiences in learning Physics/ Chemistry Organizing activity based class room, use of instructional material (learner participation in developing them), use of laboratories, field experiences, ICT application. (ii) Curricular components Encouraging learner to non-formal channels such as debate/discussion project, exhibition, science and technology fair, children science congress, State and National Level Science Exhibition, nurturing creative talent at local level and exploring linkage with district/ state central agencies; community participation.
Reference:	

Course Name: Pedagogy Course (Subject II): Mathematics/Biology-I

Credits: 4

Course Code: PC-1

Mathematics

Objectives:	Aim of the Course After completion of course the students will be able to • gain insight on the meaning, nature, scope and objective of mathematics education • appreciate mathematics as a tool to engage the mind of every student. • appreciate mathematics to strengthen the student's resource. • appreciate the process of developing a concept. • appreciate the role of mathematics in day-to-day life. • learn important mathematics: Mathematics is more than formulas and mechanical procedures. • channelize, evaluate, explain and reconstruct their thinking. • see that mathematics as something to talk about, to communicate through, to discuss among themselves, to work together on. • pose and solve meaningful problems. • appreciate the importance of mathematics lab in learning mathematics. • construct appropriate assessment tools for evaluating mathematics learning.
Syllabus:	Unit- I **Nature of Mathematics** • Axiomatic Framework of Mathematics Axioms, Postulates, Undefined Terms, Defined Terms, Reasoning, Type of Reasoning, Proofs - Types of Proofs. • Learning Outcome in Mathematics Inculcation of specific attitudes like Problem solving, Logical thinking, Drawing inferences, Handling abstraction, Visualising etc. in learner's personality. Emphasis on use of mathematics in daily life situations. Role of mathematics in other subject areas – Interdisciplinary approaches **Unit-II** Problem posing / solving in Mathematics Problem posing: Problem posing skill contextualised to recognition of pattern, Extension of pattern, Formulisation of conjecture and generalisation through several illustrations drawn from learners immediate environment, Skill development of Process Questioning – that requires more than a simple factual response like yes or no only, can stimulate discussion of an idea, which lead to further exploration and use of oral language to explain and justify a thought. Problem solving: Understanding of Problem, Splitting the Problem in known and unknown parts, Symbolisation and mathematical formulation, Solving problem with multiplicity of approaches- Probing questions and concrete analogies can be used to initiate the exploration of alternative methods, Attitude build up of internal questioning – learn to ask

	themselves key questions before, during and after the solution process. **Unit-III** **Construction of concepts** Recall and consolidation of various concepts with varied examples and illustrations. Teaching of Arithmetic, Algebra, Co-ordinate Geometry, Geometry, Trigonometry, Mensuration, Statistics and Probability. Analysis of concepts coherently in graded way. Misconception and common errors Unit- IV Integration of mathematical content with activities through Mathematics Laboratory Identifying activity in several content areas conducive to the comprehension level of learner. Inculcating skills in Designing, Demonstrating, Interpreting and drawing inference of activities/concrete models.
Reference:	1. NCERT, National Curriculum Framework – 2005. 2. NCERT, Position Paper of NFG on Teaching of Science -2005. 3. NCERT, Position Paper of NFG on Habitat and Learning – 2005 4. NCERT Position Paper of NFG on Examination Reforms – 2005 5. NCERT, Position Paper of NFG on Aims of education – 2005. 6. NCERT, Position Paper of NFG on Education for Peace – 2005. 7. N. Vaidya, Science Teaching for 21st Century, Deep & Deep Publications (1999). 8. Dat Poly, Encyclopedia of Teaching Science, Sarup & Sons, New Delhi (2004) 9. Radha Mohan, Innovative Science Teaching for Physical Science Teachers, Prentice Hall of India Pvt Ltd., New Delhi (2002) 10. Sutton, CR and Hayson JH, The Art of the Science Teacher, Mc Graw Hill Book Company Ltd. (1974) 11. Their, DH, Teaching Elementary School Science : A Laboratory Approach, Sterling Publication Pvt. Ltd (1973) 12. Science Teach (NSTA's peer reviewed journal for secondary science teachers) 13. Journal of Research in Science Teaching (Wiley-Blackwell) 14. Misconceptions in chemistry, addressing perceptions in Chemical Education, Bake, Hans Dieter, A1 Yitbarek, Sileshi, Publication of Springer. 15. Turner Tony and Wendey Di Macro, Learning to Teach School Experience in secondary school teaching, Routledge, London and New York. 16. Taber K.S.: Chemical Misconceptions – Prevention, Diagnosis and cure volume 1 and 2, London 2002 (Royal Society of

	Chemistry)

Biology V

Objectives:	1. Gain insight on the meaning, nature, scope and objectives of science education. 2. Recognize the fact that every child possesses curiosity about his natural surroundings. 3. Realize that science is a dynamic body of knowledge. 4. Identify and relate every day experiences with learning science. 5. Practice various approaches of teaching-learning of science. 6. Employ various techniques of transaction of science. 7. Use effectively different activities/ demonstrations/ laboratory experiences for teaching- learning of science. 8. Facilitate development of scientific attitudes in learners. 9. Construct appropriate assessment tools for evaluating science learning.
Syllabus:	UNIT – I Nature of Science Learning experiences of science in context to life Objectives of science education, role of science in removing ignorance and superstition, bringing in socio-economic changes , aims and objectives of teaching science in relation to poverty, health, equity, peace, environment and gender. Science as a domain of enquiry Observation, process skills, steps in scientific method, developing scientific attitude. UNIT – II Science as a dynamic body of knowledge Historical and developmental perspective of science, major scientific achievements in the physical and biological sciences: Impact on society, and futuristic views. UNIT – III Content Specific Pedagogy I Pedagogy in Science Nature of scientific disciplines, constructivist approach in learning science at various levels of school education, science as a discourse of interdisciplinary learning, communication in science learning. Pedagogy specific to disciplines The theoretical basis of school science education: Thematic approach at elementary and secondary stages with subjects specific examples such as Food and Nutrition, Air, Energy, Water ; Natural resources, Habitat; interdisciplinary approach with specific examples from Text books diffusing disciplinary boundaries (with specific examples like biomolecules .) UNIT – IV Content specific pedagogy II Development of analytical ability

	Analysis of the organization of relationships between concepts, laws and theories in science, erroneous concepts of scientific knowledge and remedies: learner's preconception, sources of misconception, language and misconception, effective remedies, use of ICT in teaching-learning. UNIT – V Resource utilization Learning Resources Identification of learning resource from immediate environment, formal and non-formal channels, collection of material (school specific –rural/ urban, community), exploring alternative resources, handling hurdles in utilization of resources. Resources specific to the children with special needs Alternative resources for physically challenged learners; ensuring partnership in classroom and other activities, socio –economic considerations; resources for talented minorities.
Reference:	1. NCERT, National Curriculum Framework – 2005. 2. NCERT, Position Paper of NFG on Teaching of Science - 2005. 3. NCERT, Position Paper of NFG on Habitat and Learning – 2005 4. NCERT Position Paper of NFG on Examination Reforms – 2005 5. NCERT, Position Paper of NFG on Aims of education – 2005. 6. NCERT, Position Paper of NFG on Education for Peace – 2005. 7. N. Vaidya, Science Teaching for 21st Century, Deep & Deep Publications (1999).Dat Poly, Encyclopedia of Teaching Science, Sarup & Sons, New Delhi (2004) 8. Radha Mohan, Innovative Science Teaching for Physical Science Teachers, Prentice Hall of India Pvt Ltd., New Delhi (2002) 9. Sutton, CR and Hayson JH, The Art of the Science Teacher, Mc Graw Hill Book Company Ltd. (1974) 10. Their, DH, Teaching Elementary School Science : A Laboratory Approach, Sterling Publication Pvt. Ltd (1973) 11. Science Teacher (NSTA's peer reviewed journal for secondary science teachers) 12. Journal of Research in Science Teaching (Wiley-Blackwell) Turner Tony and Wendey Di Macro, Learning to Teach School Experience in secondary school teaching, Routledge, London and New York.

Course Name: Basic Action Research

Credits: 2

Course code: AC-10

Objectives:	
Syllabus:	
Reference:	

Course Name: Learning to Function as a Teacher – Core Training I

Credits: 4

Course code:TP-1

Objectives:	On the completion of Core-training the teacher-trainees will be able to: - develop core-teaching competencies, - develop insight in to the intricacies of teaching-learning process
Syllabus:	Core teaching competencies Textbook Analysis
Reference:	

Semester VI

Course Name: Physics VI/Computer Science VI

Credits: 5 (Theory 3+2 Practical

Course code: SS-1

Physics Theory VI

Objectives:	After the completion of the course the students will be able to: 1. Understand the spectra of hydrogen and the fine structure of spectral lines. 2. Understand Raman effect and its applications. 3. Understand various spectroscopic techniques. 4. Understand various efforts made by the Physicist to know about the constituents of the nucleus. 5. Understand nuclear forces and binding energy of nucleus. 6. Understand the use of nuclear accelerators and detectors. 7. Understand various types of elementary particles, forces of nature
Syllabus:	Unit-1 Atomic Physics Spectra of hydrogen and alkali atoms spectral terms, doublet fine structure, screening constants for alkali spectra for s,p,d and f states, selection rules.

	Singlet and triplet fine structure in alkaline earth spectra, L-S and J-J coupling. Fermi Golden rule. Unit-2 Molecular spectra Discrete set of electronic energies of molecules, quantisation of vibrational and rotational energies, determination of inter nuclear distance, pure rotational and rotational-vibrational spectra, dissociation limit for the ground and other electronic states, transition rules for pure vibration and electronic vibration spectra. Raman effect, Stokes and anti-Stokes lines, complementary character of Raman and infrared spectra, experimental arrangements for Raman spectroscopy, ideas about spectroscopic techniques. Unit-3 Nuclear detectors and accelerators Interaction of charged particles and neutrons with matters, working of nuclear detectors, GM counter, proportional counter and scintillation counter, cloud chamber, spark chamber, emulsions. Survey of particle accelerators; cyclotron; synchrocyclotron; betatron; bevatron. Unit-4 Structure of Nucleus Basic nuclear properties-size, binding energy, angular momentum, parity, magnetic moment. semi-empirical mass formula and applications; magnetic moment and non-central forces. Meson theory of nuclear forces. Salient features of nuclear forces; Shell model of the nucleus-success and limitations. Alpha decay Geiger-Nuttal law, Fermi's theory of Beta decay, violation of parity in beta decay; and continuous and discrete spectra; Gamma decay and internal conversion; elementary ideas about Mossbauer spectroscopy. Unit-5 Particle Physics and nuclear phenomena Classification of elementary particles, anti-particles, pions and muons, and their interactions; Conservation laws; Quark structure of hadrons. Field quanta of electro-weak and strong interactions; the W-Z particles; conservation laws; Q-value of nuclear reactions, nuclear fission and fusion, energy production in stars, nuclear reactors.
Reference:	Goyal, R.P., Unified Physics, Shiv lal Agarwal & Co., Indore. Freedman and Young, University Physics, Addison-Wesley Sharma, R.C., Nuclear Physics, K. Nath and Co., Meerut.

Physics Practical VI

Objectives:	
Syllabus:	Atomic Physics

	1. Zeeman effect 2. Absorption spectrum of iodine vapour. 3. Study of alkali or alkaline earth spectra using a concave grating / constant deviation prism. 4. Analysis of a given spectrum. 5. Rutherford scattering – Simulation 6. G.M counter experiments (Characteristic, Inverse square law, Absorption coefficient) 7. Radioactive decay – Simulation 8. G.M counter as a black box- (Disintegration data)
Reference:	1. Latest version of the books may be preferred 2. Feynman,P., Lighto 3. n,R.B. and sands, M., The Feynman Lectures on Physics Vol 4. I,II,III, Narosa Publishing House, New-Delhi. Khandelwal, D.P., Oscillations and Waves, Himalaya Publishing House, Bombay. 5. Unified Physics , Shivlal Agrawal and Yugbodh Prakashan 6. Pugh, E.M. and Pugh, E.W., Principles of Electricity and Magnetism, Adison-Welsely, London. 7. Purcell, E.M., Electricity and Magnetism, Berkeley Physics Course, McGraw-Hill 8. Co., Bombay. 9. Haung, K., Statistical Physics, Wiley Eastern Ltd., New-Delhi. 10. Jenkins, F.M. and White, H.E.;Fundamentals of Optics, McGraw-Hill, Bombay. 11. Smith, F.R.S. and Thomson, J.H., Optics; John Wiley and sons, London. 12. Main, I.G.; Vibrations and Waves, Cambridge University Press. 13. Sadiku, M.N.O., Elements of Electromagnetism, Oxford University Press 14. Halliday, D. and Resnik, R., Physics, Wiley Eastern, London. 15. Jordan, E.C.; Electromagnetic Waves and Radiating Systems, Prentice-Hall of India 16. Patel, Y.I., Verma, L.R.; Yugbodh Physics, Yugbodh Prakashan , Raipur. 17. Bapat, M.N., DS Mathur's Heat and Thermodynamics; Sultan Chand and Sons, 18. New Delhi 19. Rajam, J.B., Atomic Physics; S Chand & Co., New Delhi

Computer Science VI

Objectives:	
Syllabus:	
Reference:	

Course Name: Chemistry VI/ Information Practices VI

Credits: 5 (Theory 3+2 Practical

Course code: SS-2

Chemistry Theory VI

Objectives:	After completion of the course of VI semester, the students will be able to: (i) gain detailed knowledge about hard and soft acid and bases and appreciate the use of this concept in the learning of inorganic chemistry. (ii) learn silicones and phosphozenes as inorganic polymers and assess the significance of the loading parameters in them. (iii) get a comparative view of the valence bond theory and crystal field theory in explaining the behaviour of the complex species. (iv) enumerate the factors affecting the thermodynamic stability of the complex species. (v) give explanation about the magnetic and spectral behaviour exhibited by various complex species. (vi) appreciate the role of organometallic chemistry in the industry. (vii) assess the role of metals ions with special reference to alkali and alkaline earth metals in various biological processes. Instructional Strategy: In dealing with the Hard and Soft Acids and bases, the teacher may make use of Ausubel's advance organiser model. Use of ICT may be ensured in dealing with silicones and phosphozenes. Bonding in complexes, thermodynamic stability of complexes, magnetic and spectral properties associated with the complexes be dealt with keeping in focus the cognition needs of the learner through problems solving and intentionally arousing cognitive conflict. Organometallic chemistry may be transacted keeping in focus the structured parameters. Bio-inorganic chemistry may be learnt through posters sessions wheresoever posters can be prepared to highlight metabolic paths.
Syllabus:	UNIT – I (A) Hard and Soft Acids and Bases (HSAB) : Classification of acids and bases as hardand soft. Pearson's HSAB concept, acid-base strength and hardness and softness. Symbiosis, theoretical basis & hardness and softness, electronegativity and hardness and softness.

	(B) Silicones and Phosphazenes: Silicones and phosphazenes as examples of inorganic polymers, nature of bonding in triphosphazenes. UNIT – II (A) Metal-ligand Bonding inn Transition Metal Complexes: Limitations of Valence bond theory, an elementary idea of crystal-field, crystal field splitting in octahedral, tetrahedral and square planar complexes, factors affecting the crystal-field parameters. (B) Thermodynamic and Kinetic Aspects of Metal Complexes: A brief outline of thermodynamic stability of metal complexes and factors affecting the stability, substitution reactions of square planar complexes. UNIT – III (A) Magnetic Properties of Transition Metal Complexes: Types of magnetic behaviour, methods of determining magnetic susceptibility, spin-only formula. L-S coupling, correlation of □s (spin only) and □eff values, orbital contribution to magnetic moments, application of magnetic moment data for 3d-metal complexes. (B) Electron 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' and d'' states, discussion of the electronic spectrum of [Ti(H2O)6]3+ complexion. UNIT – IV Organometallic Chemistry : Definition, nomenclature and classification of organometallic compounds. Preparation, Properties, bonding and applications of alkyls and aryls of Li, Al, Hg, Sn and Ti, a brief account of metal-ethylenic complexes and homogeneous hydrogenation, mononuclear carbonyls and the nature of bonding in metal carbonyls. UNIT – V Bio-inorganic 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 Ca2+, Nitrogen fixation. Suggested Readings for Semester VI
Reference:	1. Cotton, F.A. , G. Wilkenson, G. and Gaus, P.L. , Basic Inorganic Chemistry; John Wiley and Sons, New York.

	2. Lee, J.D. , Concise Inorganic Chemistry ELBS 3. Sharpe, A.G., Inorganic Chemistry ,ELBS 4. Malik, Madan and Tuli; Modern Inorganic chemistry; S. Chand and Company Ltd. 5. Donglas, Bodie E., Concepts and Models of Inorganic chemistry 6. Malik, Madan and Tuli; Advanced Inorganic Chemistry S. Chand and Company Ltd. 7. Huheey, James E., Inorganic Chemistry 4th Ed - New Delhi: Peareon Education. 8. Manku, G.S., Theoretical principles of Inorganic Chemistry, Tata McGraw – Hill Publishing Company, New Delhi 9. Soni, P.L., Textbook in Inorganic chemistry (a modern approach) Sultan Chand and Sons, New Delhi:

Chemistry Practical VI

Objectives:	
Syllabus:	Gravimetric Analysis a. Analysis of Cu as CuCNS. b. Analysis of Ni as Nickel dimethylalyoxime. c. Analysis of Ba as BaSO4 2. Separation Techniques a. Separation of Mg(ווו) and Fe(ווו) by solvent extraction. b. Separation of Mg(ווו) and Zn(ווו) by ion exchange. 3. Synthesis and Analysis a. Preparation of sodium trioxalato ferrate(ווו) and determination of its composition by permangnatometry. b. Preparation of Copper(ווו) tetramine complex. c. Preparation of cis and trans bisoxalato diaqueo chromate(ווו) complex. 4. Colorimetery a. Job's Method b. Mole-ratio Method c. Determination of KMnO4 in given solution d. Determination of K2Cr2O7 in given solution.
Reference:	2. Vogel, Qualitative Inorganic Analysis, Svehla Orient Longman 2. Barsett, J., Denney, R.C., Jeffery, G.H. and. Mendham J., Vogel, Textbook of Qualitative Inorganic Analysis (revised). , ELBS. 3. Clarke, H.D., A Handbook of Organic Analysis. 4. Shrivastav, S.N. and Tondon, M.M.N., A Textbook of Practical Chemistry vol. I and II. Agra.

	6. Agarwal, O.P., Advanced Practical Organic Chemistry, Goel Publishing House, Meerut. 6. Barsett, J.,Denney R.C., Jeffery, G.A. and Mendehn J., Vogel, Textbook of Quantitative Inorganic Analysis, ELBS 7. Laboratory Manual in Organic Chemistry 8. Palit, S.R..,Dey, S.K., Practial Physical Chemistry. 9. Yadav, J.B., Advanced Practical Physical Chemistry, Goel Publishing House, Meerut. 10. Nadkarny, V.V., Kothare, A.N., Lawande, Y.V., Practical Physical Chemistry, Popular Prakashan , Bombay. 11. Palmes, W.G., Experimental Inorganic Chemistry, Cambridge 12. Bansal, R.K ., Laboratory Manual in Organic Chemistry ,Wiely Foaster Pvt. Ltd. 13. Singh, P.R ., Gupta, D.S. and Bajpai, K.S., Experimental Organic Chemistry, Vol. I & II., Tata Mc Graw Hill. 14. Vogel.,Text Book of Practical Organic Chemistry, ELBS 15. Vogel, A.I., Textbook of Quantitative Inorganic Analysis 16. Shoemaker and Garland, Experiments in Physical Chemistry 17. Daniels and Alberty et.al., Experimental Physical Chemistry

Information Practices VI

Objectives:	
Syllabus:	
Reference:	

Course Name: Botany VI/Zoology VI/Mathematics VI

Credits: 5 (Theory 3+2 Practical

Course code: SS-3

Botany VI

Objectives:	To impart the skills of handling and setting up of apparatus to conduct plant physiological experiment, collection of data and interpretation of results.
Syllabus:	

	Unit I Basics of enzymology : Discovery and nomenclature; Nature and characteristics of enzymes; concept of holoenzyme, apoenzyme, coenzyme and cofactors; regulation of enzyme activity; mechanism of action. Plant – Water relations: Importance of water to plant life; physical properties of water; diffusion and osmosis; absorption, transport of water and transpiration; physiology of stomatal movement. Unit II Mineral nutrition : Essential macro and micro-elements and their role; deficiency symptoms, mechanism of mineral uptake. Transport of organic substances: Mechanism of phloem transport; source-sink relationship; factors affecting translocation. Unit III Photosynthesis : Historical aspects; photosynthetic pigments; action spectra and enhancement effects; concept of two photosystems; Z-scheme; photophosphorylation; Calvin cycle; C-4 pathway; CAM plants; photorespiration. Significance of photosynthesis. Respiration : Aerobic and anaerobic respiration, kreb's cycle; electron transport mechanism (chemi-osmotic theory); Redox potential; oxidative phosphorylation; ATP the biological currency? Pentose phosphate pathway. Unit IV Nitrogen and lipid metabolism : Biology of nitrogen fixation; importance of nitrate reductase and its regulation; ammonium assimilation; structure and function of lipids; fatty acid biosynthesis; β-oxidation; saturated and unsaturated fatty acids; storage and mobilization of fatty acids. Unit V Growth and development : Definitions; phases of growth and development; Kinetics of growth ; seed dormancy, seed germination and factors of their regulation; plant movements; the concept of photoperiodism; physiology of flowering; Florigen concept; biological clocks; physiology of senescence, fruit ripening; plant hormones-auxins, gibberellins, cytokinins, abscisic acid and ethylene, history of their discovery, biosynthesis and mechanism of action; photomorphogenesis; phytochrome and cryptochrome, their discovery, physiological role and mechanism of action.
Reference:	Salisbury, F.B. and Ross, C.W., 2005, Plant Physiology (4th Edition) CBS Publishers & Distributors Taiz L. and Zeiger E., 2003, Plant Physiology (2nd Edition) Panima Publishing Lorpin, New Delhi

	Mohr. H and Schofer, P.1995, Plant Physiology, Springer Veriag, Berlin Germany Noggle G.R. and Fritz. G.J. 2003 Introductory Plant Physiology, Narosa Publishing House, New Delhi Mukherji, S. and Ghosh A.K. 2006 Plant Physiology, New Central Book Agency, New Delhi Sinha R.K. 2004, Modern Plant Physiology Narosa Publishing House, New Delhi

Botany Practical VI

Objectives:	To impart the skills of handling and setting up of apparatus to conduct plant physiological experiment, collection of data and interpretation of results.
Syllabus:	1. To study the permeability of plasma membrane using different concentrations of organic solvents inorganic salts. 2. To study the effect of temperature on permeability of plasma membrane. 3. To prepare the standard curve of protein and determine the protein content in unknown samples. 4. To study the enzyme activity of catalase and analyse as influenced by pH and temperature. 5. Comparison of the rate of respiration of various plant parts. 6. Separation of chloroplast pigments by solvent method and chromatography. 7. Determining the osmotic potential of vacuolar sap by plasmolytic method. 8. Determining the water potential of any tuber (potato). 9. Separation of amino acids in a mixture by paper chromatography and their identification by comparison with standards. 10. Bioassay of auxin, cytokinin, GA, ABA and ethylene using appropriate plant material. 11. Demonstration of root and shoot formation from the apical and basal portion of stem segments in liquid/solid medium containing different hormones.
Reference:	Salisbury, F.B. and Ross, C.W., 2005, Plant Physiology (4th Edition) CBS Publishers & Distributors Taiz L. and Zeiger E., 2003, Plant Physiology (2nd Edition) Panima Publishing Lorpin, New Delhi

	Mohr. H and Schofer, P.1995, Plant Physiology, Springer Veriag, Berlin Germany Noggle G.R. and Fritz. G.J. 2003 Introductory Plant Physiology, Narosa Publishing House, New Delhi Mukherji, S. and Ghosh A.K. 2006 Plant Physiology, New Central Book Agency, New Delhi Sinha R.K. 2004, Modern Plant Physiology Narosa Publishing House, New Delhi

Zoology Theory VI

Objectives:	To gain knowledge of animal physiology, metabolism, and immunology	
Syllabus:	Unit I	Digestion and Respiration: (a) Macro and micro nutrients, (b) Physiology of digestion and absorption, (c) hormonal regulation of digestion. (d) Respiration; Mechanism of breathing, (e) Respiratory pigments and their role in respiration, (d) Factors affecting oxygen dissociation, (e) Neural control of respiration.
	Unit II	Blood and Circulation: (a) Composition of blood, (b) blood volume, (c) blood group, (d) Rh factor and clotting mechanism, (e) blood pressure, (f) ECG, (g) cardiac cycle, (h) control of heart beat and cardiac output, circulatory system, nervous & chemical regulation of blood circulation.
	Unit III	Excretion & Osmoregulation: (a) Types of excretory products (b) physiology of excretion, (c) counter current mechanism, (d) composition of urine, (e) acid base regulation and (f) osmoregulation.
	Unit IV	Nervous system and Muscles: (a) Structure of neurons,(b) generation and propagation of nerve impulse. (c) Synaptic transmission, (d) reflexes, (e) photoreceptor and bioluminescence, (f) structure of muscle, (g) mechanism of muscle contraction.
	Unit V	Immunology: a. Immune system in self defence mechanism b. Innate and adaptive immunity. c Humoral and cell mediated immunity d Antigen and antibody interaction e. Structure of antibody f. Auto immunity and immuno tolerance & t.s. g. Vaccine and their application h. diseases i. Allergy & allergens
Reference:	Aschoff, J: Biological clock 2. C.P. Rawal: Animal physiology (Rajasthan Academy) 3. Chaterjee C.L : Human physiology Vol. I & II 4. Giese : Cell physiology Hoar, W.S: General Physiology	

	5. Hurkat, P.C: and Mathur P.N. : A text book of Animal Physiology 6. Krishnamurthi: A textbook of elementary physiology 7 Mitchell: General Physiology 8. Marshell, A.H: Reproductive Physiology 9. Nagabhushanam Kodarkar: A textbook of Animal Physiology 10 Neilson, S: Animal physiology 11. Prossar & Brown: Comparative Animal Physiology 12 Rao Chellappa: Animal Physiology & Ecology 13. Samsons Wright: Applied Physiology 14. Schmidt & Nelson: Animal Physiology 15 S.C. Rastogi: Animal Physiology 16. Yen and Jaffe: Reproductive Physiology

Zoology Practical VI

	To enable the students to understand the physiological processes & functions of different systems, staining and identification of blood & blood group, physiology of blood and immunology
	Identification of blood groups in the given human blood. 2. Preparation of blood film and study of blood cells of human. 3. Study of Hemin crystal from blood of rat/human 4. Estimation of Haemoglobin in the blood of a human being. 5. RBC & WBC count in human blood 6. Study of Blood Pressure 7 Field visit to local pathology lab for study of ELISA & RIA techniques 8. Coagulation of blood - bleeding and clotting time. 9. Study of Reflex action of Frog / Human
	Aschoff, J: Biological clock 2. C.P. Rawal: Animal physiology (Rajasthan Academy) 3. Chaterjee C.L : Human physiology Vol. I & II 4. Giese : Cell physiology Hoar, W.S: General Physiology 5. Hurkat, P.C: and Mathur P.N. : A text book of Animal Physiology 6. Krishnamurthi: A textbook of elementary physiology 7 Mitchell: General Physiology 8. Marshell, A.H: Reproductive Physiology 9. Nagabhushanam Kodarkar: A textbook of Animal Physiology 10 Neilson, S: Animal physiology 11. Prossar & Brown: Comparative Animal Physiology 12 Rao Chellappa: Animal Physiology & Ecology 13. Samsons Wright: Applied Physiology 14. Schmidt & Nelson: Animal Physiology 15 S.C. Rastogi: Animal Physiology 16. Yen and Jaffe: Reproductive Physiology

Objectives:	To enable the pupil teacher to: • Understand and appreciate the uses and significance of mathematics in life. • Learn successfully, various approaches of teaching mathematics and to use them judiciously. • Know the methods of planning instruction for the classroom • Construct test items in mathematics. • Appreciate and organize activities to develop aesthetic sense of mathematics. • Obtain feed back both about teaching as well as students learning • Use the tools of ICT for affective transaction of Mathematics Teaching.
Syllabus:	Unit – 1 Planning in Mathematics Teaching • Practice of writing specific objectives • Unit and Lesson planning • Inductive method of teaching mathematics • Deductive method of teaching mathematics • Analytic method of teaching mathematics • Synthetic method of teaching mathematics Unit – 2 Learning Resources and materials in Mathematics Textbook • Self learning materials • Teaching aids: their - meaning - need - planning - making and - appropriately using Unit –3 Mathematics laboratory and Mathematics club activities • Meaning of experiments in Mathematics • Maths lab its meaning, need & designing • Distinction between Maths lab and Science lab. • Mathematical games and amusements • Recreational Mathematics • Mathematical puzzles • Mathematics Club - Its organization - Special activities - Tournaments Unit – 4 Evaluation in Mathematics • Test items in Mathematics

	- long answer type - short answer type - very short answer type - objective type - Construction of various types of test items in Mathematics - The precautions to be taken - Reasons for the precautions Unit 5: ICT in Mathematics Teaching • MS PowerPoint: Creating, editing and enhancing PowerPoint presentation, Inserting charts (especially making mathematical documents). • Use of 'MATHEMATICA'software. • Use of 'MAPLLE' software • Internet Exploration: Communicating using e-mail and Internet, locating especially the ones dealing with maths. Visiting, sloane sequence and creating more sequences and registering them. Internet resources, use of internet for acquiring information.
Reference:	Suggested Readings of Semester VI 1. Nagpal, D.P. : Computer Course 2. Tawney, D.A.: Learning through Computer 3. O'Shea T. and John S: Learning and Teaching with Computer 4. User manual for 'MATHEMATICA' software 5. User manual for 'MAPLLE' software 6. What is Mathematics? An elementary approach to ideas and methods. Richard Courant & Herbert Robbins Oxford University Press 7. The Art of Mathematics – Jerry P. King – Plenum Press 8. Techniques of Problem Solving – Steven G. Krant, Universities Press 9. Culture, Excitement and Relevance of Mathematics – V. Krishnamurthy, Wiley Eastern Limited

Course Name: Instructual Technology

Credits: 4

Course Code: CC-6

Objectives:	1. To understand the meaning and nature of instructional design and technology 2. To understand the different approaches to instructional design 3. To plan and develop instructional design based on different models 4. To understand the process of communication and its role in teaching learning process 5. To plan and develop various instructional media for educational use 6. To understand the multimedia based instructional design 7. To plan, develop, and evaluate multimedia based learning content 8. To understand the concept of e-learning, e-learning technologies and learner management systems 9. To understand the concept of e-content, learning objects, and

	authoring tools 10. To use various web-2 technologies for educational use
Syllabus:	Unit I: Introduction to Instructional Technology • Nature and meaning of technology and instructional technology • Need and importance of instructional technology • Instruction, teaching and training: meaning and function • Phases of instruction: pre-active, interactive, and post-active Unit II: Instructional Design • Instructional design: meaning, process, and models • Blooms taxonomy and instructional objectives • Mastery learning: concept, goals, assumptions, and principles • Programmed instruction: concept, principles, design and types • Models of teaching: goals, assumptions, syntax, and effects with reference to the following: o Advance organizer model o Inductive thinking model o Concept attainment model • Cooperative learning: Meaning, goals, types and design Unit III: Communication • Meaning and nature of communication • Process of communication: elements and cycle • Types of communication • Barriers in communication • Role of media in communication: Dale's cone of experience • Instruction as a communication process Unit IV: Instructional Media • Instructional media: principles and steps of selection, principles of use, and classification • Opaque still pictures/graphic aids: types, development, and uses • Real things and models: types, development, and uses • Audio and video programmes: radio(broadcast & internet), tape recorder, CD/DVD players, television(satellite and internet) – types of programmes and educational use • Projecting equipments: slide projector, OHP, multimedia projectors, and interactive white boards • Edusat and teleconferencing: the Indian experiments Unit V: Multimedia Based Instructional Design • Multimedia: meaning, types, advantages and evaluation • Multimedia instructional design: planning, content structure and sequence, media specification • E-learning: concept, types, learner management systems, and e-learning technologies • E-content: design, development, standards, learning objects, and

	authoring tools • Educational use of internet technologies: e-mail, wiki, blog, podcasting, streaming, chat, and forum Methods of Transaction • Class presentations • Readings and class discussions • Assignments • Hands on experience in using various projecting equipments • Plan and develop charts, models, over head transparencies, and posters • Developing lesson/unit plans based on various instructional designs • Production of multimedia in the computer laboratory • Development of e-content using some of the open source authoring software • Exposure to on-line learning using learner management system – Moodle • Hands on experience in using blogs, podcasting, chat, and forum
Reference:	1. Anderson, E.J. and Hunder, E. (1967). Improving the Teaching Analysis of Classroom Verbal Interaction, New York, Holt Rinehart and Winston, Inc. 2. Bajpai, Al and Leedham JF: Aspects of Educational Technology, Pitman Publishers, New York. 3. Bereday, George, F., and Lanwery Joseph (1963). Educational and Training of Teacher, Trens. Brother Ltd. London. 4. Bloom, B.S. (1956). Taxonomy of Educational Objectives; Cognitive Domain, Book-I Mckey New York. 5. Bruner, J.S. (1966). Towards a Theory of Instruction; Harard University Press Massachussetts. 6. Buch MS and Santhasnam, MR: Communication in Classroom, CASE, Baroda. 7. Budgett, R. and Leedham, J aspects of Education Technology (Eds.), Pitman, London.

Course Name: Pedagogy Course (Subject I): Science II

Credits: 4

Course code: PC-1

Objectives:	
Syllabus:	UNIT- I Learning process Exploring learners Cultivating in student-teacher the habit of listening, motivating learner to bring her previous knowledge gained through class room/ environment / parents and peer group; generating discussion, involving learner in teaching – learning process, encouraging learner to raise questions, appreciating dialogue amongst peer group. Unit II Evolving learning situation Analysis of textual and supplementary print material and suitable planning

	for connecting lab/ field experiences in class room interaction, identifying desired experience (i.e. what level of under standings is desired, what essential questions will guide teaching – learning), determining acceptable evidences that show students understand, integrating learning, experiences and instructions, steps in teaching-learning experiences that enable students to develop / demonstrate desired understanding, use of ICT experiences in classroom to enable learner to adopt new techniques in teaching – learning process. Unit III Assessment and Evaluation Informal creative evaluation to assess creativity, problem solving, practical / technological skills, appreciating evaluation through co-curricular channels, exploring content areas not assessed in formal examination system through performance based assessment. Modes of Assessment Participation in group; presentation and communication skills of science; posing questions, interpretation and analysis of observation; Designing innovative learning situations; laboratory experience; field notes. Unit IV- Formal ways to evaluate learner Challenges to test understanding / concept development during practice and term/terminal examination, practicing continuous and comprehensive evaluation to test regular progress/ achievement of learner, oral presentation, developing performance parameter for qualitative assessment, anecdotal records, rubric portfolio. Unit V: Formal Blue print and framing questions. Identifying and organizing components for developing frame work of question paper at different stages of learning, percentile ranking, reporting performance of learners, framing questions based on theory, experiment/activities to discourage rote learning and promoting analysis, critical thinking and reasoning, open ended questions to evaluate creativity and expression of learner. Topics for internal assessment Hands-on activity and lab experiences Encouraging learner to collect material to develop/ fabricate suitable activity prior to the class (individual or group work) and teacher facilitated activities to generate discussion; experiences on layout, setting and organizing laboratory, Developing content specific project work, projects on planning and developing instructional materials. Provide opportunities for group discussion on key themes and concepts, group/individual presentation, lecture in interactive manner providing opportunity for sharing ideas followed by group discussion, exposing to exemplar constructivist learning situations in science, designing and setting up activities/laboratory work, Making field notes/observation , visit to State/National level science exhibition/science centre/science museum, audio visual presentation followed by its analysis and discussion, reflective written assignments, case studies.
Reference:	1. NCERT, National Curriculum Framework – 2005. 2. NCERT, Position Paper of NFG on Teaching of Science -2005. 3. NCERT, Position Paper of NFG on Habitat and Learning – 2005 4. NCERT Position Paper of NFG on Examination Reforms – 2005 5. NCERT, Position Paper of NFG on Aims of education – 2005. 6. NCERT, Position Paper of NFG on Education for Peace – 2005.

	7. N. Vaidya, Science Teaching for 21st Century, Deep & Deep Publications (1999). 8. Dat Poly, Encyclopedia of Teaching Science, Sarup & Sons, New Delhi (2004) 9. Radha Mohan, Innovative Science Teaching for Physical Science Teachers, Prentice Hall of India Pvt Ltd., New Delhi (2002) 10. Sutton, CR and Hayson JH, The Art of the Science Teacher, Mc Graw Hill Book Company Ltd. (1974) 11. Their, DH, Teaching Elementary School Science : A Laboratory Approach, Sterling Publication Pvt. Ltd (1973) 12. Science Teach (NSTA's peer reviewed journal for secondary science teachers) 13. Journal of Research in Science Teaching (Wiley-Blackwell) 14. Misconceptions in chemistry, addressing perceptions in Chemical Education, Bake, Hans Dieter, A1 Yitbarek, Sileshi, Publication of Springer. 15. Turner Tony and Wendey Di Macro, Learning to Teach School Experience in secondary school teaching, Routledge, London and New York. 16. Taber K.S.: Chemical Misconceptions – Prevention, Diagnosis and cure volume 1 and 2, London 2002 (Royal Society of Chemistry

Course Name: Pedagogy Course (Subject I): Mathematics II/Biology II

Credits: 4

Course Code: PC-2

Mathematics II

Objectives:	Aim of the Course After completion of course the students will be able to • gain insight on the meaning, nature, scope and objective of mathematics education • Appreciate mathematics as a tool to engage the mind of every student. • Appreciate mathematics to strengthen the student's resource. • Appreciate the process of developing a concept. • Appreciate the role of mathematics in day-to-day life. • Learn important mathematics: Mathematics is more than formulas and mechanical procedures.

	• Channelize, evaluate, explain and reconstruct their thinking. • See that mathematics as something to talk about, to communicate through, to discuss among themselves, to work together on. • Pose and solve meaningful problems. • Appreciate the importance of mathematics lab in learning mathematics. • Construct appropriate assessment tools for evaluating mathematics learning.
Syllabus:	Unit-V Exploring learners Cultivating learner's sensitivity like listening, encouraging learner for probing, raising queries, appreciating dialogue among peer group, promoting the student's confidence. Unit-VI Planning Classroom Strategies Analysis of textual and supplementary print materials, connecting lab / field experiences and suitable planning for classroom interaction. (i) Identifying desired outcome, i.e., what level of understanding is desired, what essential questions will guide teaching/learning. (ii) Determining acceptable evidences that show students understanding. (iii) Integrating learning experiences and instructions – sequence of teaching /learning experiences that enable students to develop / demonstrate desired understanding. (iv) Developing skills and knowledge required to make appropriate use of technology, learner teachers will be required to make pedagogical choices critically about when and where technology should be used. (v) The role of cooperative learning in mathematics. **Unit- VII** **Assessment and Evaluation** • Informal creative Evaluation Encouraging learner to examine a variety of methods of assessment in mathematics so as to assess creativity, problem solving and practical performance. Appreciating evaluation through overall performance of the child. Self and peer evaluation • Formal ways of Evaluation Variety of assessment techniques and practices. Assessing Product vs. Process, Knowing vs. Doing. In practice midterm / terminal examination, practicing continuous and comprehensive evaluation to test regular programs / achievement of learner. Unit- IV

	Developing Blue print for designing question paper Identifying and organizing components for developing frame work of question paper at different stages of learning. Framing questions based on concepts and sub concepts so as to encourage critical thinking, promote logical reasoning and to discourage mechanical manipulation and rote learning. Framing of open ended questions providing the scope to learners to give responses in their own words. Framing of conceptual questions from simple questions. Modes of Learning Engagement • Providing opportunities for group activities. • Group/ individual presentation. • Providing opportunity for sharing ideas. • Exposing to exemplar constructivist learning situations in mathematics. • Designing and setting up models, teaching aids and activities/ laboratory work. • Visit to district, state and national level science exhibition. • Audio visual presentation followed by its analysis and discussion. • Reflective written assignments. • Case studies. Modes of Assessment • Presentation and communication skills in mathematics • Posing conceptual questions from simple situations, interpretation and analysis • Designing innovative learning situations • Performance in group activity • Laboratory experiences • Reflective written assignment • Written test on conceptual understanding of specific topics and its pedagogy • A year and summative assessment by the university.
Reference:	**Reading Material** 1. The Teaching of Mathematics- Roy Dubisch, John Wiley and Sons INC, New York and London, 1963 2. Teaching of Mathematics by Butler and Wren, Mc.Graw Hill Book Company, INC, New York and London, 1960 3. The Teaching of Secondary Mathematics by Claude H. Brown, Harper & Brothers, Publishers, New York (1953) 4. Teaching Mathematics in the Secondary School, Reinhart & Company INC, New York, 1954 5. Mathematical Discovery (Volume I and II) , George Polya, John Wiley & Sons, INC, New York and London, 1962 (I), 1965 (II)

	6. Teaching Mathematics in Elementary School by C. G. Corle, The Ronalal Press Company, New York (1964) 7. Activity for Junior High School and Middle School Mathematics, Volume – II, NCTM, USA, 1999 8. Geometry- History, Culture and Techniques, J.L. Heilborn, Oxford University Press, 2000 9. Mathematics, Part I and II TEXTBOOK FOR CLASS XII, 2007, NCERT, New Delhi 10. Mathematics, Part I and II TEXTBOOK FOR CLASS XI, 2006, NCERT, New Delhi 11. Mathematics, TEXTBOOK FOR CLASS X, 2007, NCERT, New Delhi 12. Mathematics, TEXTBOOK FOR CLASS IX, 2006, NCERT, New Delhi 13. Mathematics, FOR CLASS VIII, 2008, NCERT, New Delhi 14. Mathematics, FOR CLASS VII, 2007, NCERT, New Delhi 15. Mathematics, FOR CLASS VI, 2006, NCERT, New Delhi 16. National Curriculum Framework – 2005, NCERT. 17. Position Paper of NFG on Teaching of Mathematics – 2005, NCERT. 18. Position Paper of NFG on Habitat and Learning – 2005, NCERT. 19. Position Paper of NFG on Examination Reforms – 2005, NCERT. 20. Position Paper of NFG on Aims of Education – 2005, NCERT. 21. Position Paper of NFG on Gender Issues in Education – 2005, NCERT. 22. Position Paper of NFG on Education for Peace – 2005, NCERT. Journals: 23. Teaching Children Mathematics (TCM), NCTM, USA 24. Mathematics Teaching in the Middle School (MTMS), NCTM, USA 25. Journal of Mathematics Teacher Education, Springer Netherlands

Biology II

Objectives:	After completion of course the students will be able: 1. Gain insight on the meaning, nature, scope and objectives of science education. 2. Recognize the fact that every child possesses curiosity about his natural surroundings. 3. Realize that science is a dynamic body of knowledge. 4. Identify and relate every day experiences with learning science. 5. Practice various approaches of teaching-learning of science. 6. Employ various techniques of transaction of science. 7. Use effectively different activities/ demonstrations/ laboratory experiences for teaching- learning of science. 8. Facilitate development of scientific attitudes in learners. 9. Construct appropriate assessment tools for evaluating science learning.

Syllabus:	UNIT- I Learning process Exploring learners Cultivating in student-teacher the habit of listening, motivating learner to bring her previous knowledge gained through class room/ environment / parents and peer group; generating discussion, involving learner in teaching – learning process, encouraging learner to raise questions, appreciating dialogue amongst peer group. Unit II Evolving learning situation Analysis of textual and supplementary print material and suitable planning for connecting lab/ field experiences in class room interaction, identifying desired experience (i.e. what level of under standings is desired, what essential questions will guide teaching – learning), determining acceptable evidences that show students understand, integrating learning, experiences and instructions, steps in teaching-learning experiences that enable students to develop / demonstrate desired understanding, use of ICT experiences in classroom to enable learner to adopt new techniques in teaching – learning process. Unit III Assessment and Evaluation Informal creative evaluation to assess creativity, problem solving, practical / technological skills, appreciating evaluation through co-curricular channels, exploring content areas not assessed in formal examination system through performance based assessment. Modes of Assessment Participation in group; presentation and communication skills of science; posing questions, interpretation and analysis of observation; Designing innovative learning situations; laboratory experience; field notes. Unit IV- Formal ways to evaluate learner Challenges to test understanding / concept development during practice and term/terminal examination, practicing continuous and comprehensive evaluation to test regular progress/ achievement of learner, oral presentation, developing performance parameter for qualitative assessment, anecdotal records, rubric portfolio. Unit V: Formal Blue print and framing questions. Identifying and organizing components for developing frame work of question paper at different stages of learning, percentile ranking, reporting performance of learners, framing questions based on theory, experiment/activities to discourage rote learning and promoting analysis, critical thinking and reasoning, open ended questions to evaluate creativity and expression of learner. Topics for internal assessment Hands-on activities and lab experiences Encouraging learner to collect material to develop/ fabricate suitable activity prior to the class (individual or group work) and teacher facilitated activities to generate discussion; experiences on layout, setting and organizing laboratory, Developing content specific project work, projects on planning and developing instructional materials. Provide opportunities for group discussion on key themes and concepts, group/individual presentation, lecture in interactive manner providing opportunity for sharing ideas followed by group discussion, exposing to exemplar constructivist learning situations in science, designing and setting up activities/laboratory work, Making field notes/observation , visit to State/National level science exhibition/science centre/science museum, audio visual presentation followed by its analysis and discussion, reflective written assignments, case studies.
Reference:	Reading Materia

	1. NCERT, National Curriculum Framework – 2005. 2. NCERT, Position Paper of NFG on Teaching of Science -2005. 1. NCERT, Position Paper of NFG on Habitat and Learning – 2005 2. NCERT Position Paper of NFG on Examination Reforms – 2005 3. NCERT, Position Paper of NFG on Aims of education – 2005. 4. NCERT, Position Paper of NFG on Education for Peace – 2005. 5. N. Vaidya, Science Teaching for 21st Century, Deep & Deep Publications (1999).Dat Poly, Encyclopedia of Teaching Science, Sarup & Sons, New Delhi (2004) 6. Radha Mohan, Innovative Science Teaching for Physical Science Teachers, Prentice Hall of India Pvt Ltd., New Delhi (2002) 7. Sutton, CR and Hayson JH, The Art of the Science Teacher, Mc Graw Hill Book Company Ltd. (1974) 8. Their, DH, Teaching Elementary School Science : A Laboratory Approach, Sterling Publication Pvt. Ltd (1973) 9. Science Teacher (NSTA's peer reviewed journal for secondary science teachers) 10. Journal of Research in Science Teaching (Wiley-Blackwell) 11. Turner Tony and Wendey Di Macro, Learning to Teach School Experience in secondary school teaching, Routledge, London and New York.

Course Name: Health and Physical Education

Credits: 2

Course Code: AC-12

Objectives:	Objectives: - To promote amongst the trainees awareness, attitudes and competency in physical education and sports through participation. - To enable the trainees to organize selected physical education and sports activities in schools. - To develop specific skills of major games and sports. - To develop the correct skills in practicing yoga.
Syllabus:	Unit I: Physical fitness programmes through sports activities. Unit II:

	Warming up and conditioning exercises (General and specific), circuit training. Unit III: Fundamental skills (Running, Jumping and Throwing) – techniques, equipments and play areas. Unit IV: Yoga: Asanas, Pranayama, Kriya and Meditation Unit V: Major games (Athletics, Badminton, Basketball, Cricket, Football, Kho-Kho and Volleyball) dealt under the following heads: - Instructions & demonstration of basic skills. - Equipments and ground dimensions - Common rules with interpretations - Organisation and conduct of tournaments/competition
Reference:	

Course Name: Learning to Function as a Teacher – School Experience Programme (one week)

Credits: 2

Course Code: TP-1

<table>
<tr><td>Objectives:</td><td>The pupil teachers would be exposed to different type of schools such as urban, rural, tribal with a view to
Develop understanding about the school activities with different cultures.
Develop the process of engaging students in classrooms through observing the process adopted by regular teachers.
Develop understanding to manage a substitute (arrangement class)
Experience of engaging classroom activities
Conduct case studies</td></tr>
<tr><td>Syllabus:</td><td>The institute will identify suitable number of cooperating urban schools, rural schools, and tribal schools, and students will be placed by rotation in all the three types of schools. All activities listed below are to be completed within two weeks during the placement of student teachers in three types of schools in rotation. Each pupil teacher performs the following activities under the guidance of supervisor and prepare reports on all the activities. The report will be evaluated as indicated below:
<table>
<tr><td>S. No.</td><td>Activities</td></tr>
<tr><td>1</td><td>Observing 10 lessons 5 in each method delivered by regular teachers with the help of observation schedule</td></tr>
<tr><td>2</td><td>Observation of day-today school activities and preparation of comprehension report highlighting working of the library, co-scholastic activities, games and sports, functioning of laboratory, school morning assembly</td></tr>
<tr><td>3</td><td>Availing atleast six substitute teaching opportunities in</td></tr>
</table></td></tr>
</table>

			actual school situation	
		4	Developing two lessons in each method subject and use of learning materials/teaching aids	10
		5	Undertaking a case study	10
			Total	50
Reference:				

Semester VII

Course Name: Elective I – Physics VII / Computer Science VII

Credit: 5 (Theory 3+2 Practical)

Course Code: SS-1

Physics Theory VII

Objectives:	After completion of this course, the students will be able to 1) Understand the merits of semiconductor diodes and thermistors. 2) Understand the applications of semiconductor devices. 3) Analyse graphically the CE characteristics of thermistors. 4) Understand the working of field effect transistor. 5) Understand the usefulness of amplifier in electronic circuits. 6) Understand the concepts of an oscillator and its practical applications.
Syllabus	Unit 1. Solid state Devices Semiconductors: Intrinsic semiconductors, electrons and holes, Fermi level, temperature dependence of electron and hole concentrations; extrinsic semiconductors: doping, impurity states, n and p type semiconductors, conductivity, mobility; semiconductor devices: Metal semiconductor junction, p-n junction, majority and minority carriers, Diode, zener and tunnel diodes, light emitting diode, photovoltaic cell, diode as a circuit element, load line concept, rectification, ripple factor , power supply, zener diode voltage stabilization ,. Unit 2 Transistors Characteristics of transistors in CB, CE and CC mode, graphical analysis of the CE configuration, low frequency equivalent circuits, h – parameters, bias stability, thermal runaway. Field effect transistors: JFET volt-ampere curves, biasing JFET, Depletion and Enhancement mode, MOSFET, FET as variable resistor; constant current and voltage sources. Unit 3 Simple electronic circuits Kirchhoff's laws and their applications, Norton, Thevenin, maximum power transfer theorem; series and parallel LCR circuits, resonance in LCR circuits; Digital electronics-Boolean identities, De Morgan's laws, Logic gates and truth tables. Simple logic circuits; fundamentals of microprocessors and digital computers. Unit 4

	Amplifiers Small signal amplifiers: General principles of operation, classification, distortion, RC coupled amplifier, gain frequency response, input and output impedance, multistage amplifiers, transformer coupled amplifiers; Noise in electronic circuits, introduction to OPAMP as circuit element. Unit 5. Equivalent circuits Circuits at low, medium and high frequencies; emitter follower, low frequency common source and common drain amplifier, Feedback in amplifier, types of feed back, voltage gain of feedback amplifier, advantages of negative feedback (emitter follower); positive feedback amplifier as an oscillator; Barkhausen criteria for oscillations; classification of oscillators.
Reference:	1. Mehta, V.K., Mehta, R., Electronic Principles, Sultan Chand and sons, New-Delhi. 2. Millman, J., Halkias, C.C., Electronic Devices & Circuits, McGraw Hill International Editions, 3. Gupta,S.L. and kumar, V., Hand Book of Electronics, Pragati Prakashan, Meerut. 4. Malvino, A.P., Electronic Principles, Tata Mc Graw hill, New Jersey, USA.

Physics Practical VII

Objectives:	
Syllabus:	Electronics 1. Study of Doide – Transistor characterstics. 2. Study of voltage regulation system . 3. Study of R-C coupled amplifier 4. Zener diodes 5. Study of Oscillators 6. Determination of dielectric constant 7. Hysterisis curve
Reference:	1) Latest version of the books may be preferred 2) Feynman,P., Lighto 3) n,R.B. and sands, M., The Feynman Lectures on Physics Vol 4) I,II,III, Narosa Publishing House, New-Delhi. Khandelwal, D.P., Oscillations and Waves, Himalaya Publishing House, Bombay. 5) Unified Physics , Shivlal Agrawal and Yugbodh Prakashan 6) Pugh, E.M. and Pugh, E.W., Principles of Electricity and Magnetism, Adison-Welsely, London. 7) Purcell, E.M., Electricity and Magnetism, Berkeley Physics Course, McGraw-Hill

	8) Co., Bombay. 9) Haung, K., Statistical Physics, Wiley Eastern Ltd., New-Delhi. 10) Jenkins, F.M. and White, H.E.;Fundamentals of Optics, McGraw-Hill, Bombay. 11) Smith, F.R.S. and Thomson, J.H., Optics; John Wiley and sons, London. 12) Main, I.G.; Vibrations and Waves, Cambridge University Press. a. Sadiku, M.N.O., Elements of Electromagnetism, Oxford University Press 13) Halliday, D. and Resnik, R., Physics, Wiley Eastern, London. 14) Jordan, E.C.; Electromagnetic Waves and Radiating Systems, Prentice-Hall of India 15) Patel, Y.I., Verma, L.R.; Yugbodh Physics, Yugbodh Prakashan , Raipur. 16) Bapat, M.N., DS Mathur's Heat and Thermodynamics; Sultan Chand and Sons, a. New Delhi b. Rajam, J.B., Atomic Physics; S Chand & Co., New Delhi.

Computer Science VII

Objectives:	
Syllabus:	
Reference:	

Course Name: Elective II – Chemistry VII/ Informatic Practices VII

Credit: 5 (Theory 3+2 Practical)

Course Code: SS-2

Chemistry Theory VII

Objectives:	After completion of the VII semester course the students will be able to: (i) get knowledge about NMR spectroscopy technique in elucidation of the structure of organic compounds and solve problems pertaining to elucidation of structures. (ii) get detailed acquaintance with the chemistry of organomagnesium, organozinc, organolithium and organosulphur compounds and their industrial importance. (iii) appreciate the role of polymers in daily life. (iv) develop interest in the synthetic organic chemistry. (v) make a comparative study about reaction mechanism of heterocyclic and other aromatic compounds to judge the role of lone pair species in heterocyclic compounds.

	(vi) gain knowledge about various classes of carbohydrates and appreciate the role of structures in the explanation of various phenomena like mutarotation and determination of ring size. (vii) visualize the importance of sugars as bio molecules. (viii) learn in detail the chemistry associated with nitrogen based compounds such as amino acids, proteins, peptides, nuclic acids and the biological issues associated with their study. (ix) judge and describe the importance of oil, fats, detergents and dyes in daily life. (x) prepare some of the dye materials in the laboratory.
Syllabus:	Instructional Strategy: The instructional strategy associated with the transaction of content of V semester may also be practiced here. However the teacher may make use of problem solving approach in elucidation of structures and interconversion of compounds. The use of project work technique may also be encouraged in dealing with industrial topics like oil, fats, detergents, polymers and dyes. Unit – I Spectroscopy: Nuclear magnetic resonance (NMR) spectroscopy. Proton magnetic resonance (1H 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. Problems pertaining to the structure elucidation of simple organic compounds using UV, IR and PMR spectroscopic techniques. Unit – II Organometallic Compounds: Organomagnesium Compounds: The Grignard reagents-formation, structure and chemical reactions. Organozinc compounds: Formation and chemical reactions. Organolithium compounds: Formation and chemical reactions. Organosulphur Compounds: Nomenclature, structural feature, methods of formation and chemical reactions of thiols, thioethers, sulphonic acids, sulphonamides and sulphaguanidine. Synthetic Polymers: Addition or chain-growth polymerization. Free

radical vinyl polymerization, ionic vinyl polymerization, Ziegler-Natta polymerization and vinyl polymers.

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

Unit - III

Heterocyclic Compounds: Introduction: Molecular orbital picture and aromatic characteristics of pyrrole, furan, thiophene and pyridine. Methods of synthesis and chemical reactions with particular emphasis on the mechanism of electrophillic substitution. Mechnaism of nucleophilic 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 isoquinoline with special reference to Fischer indole synthesis, Skraup synthesis and Bishchler-Napieralski synthesis. Mechanism of electrophilic substitution substitution reactions of indole, quinoline and isoquinoline.

Organic Synthesis via Enolates: acidity of □-hydrogens, alkylation of diethyl malonate and ethyl acetoacetate. Synthesis of ethyl acetoacetate, the Claisen Alkylation of 1, 3-dithianes. Alkylation and acylation of enamines.

Unit – IV

Carbohydrates: Classification and nomenclature. Monosaccharides, mechanism of osazone formation, interconversion of glucose and fructose, chain lengthening and chain shortening of aldoses. Configuration of monosaccharides. Erythro and threo diasteromers. 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 polysaccharides (starch and cellulose) without involving structure determination.

Fats, Oils and Detergents: Natural facts, 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 – V Amino Acids, Peptides, Proteins and Nucleic Acids: Classification, Structure and stereochemistry of amino acids, Acid-Base behaviour isoelectric point and electrophoresis. Preparation and reactions of a-amino acids. Structure and nomenclature of peptides and proteins. Classification of proteins. Peptide structure determination, end group analysis, selective hydrolysis of peotides. Classical peptide synthesis, solid-phase peptide synthesis. Structure of peptide and proteins, levels of protein structure. Protein denaturation/renaturation. Nucleic acids: Introduction, Constituents of nucleic acids. Ribonucleosides and ribonucleotides. Th double helical structure of DNA. Synthetic Dyes: Colour and constitution (electronic concept). Classification of dyes, Chemistry and synthesis of Methyl orange, Congo red, Malachite green, Crystal violet, Phenolphthalein, Fluorescein, Alizarin and Indigo.
Reference:	1. Bahl, Arun and Bahl, B.S., Advanced organic chemistry, S. Chand & Co. Ltd., New Delhi 2. Pine, S.H., Hendrickson, Cram ,D.J.,and Hammond, G.S.,Organic chemistry McGraw Hill Ltd. 3. Finar,I.L., Organic chemistry Vol. 2., Person Education Ltd. 4. Agarwal,O.P., Reaction and Reagents, Organic chemistry, Krishna Prakashan Media (P) Ltd. 5. Mehrotra, R.C., & Singh,A., Orgnometallic chemistry, a unified approach, New Age International, New Delhi,2000. 6. Tiwari, K.S., and. Vishnoi, N.K., A Textbook of Organic Chemistry, Vikas Publishing House. 7. John R. Dyer., Application of Absorption Spectroscopy of organic compound, Prantice Hall of India, New Delhi, 2004

Chemistry Practical VI

Objectives:	
Syllabus:	Estimation of glucose, aniline or phenol. 2. Analysis of an organic mixture containing two solid components

	using water, NaHCO3, NaOH for separation and preparation of suitable derivative.
Reference:	1. Bahl, Arun and Bahl, B.S., Advanced organic chemistry, S. Chand & Co. Ltd., New Delhi 2. Pine, S.H., Hendrickson, Cram ,D.J.,and Hammond, G.S.,Organic chemistry McGraw Hill Ltd. 3. Finar,I.L., Organic chemistry Vol. 2., Person Education Ltd. 4. Agarwal,O.P., Reaction and Reagents, Organic chemistry, Krishna Prakashan Media (P) Ltd. 5. Mehrotra, R.C., & Singh,A., Orgnometallic chemistry, a unified approach, New Age International, New Delhi,2000. 6. Tiwari, K.S., and. Vishnoi, N.K., A Textbook of Organic Chemistry, Vikas Publishing House. 7. John R. Dyer., Application of Absorption Spectroscopy of organic compound, Prantice Hall of India, New Delhi, 2004

Informatic Practices VII

Objectives:	
Syllabus:	
Reference:	

Course Name: Elective III – Botany VII/Zoology VII/Mathematics VII

Credit: 5 (Theory 3+2 Practical)

Course Code: SS-3

Botany Theory VII

Objectives:	To provide knowledge about structure, development and reproduction and utilization of flowering plants.
Syllabus:	Unit I The shoot system : The shoot apical meristem and its histological organisation. Vascularisation of primary shoot monocotyledons and dicotyledons, formation of internodes, branching pattern; monopodial and sympodial growth. Canopy architecture; cambium and its functions; formation of secondary tissue xylem; a general account of wood structure in relation to conduction of water and minerals; characteristics of growth rings, sapwood and heart wood, role of woody skeleton; secondary phloem-structure-function relationships; periderm.

	Unit II Leaf : Origin, development, arrangement and diversity in size and shape (leaf morphology) internal structure in relation to photosynthesis and water loss; adaptations to water stress; senescence and abscission. The root system : The root apical meristerm; differentiation of primary and secondary tissues and their roles; structural modification for storage, respiration and interaction with microbes. Unit III Flower : A modified shoot, its structure, development and function, structure of anther and pistil; the male and female gametophytes, types of pollination, attractions and rewards for pollinators; pollen-pistil interaction, self incompatibility, double fertilization; formation of seed, endosperm and embryo; fruit development and maturation. Ecological adaptations of seeds and fruits, dispersal strategies, significance of seed – genetic recombination and its significance. Unit IV Food Plants : Rice, Wheat, Maize, Potato, Sugarcane Fibers : Cotton and Jute Vegetable Oils : Groundnut, Mustard and Coconut Unit V General account of sources of firewood, timber and bamboos Spices : General account Beverages : Tea and Coffee Medicinal Plants : General account
Reference:	• Kocchar, S.L. 1998, Economic Botany in Tropics, 2nd edition, Macmillan India Ltd., New Delhi • Sambamurthy, A.V.S.S. and Subramanyam, N.S. 1989. A Textbook of Economic Botany, Wiley Eastern Ltd. New Delhi • Sharma, O.P. 1996. Hill's Economic Botany (Late Dr. A.F. Hill adapted by O.P. Sharma). Tata McGraw Hill Co. Ltd. New Delhi • Mishra, R. 1968. Ecology Work Book Oxford & IBH New Delhi • Bhojwani, S.S. and Bhatnagar, S.P. 2000. The Embryology of Angiosperms (4th Edition) Vikas Publishing House, Delhi • Esau, K.1977. Anatomy of seed plants (2nd Editor) John Wiley and Sons, New York • Fahn, A. 1974: Plant Anatomy, (2nd Ed.) Pergamon Press, Oxford • Pandey B.P. 2007, Botany for Degree Students Course I & Course II. S. Chand & Co. New Delhi • Singh V. Pande P.C. and Jain D.K. 2001, Diversity and

	Systematics of Seed Plants. Rastogi Publications • Singh V., Pande, P.C and Jain D.K. 2004. Structure, Development and Reproduction in Angiosperms. Rastogi Publications, Meerut

Botany Practical VII

Objectives:	To provide skills of section cutting of angiosperms specimens in different plants (T.S., T.L.S., R.L.S.) ii) To provide field experiences for studying sources of fire woods, timber yielding and medicinal plants. iii) To familiarize the students with morphology, anatomy and microchemical tests of economically important plants.
Syllabus:	1. Anatomy of primary structure and secondary growth in sterner and roof of monocots and dicots using hand sections for prepared slides. Structure of secondary phloem and xylem. Growth rings in wood. Microscopic study of wood in T.S. T.L.S. and R.L.S. 2. L.S. : Shoot apex to study the cytohistological zonation and origin of leaf primordial. 3. Structure of anther, microsporogenesis (using slides) and pollen grains (using whole mounts). Pollen viability using in vitro pollen germination. 4. Food Plants : Study of the morphology, structure and simple micro chemical tests of the food storing tissues in rice, wheat, maize, potato and sugarcane, microscopic examination of starch in these plants (except sugarcane). 5. Fibers : Study of cotton flowers and bolls, sectioning of the cotton ovules/developing seeds to trace the origin and development of cotton fibers. Microscopic study of cotton and test for cellulose. Test for lignocelluloses. **6.** Vegetable Oils : Study of hand sections of groundnut, mustard and coconut and staining of oil droplets by Sudan III and Sudan Black. **7.** Spices : Examine black pepper, cloves, cinnamon and opened fruits of cardamom and describe them botanically. **8.** Field study of diversity in leaf shape, size, thickness, surface properties. Internal structure of leaf. Structure of stomata (using epidermal peels of leaf). 9. Field Visits : To study sources of firewood (10 plants), timber yielding trees (10 trees) and bamboos. A list to be prepared mentioning special features. 11. Preparation of an illustrated inventory of 10 medicinal plants used in indigenous system of medicine and allopathy : Write

	their botanical and common names, parts used and diseases disorders for which they are prescribed.
Reference:	• Kocchar, S.L. 1998, Economic Botany in Tropics, 2nd edition, Macmillan India Ltd., New Delhi • Sambamurthy, A.V.S.S. and Subramanyam, N.S. 1989. A Textbook of Economic Botany, Wiley Eastern Ltd. New Delhi • Sharma, O.P. 1996. Hill's Economic Botany (Late Dr. A.F. Hill adapted by O.P. Sharma). Tata McGraw Hill Co. Ltd. New Delhi • Mishra, R. 1968. Ecology Work Book Oxford & IBH New Delhi • Bhojwani, S.S. and Bhatnagar, S.P. 2000. The Embryology of Angiosperms (4th Edition) Vikas Publishing House, Delhi • Esau, K.1977. Anatomy of seed plants (2nd Editor) John Wiley and Sons, New York • Fahn, A. 1974: Plant Anatomy, (2nd Ed.) Pergamon Press, Oxford • Pandey B.P. 2007, Botany for Degree Students Course I & Course II. S. Chand & Co. New Delhi • Singh V. Pande P.C. and Jain D.K. 2001, Diversity and Systematics of Seed Plants. Rastogi Publications • Singh V., Pande, P.C and Jain D.K. 2004. Structure, Development and Reproduction in Angiosperms. Rastogi Publications, Meerut

Zoology Theory VII

Objectives:	To develop knowledge of structure and function of macromolecules andregulatory molecules with metabolic pathway of various levels and Endocrine organs and their functions.
Syllabus:	Unit I (a) Micro nutrients – vitamins their sources and classification and deficiency disease. (b) Essential minerals their roles in body function. (c) Macro nutrients, (d) Carbohydrates, Proteins, Lipids and their classification. Unit II (a)Enzymes their classifications and Mechanism of action. (b)Hormones their classification and mechanism of actions, (c) Receptors, (d) Primary and Secondary messengers and signal transudation (e) Local and Endocrine hormones Unit III (a) Pathways of Carbohydrates, (b) Metabolism, (c) glycogenolysis, (d) gluconeogenesis,(e) glycolysis, (f) Kreb's cycle electron transport system, (g) oxidative phosphorylation, (h) oxidation of fatty acids (i) Steroid biosynthesis. Unit IV (a) Structure and function of Pituitary gland, Hypothalmo – hypophysical portal systems, pituitary hormones and their function.

	(b)Brief account for structure and function of Thyroid, Parathyroid, Thymus, Pineal, Adrenal, Islets of Langerhaus Unit V: (a) Reproductive hormones and their functions,(b) ovulation, menstrual cycle (c) regulation of milk secretion
Reference:	Campbell : Biochemistry – III ;(Samders College Publishing) 2. Conn; stumps., Bruening, Doi : Outline of Biochemistry ;(John Wiley and Sons, Singapore) 3. David W. Martin, Jr. Peter A. Mayes: Victor W Rodwell. 4. Daryl K. Grannes Herper's Review of Biochemistry 5 Ellioff & Ellioff : Biochemistry & Mo. Biology – III (Oxford University Press) **Lehninger, Biochemistry** **6. S.K. Sawhney & Randhir Singh: Introductory Practical Biochemistry** **2. Stryer: Biochemistry** **3. Hadely: Endocrinology** **4. Tanable B. and Yokhama:. H. Biological rhythm**

Zoology Practical VII

Objectives:	To enable the students to develop the skills of identification & estimation of nutrients and biochemicals and histology of different endocrine glands and hormones
Syllabus:	Estimation of Protein by lowry method: 2. Identification of carbohydrates, protein and fats in a given sample 3. Testing of Salivary amylase 4. Effect of temperature and pH.on the activity of salivary amylase 5. Testing of Sugar, Albumin, Bile pigments in urine sample 6. Study of histological permanent slides of Endocrine glands and dissection of rat to study endocrine glands. 7. Study of pH, dissolved oxygen, COD salinity alkalinity from given water sample. 8. Study oestrous cycle from the of vaginal smears in rat/mice
Reference:	Campbell : Biochemistry – III ;(Samders College Publishing) 2. Conn; stumps., Bruening, Doi : Outline of Biochemistry ;(John Wiley and Sons, Singapore) 3. David W. Martin, Jr. Peter A. Mayes: Victor W Rodwell. 4. Daryl K. Grannes Herper's Review of Biochemistry 5 Ellioff & Ellioff : Biochemistry & Mo. Biology – III (Oxford University Press) **Lehninger, Biochemistry** **6. S.K. Sawhney & Randhir Singh: Introductory Practical Biochemistry** **2. Stryer: Biochemistry**

	3. Hadely: Endocrinology **4. Tanable B. and Yokhama:. H. Biological rhythm**

Mathematics VII

Objectives:	
Syllabus:	
Reference:	

Course Name: Schooling, Socialisation & Identity

Credit: 4

Course Code: CC-7

Objectives:	Schools, apart from transmitting curricular knowledge and skills, serve as crucial sites for processes of socialization and transmission of value frameworks that are more often than not, unexamined. Schooling' may thus be seen as a key ingredient in the socialization of the young. This socialization ultimately contributes to and results in the formation of identity. However, children who attend school have, already, been socialized into certain value frame by the time they enter school. The value-frame, sense of self, and identity imbibed by the child at home and in the wider society, interacts in complex ways with school and its socialization processes, more often than not being in conflict. This is furthermore also true of adult learners who join teacher education. Therefore, this course, precisely, intends to analyze and critique the way self and its identities are constructed through socialization process within as well as outside the school. In the process of analyzing the self and identity critically, the course deliberately brings in the social categories such as, caste, class, gender, religion, as well as other factors that are at work in constructing the self and identity of individuals and collectives. Further, the course intends to provide opportunities to contest the value frame emanating from these processes of socialization. An understanding of the multiple processes that form the self and identity ought to result in a capacity to reflect on one's own self and identity, putting this under critical scrutiny. In becoming conscious of the many factors that influence identity and self, the student-teachers should become more sensitively aware of these and begin to 'free' themselves from limiting conceptions of self and identity, thus becoming proactive in shaping their own identities as 'teachers' and 'professionals'. Therefore, teacher educators facilitating this course are asked to adopt transactional modes that result in critical awareness of 'self' and 'identity' leading to the emergence of humanistic values, rather than simply in transmitting theories of 'socialization', 'self' and 'identity'. Through this Course the student teachers will then be able to • Become aware of the processes of socialization at home and

	school that act as shaping factors in identity formation of the school going child (in Indian contexts) • Reflect critically on factors that shape identity formation and influence sense of self of the growing 'student' as well as 'teacher' in school as well as in out of school situations • Begin to understand the processes that have shaped/continue to shape one's own sense of identity as 'student' and a 'person' located in multiple social contexts and roles • Begin to become critically aware of 'self' and 'identity' and 'free' oneself through self-understanding, from tendencies that lead to crystallizing and limiting of one's identity as a teacher and a human being. • 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'.
Syllabus:	Unit 1: Socialization and development of self • Understanding the nature and processes of socialization - At home: family as a social institution; impact of parenting style/child rearing practices; transmission of parental expectations and values; - In the community: neighbourhood, extended family, religious group and their socialization functions - At school: impact of entry to school; school as a social institution; value-formation in the context of schooling; • Various dimensions of self and the impact of socialization on development of self • Understanding interface between home, community and school; inter-linkages within wider socio-cultural context Unit 2: Emergence of 'person' and 'identity' • Understanding 'identity formation'; emergence of multiple identities in the formation of a person placed in various social and institutional contexts; the need for inner coherence; managing conflicting 'identities'. • 'Gender based identity' • Determinants of identity formation in individuals and groups: Social categories such as caste, class, gender and religion • The influence of peer group, media messages, technology, and globalization on identity formation in contemporary society Unit 3: Schooling and identity formation: a critical study • Schooling as a process of identity formation: ascribed, acquired and evolving • School as a site of identity formation in teacher and students: school culture and ethos, teaching-learning practices and teacher discourse in the classroom, evaluation practices; value system and 'hidden curriculum' in schools • Potential role of school in developing national, secular and humanistic identities

	Unit 4: Coping with social complexities: role of education • Expanding human activities and relations; increasing complexity, homogenization of culture vs preservation of distinctive identities; competition, uncertainty and insecurities and the resultant identity conflicts • Assertion of identities, oppression, conflict and violence – relevance of education for peace • Constructive role of education and 'critical pedagogy' in moving towards peaceful living Unit 5: Evolving a 'constructive identity' as a teacher • The impact of one's own socialization processes; awareness of one's own shifting identities as 'student', 'adult' and 'student teacher', and influences that have acted/continue to act on oneself • Reflections on one's own aspirations and efforts in becoming a 'teacher' • Evolving an identity as a teacher, which is progressive and open to re-construction • Teacher's 'professional identity': what does it entail? Modes of Learning Engagement Compilation of a few selected readings should make up course material given to student teachers. There may not be readily available texts on all themes, and faculty would need to seek out additional reference material from literature (fiction), sociological works, writings of alternative educators, articles and such like. Relevant documentary films and film clips should also be used to bring out course themes more vividly. • Introductory lectures-cum-discussion, to introduce key themes of the course – socialization, identity formation, sociological notions and experiential sense of 'self' etc • Observations of schools and classrooms through the lens of course themes; interviews with teachers; making field notes • Group discussion and exploration, around selected readings and key questions • Viewing selected documentaries and film clippings • Writing critical reviews of readings and films viewed • Presentations of reviews • Reflective, autobiographical writing, towards self-understanding, on given topics • Journal writing, on course experiences (to be initiated with this course; to be continued through the year, with occasional sharing with a 'mentor')
Reference:	• Pathak, Avijit (2002), Social Implications of Schooling, Rainbow Publishers, Delhi • Kumar Krishna (2004), What is Worth Teaching? 3rd edition, Orient Longman

	• Krishnamurti, J., Education and the Significance of Life, KFI Publications • Chap. 6: Parents and Teachers • Butler, J. (1990). Gender Trouble: Feminism and the subversion of Identity. New York; Routledge. • Sharma, R &E. Annamalai. (2003). Indian Diaspora: In Search of Identity. Mysore: CIIL. • Kumar, K.(2001) Prejudice and Pride: School Histories of the Freedom Struggle. New Delhi: Viking/Penguin. • Amalendu Misra, (2004). Identity and Religion Foundations of Anti-Islamism in India. Sage Publications, New Delhi • Dipankar Gupta (Ed.) (2004). Caste in question Identity or Hierarchy. Sage Publications, New Delhi. • Kamala Ganesh & Usha Thakkar (Ed.) (2005). Culture and Making of Identity in India, Sage Publications, New Delhi. • Saraswati, T.S. (Ed.) (1999). Culture, Socialization and Human Development. Theory: Research and Applications in India, Sage Publication, New Delhi. • Sen Amartya (2006). Identity and Violence. The Illusion of Destiny. Allen and Lane: Penguin Books India Pvt. Ltd. New Delhi. • Shashi Tharoor (2007). The Elephant, the Tiger &the Cell phone. (Particularly part two of the book).Penguin Viking, New Delhi. • Srinivas M.N., (1986). Social Changes in Modern India, Allied Publishers, Bombay. • Vidyanathan, T.G. (1989), 'Authority and Identity in India', in 'Another India' Dae dalus, Fall, 118 (H): 147-69.

Course Name: Yoga & Well being

Credit: 2

Course Code: AC-12

Yoga & Well being

Objectives:	Awareness of health issues and maintenance of personal health are important factors in the lives of student-teachers, since these sustain a sense of balance, well-being and energy levels. These should be focussed during the two years of the B.Ed programme.
Syllabus:	Modes of Engagement: For this purpose, two kinds of activities ought to be structured into the programme: • a cumulative exposure to yoga and its health benefits through regular yoga classes (twice a week) • time and facilities for playing an outdoor sport and/or undertaking to go for regular brisk walks or jogs This is not intended to be a course for those who are going to become instructors in physical education or yoga, and hence there is no need to

	introduce theoretical aspects of these activities. Modes of Assessment: Faculty should encourage student-teachers to participate in the above activities and keep track of their participation as part of their overall profile. A descriptive assessment should be made on the basis of overall level of participation for each year and finally converted to marks out of 25 at the end of the two years.
Reference:	

Course Name: Intership in Teaching (School Placement) (6 weeks duration)

Credit: 6

Course Code: TP-2

Objectives:	Objectives: On completion of the course the student teacher will be able to • acquire the competence and skills required for multi level teaching, • class management, evaluation of learning outcome, organization of co-curricular activities, • develop professionalism and positive attitude to teaching understand the facilitating role of a teacher
Syllabus:	Content Unit-1: Organisation: In order to facilitate staged entry of student-teachers in teaching, Internship in teaching will be organized in three phases viz. pre-internship, internship and post internship. The duration of pre-internship (preparation for teaching) programme will be of 1 month in first and second semester. The internship will be of 5 weeks organized in selected cooperating schools. Necessary orientation programme for cooperating teachers and Heads of the schools will be organized at the institute. An internship committee with representatives from the Departments of Education in Science & Mathematics, Department of Education and Department of Education in Social Sciences and Humanities will look after the academic and organizational aspects of the internship programme. Unit-2: Internship Activities: The details of pre-internship have been elaborated earlier. The various activities to be performed during internship and post internship phases are as follows: B. Internship • Getting acquainted with various aspects of cooperating schools • Planning and preparation for teaching in two school subjects and maintenance of records. The students are to deliver minimum of 20 lessons (16 with detailed lessons and 4 with lesson notes) in a method subject i.e.(20 + 20 lessons) minimum in two subjects (Mathematics/Bioscience and Physical Science for B.Sc. Ed and Language and Social Sciences for B.A. Ed students. • Development of scheme of lessons and activities in schools • Administration of achievement tests, identification of learning difficulties and analysis of results • Conducting an action research • Preparation of instructional materials/teaching aids and exhibition

of the aids/materials and exhibition of the aids/materials

- Participation in school activities/organizations of activities and a reflective report on it

School Attachment Programme

Each student teacher will prepare a report on the following Suggested Activities

- Conducting classroom teaching
- Maintenance of classroom teaching records
- Framing of time table
- Development of scheme of lessons and activities
- Observation of peer lessons for self improvement
- Attending and organizing morning assembly
- Maintenance of school discipline
- Organization/participation in literary and recreational activities debates/speech competition/quiz
- Maintenance of school records
- Conducting guidance and counseling
- Conducting achievement tests
- Organizing science fair, exhibition, science club, nature study clubs
- Maintenance of school library
- Maintenance of school laboratories
- Organizing games and sports and participations

a. Post-Internship

- Discussion with the pupil-teachers in regard to:
- Seeking reactions of students, cooperating teachers and headmasters and institute supervisors through inventory, interview and group discussion as feedback
- Fellow-up, remedial and strengthening activities to be taken up by the institute
- Exhibition of works done by students during internship
- Suggestions for future

Unit-3: Evaluation and scheme of Assessment

Evaluation of performance, during internship will be done on the basis of assessment of institute supervisors, cooperating teachers, head of schools and students activities/assignments. The scheme of will be as follows in each year.

Area		Marks
Internal		
Teaching	Subject-I	35
	Subject-II	35
Lesson Planning (Record Maintenance)	Subject-I	10
	Subject-II	10
Development of scheme of lessons & Activities		10
Record on Observation of peer teaching	Subject-I	10
	Subject-II	

	Administration of Achievement tests And its analysis/identification of slow Learners/talented children Record on school site and participation of 10 School activities Preparation of instructional materials/Teaching aids exhibition 10 Assessment of Activities of Pupil-Teachers by Head of School 10 --- --- Total: 150
Reference:	

Course Name: Guidance and Counselling

Credit: 6

Course Code: AC-11

Objectives:	1. To Know types of guidance and counselling and realise the need of counseling in present world. 2. To appreciate the role of vocational guidance in career development. 3. To understand the importance of essential services of guidance programmes. 4. To solve the problem of unemployment through acquisition of knowledge of need based courses. 5. To help the teacher-trainees to know the importance of good values. 6. To group the significance of interest and aptitude in vocational choice and job satisfaction. 7. To have faith in need of mental health programme. 8. To cater the need for adjustment in personal and professional life. 9. To deal with psycho-dynamical aspects of adjustment. 10. To help the teacher-trainee to face the problem of daily life and find out solution for it. 11. To help the teacher-trainee play a role of a counselor to pupils.
Syllabus:	Unit-1: The concept of Guidance and counselling 1.1. Types of guidance 1.2 Essential service in the organization of guidance programmes in schools 1.3 General education and counselling. 1.4 Need of counselling in this fast changing world. 1.5 Vocational guidance and its role in career development. Unit-2: Types of counselling 2.1 Individual Counselling 2.2 Group counselling and development counselling (Nature & Scope only) 2.3 Characteristics of an effective counsellor 2.4 Need for special training of a counselor. Unit-3: Guidance and the Higher Education 3.1 Present scenario of Higher education 3.2 Guidance for College women 3.3 Guidance for College men. 3.4 Organizations interested in Guidance and Personal service.

	Unit-4: Cultivation of Good manners 4.1 Good manners-Activities related to it. 4.2 Inculcation of Good values by means of effective counselling. Unit-5: Concept of interest and aptitudes 5.1 Evaluation of Vocational Interest and aptitudes 5.2 Level of aspiration 5.3 Aptitudes and Vocational choice 5.4 Aptitudes and Job Satisfaction Unit-6: Concept of Adjustment and maladjustment 6.1 Determinants of Adjustment 6.2 Need of Adjustment in learning and successful life 6.3 Concept of Mental health 6.4 Determinants of mental health 6.5 Need of mental health programmes in schools Unit-7: Psychodynamics of Adjustment 7.1 Problems of Adjustment 7.2 Causes of maladjustment 7.3 Needs to solve the problem 7.4 The relevant practical psychodynamic aspects of adjustment Unit-8: Problem solving strategies 8.1 Principles of problem solving 8.2 Ways to reduce the intensity of problem 8.3 Ways to decrease the impact of the problem 8.4 Structural planning Unit-9: Guidance and Counselling in Schools 9.1 Teachers Role as Counselor 9.2 Projects related to the counselling work of Teachers Unit-10: Information center for Guidance and Counselling 10.1 Organizing a center for personal Educationa and Vocational Guidance 10.2 Reference materials, nature, source, display and use.
Reference:	1. Guidance and Counselling, Nayak, A.K., APH Publishing Corporation. 2. Guidance and Counselling, David, A. Commonwealth Publishers. Guidance and Counselling, Bhatnagar, Asha and Gupta, Nirmala, Vikas Publishing House Pvt., Ltd

Course Name: Arts and Asthetic Education

Credit: 2

Course Code: AC-15

Objectives:	The need to integrate arts education in the formal schooling of our students is to retain our unique cultural identity in all its diversity and richness and encourage young students and creative minds to do the arts.

	An understanding of the arts will give our youth the ability to appreciate the richness and variety of artistic traditions as well as make them liberal, creative thinkers and good citizens of the nation. Keeping in view some of these ideas the National Curriculum Framework-2005, introduced arts education as a mainstream curricular area, which must be taught in every school as a compulsory subject (up to class X) and facilities for the same may be provided in every school. Keeping this in view, it is all the more important that arts education is integrated in the school curriculum to provide an aesthetically viable atmosphere in schools encouraging creativity. For this, not only the art teachers but every teacher should be sensitive to appreciate this. Aim: The aim of teaching arts education in school may be perceived as a tool for development of aesthetic sensibility among learners to enable them to respond to the beauty in different forms. Thus, inclusion of the curricular area of arts in education in for student learners will contribute significantly in the overall development of their personality as well as make their teaching more effective. This may be achieved by learning different art forms as well as knowing about them and through student's own participation, community help and building up of certain core facilities. Thus, the broader objectives of learning should be able to make them; • express freely their ideas and emotions about different aspects of life through different art forms. • learn to appreciate different art forms and distinguish them. • develop an insight towards sensibility and aesthetic appreciation and become more creative and conscious about the good and beautiful in their environment, including classroom, school, home and community through an integrated learning approach. • integrate the knowledge of art with daily life through learning with different media and techniques by using creative expression and making objects of common use. • make learners conscious of rich cultural heritage of their own region as well as that of the nation. • get acquainted with the life and work of artists.
Syllabus:	Course Components: This course as part of the two year B. Ed. programme should consist of theory, practical, project work and workshop. Also, the arts need to be applied in day to day life from designing classroom materials to notice board, cultural festivals, theme based celebrations, national days to festivals etc. where everyone will participate. These occasions will be a forum for students' activities where intra relation of all the art forms will manifest on a single occasion. Theory - Concepts and forms of arts and crafts- an introduction: what do we mean by arts and crafts, which contain visual and plastic art forms, performing art forms, and heritage crafts. - Significance of art in education: why art forms are important for learning? - Integrating arts and crafts in school curriculum as a pedagogical support/ resource: education through arts and crafts is an interesting method which may be integrated in regular learning that leads to skills, observation, analysis, synthesis, evaluation, and problem

	solving. - Different ways/methods to integrate arts in education: during the curriculum transaction, different strategies can be adopted. - Historical perspectives of arts in education: reflections on importance of arts education by thinkers and educators in 20th century. - Current thinking and practices in arts education: various researches and NCF-2005. - Knowing about local art and craft forms: the diversity of India's arts and crafts at the local/ regional level and its integration in the curriculum. Practical - Activities related to doing arts, including application of arts in the immediate environment. Small activities, which enhances the skills including the communication and presentation skills, brings in imagination, creativity and aesthetic sensibility among the student teachers. - Application of aesthetic and design sensibility in the day to day life, in their profession and environment are some of the practical aspects, which needs to be taken care of. During the celebrations of festivals, functions, special days etc. this should be reflected. Project: The student teacher can take a theme-based project from any of the curricular areas covering its social, economic, cultural and scientific aspects integrating various art and craft forms. Also, they can do an analysis of textbooks - where they can find a scope either in the text or in the form of activities or exercises to integrate art forms. They can also document processes of an art or craft form from the pedagogical point of view; such as weaving or printing of textiles, making of musical instruments, folk performances in the community etc. - how the artists design their products, manage their resources including raw materials, market it, what problems do they face as all these aspects involve historical, social, economic, scientific and environmental concerns. Workshops: At least 2 workshops for half a day for one week of working with an artist or a group to learn basics of art or craft forms and understand its pedagogical aspects is required for student teacher in each year. The forms learnt during the course should be relevant and can be used by student teacher in her profession, as a means of exploring different media and creative expression in drawing, painting, rangoli, clay-work/pottery, collage-making, wood-work, toy-making, theatre, puppetry, dance, music etc. including regional/ folk forms of arts and crafts, which will be helpful in imparting quality education among school children. The focus of the workshops should be on how art forms can be used as tool/ method of teaching-learning of languages, social science, mathematics and science, specially through art related activities. Students can also be introduced to design education and basic principles of design through workshops. Modes of Learning Engagements: - Classroom environment should be interactive and discussions should take place where student teachers can document each others' experiences as an artist and connoisseur both. How arts in

	education can be - Attending exhibitions and performances, interacting with artists and craft persons, watching and listening art related films, audio and video materials available on different performers, regional/ folk art forms etc. may also be shown from time to time. These will not only create awareness but also an appreciation for arts forms and bring in aesthetic sensibility and related values among the student teachers. - Projects and assignments may be given for individual learners as well as for group work. - Workshops may be conducted at least once in each year where student teachers can get a first hand experience of working with artists, handle different materials and media, learn about different aspects of an art form on how it relates to the society and community and can be used as pedagogical tool to transact - A small Resource centre should be a part of all the RIEs, where materials including books, CDs, audio, video cassettes, films, software, props, Modes of Assessment: The engagement of teacher-learners in the above set of experiences should be quantitatively and qualitatively evaluated, based on observations and submissions of projects and assignments and an overall grade should be assigned that covers: a) submission of work b) participation c) creative potential displayed d) application of aesthetic and design sensibility in campus events or in other course work. This should be and
Reference:	

Semester VIII

Course Name: Elective I- Physics VIII/Computer Science VIII

Credit: 5 (Theory 3+2 Practical)

Course Code: SS-1

Physics Theory VIII

Objectives:	After the completion of the course the students will be able to: 1. Understand amorphous and crystalline solids and various type of crystal structures 2. Derive expressions for packing fractions of simple cubic, body centered cubic and face- centered cubic lattices as well as their co-ordination numbers. 3. Understand the use of X- rays in studying the crystal structures. 4. Understanding various types of bonding in solids as well as calculate the binding energy of ionic crystals. 5. Understand the concept of lattice vibrations and phonons. 6. Derive expressions for the specific heat of solids. 7. Understand Einstein and Debye's theory of specific heat of solids. 8. Understand electrical phenomena in solids and the role of quantum mechanics to study the electronic transport in metals, semiconductors and superconductors.
Syllabus:	Unit :1 Crystal structure Amorphous and crystalline solids, concept of crystal lattice, elements

	of symmetry, unit cells and Bravais lattices, seven crystal systems, cubic lattices, coordination number, packing fraction of sc, bcc and fcc structures, miller indices, simple crystal structures like sodium chloride, calcium chloride and diamond; Laue's equation for X-ray diffraction, Bragg's law. X-ray diffraction methods. Unit: 2 Binding in solids Inter-atomic forces and types of bonding, classification, cohesive energy of a solid, binding energy of ionic crystals, Madelung constant. Lattice vibrations and thermal properties of crystals; Specific heat of solids- classical theory (Dulong-Petits law), Einstein and Debye's theories, vibrational modes of one dimensional mono atomic lattice, dispersion relations, Brillouin zones. Unit: 3 Electrical properties of crystals Free electron model of a metal. Solution of one-dimensional Schrodinger's equation in a constant potential; density of states; Fermi energy; Energy bands in solids; (Kroning- Penney model). Distinction between metals, insulators and semiconductors; Hall effect; Hall field and Hall coefficient Unit :4 Magnetic Properties of crystals, Superconductivity Dia, para and ferromagnetism, Langevin's theory of dia and para magnetism; Curie-Weiss law, ferromagnetism and magnetic domains,Ferromagnetic materials, hysteresis, energy loss, Superconductivity- critical temperature, Meissner effect, Josephson's tunneling, elementary ideas of various theories of superconductivity. Unit 5 Elementary ideas of some frontier areas of physics Laser; holography, maser; Mossbauer effect; quasars; Chandrashekar limit, elementary ideas about neutron stars and pulsars; physics of nano materials and thin film technology. elementary ideas about four forces and Unification of Forces; introduction to NMR. waves over liquid surface; gravity waves and ripples
Reference:	1. Kittel, C., Introduction to Solid State Physics, John Wiley and Sons, Newyork. 2. Pillai, S.O., Solid State Physics, New Age international, New-Delhi. 3. Gupta, S.L. and Kumar, V., Solid State Physics, K. Nath and Co., Meerut

Physics Practical VIII

Objectives:	

Syllabus:	DOING A PROJECT INNOVATIVE APPROACH TO EXPERIMENTS Instructions for students 1. Choose an experiment you want to conduct in a project mode – get allotted. 2. Write its objectives to make it open-ended. 3. Collect literature relevant to it. 4. Collect and sequence all material for conducting it. 5. Formulate hypothesis. 6. Envisage process to attack problems and verify hypothesis. 7. Conduct experiments. 8. Tabulate observation for each objective separately. 9. Plot graphs for finding any relationship. 10. Infer from graphs. 11. Discuss reliability of result. 12. Make error analysis. 13. Write questions that need to be answered on the project. 14. Whether the stated objectives have been realized or not. If not what were the constraints. (Sources of error) 15. Number of consultation done with the teacher, experts and peer group about the project. 16. Write utility and scope of your investigation. 17. Provide references and acknowledgement. 18. Submit project by 15 march of each session. Topics for suggestive projects (interdisciplinary projects are welcome) 1. Communication Electronics 2. Nano technology 3. Superconductivity 4. Projects based innovative experiments like half life simulations, Galileo's experiments Cart experiment, Projectile motions, head on collision, Rutherford's scattering. 5. Atmospheric physics 6. Plasma Physics 7. Biophysics 8. Design of power supply.
Reference:	Latest version of the books may be preferred Feynman,P., Lighto n,R.B. and sands, M., The Feynman Lectures on Physics Vol I,II,III, Narosa Publishing House, New-Delhi. Khandelwal, D.P., Oscillations and Waves, Himalaya Publishing House, Bombay. Unified Physics , Shivlal Agrawal and Yugbodh Prakashan Pugh, E.M. and Pugh, E.W., Principles of Electricity and Magnetism, Adison-Welsely, London. Purcell, E.M., Electricity and Magnetism, Berkeley Physics Course, McGraw-Hill Co., Bombay. Haung, K., Statistical Physics, Wiley Eastern Ltd., New-Delhi.

	Jenkins, F.M. and White, H.E.;Fundamentals of Optics, McGraw-Hill, Bombay. Smith, F.R.S. and Thomson, J.H., Optics; John Wiley and sons, London. Main, I.G.; Vibrations and Waves, Cambridge University Press. Sadiku, M.N.O., Elements of Electromagnetism, Oxford University Press Halliday, D. and Resnik, R., Physics, Wiley Eastern, London. Jordan, E.C.; Electromagnetic Waves and Radiating Systems, Prentice-Hall of India Patel, Y.I., Verma, L.R.; Yugbodh Physics, Yugbodh Prakashan , Raipur. Bapat, M.N., DS Mathur's Heat and Thermodynamics; Sultan Chand and Sons, New Delhi Rajam, J.B., Atomic Physics; S Chand & Co., New Delhi.

Computer Science VIII

Objectives:	
Syllabus:	
Reference:	

Course Name: Elective II- Chemistry VIII/Informatic Practices VIII

Credit: 5(Theory3+2 Practical)

Course Code: SS-2

Chemistry Theory VIII

Objectives:	After completing this semester the students should be able to: (i) Get a comparative idea of the concepts involved in classical mechanics and quantum mechanics. (ii) Learn the origin of Schrödinger wave equation and its application in calculating the energy and wave functions of various atomic and molecular systems. (iii) Appreciate to learn the quantum mechanical explanation of the concept of hybridization. (iv) assess the various interplay regions of electromagnetic radiations and their interaction with molecular rotational, vibrational and electronic energies (v) Get acquaintance with the subject of photochemistry and make a comparative study about thermal and

	photochemical reactions. (vi) Appreciate to learn different photo-physical processes responsible for some interesting phenomenon like fluorescence and phosphorescence. (vii) Apply the idea of physical properties in the derivation of molecular structures. (viii) Gain knowledge about colligalive properties and determining molecular mass by the help of these properties. (ix) Lean the concept of electrode potential and appreciate to learn its application in deciding reactivity of different substances and in the determination PH of various solutions. (x) Construct various electrochemical cells based on electrochemical series displayed by the redox couples and the types of electrodes used. (xi) Establish a correlation between the ideas of thermodynamics and cell reactions. (xii) Learn the conceptual background of performing the potentiometeric titrations. Instructional Strategy: In dealing with quantum mechanics, the teachers should impress upon the students the role of mathematical modeling in transaction of concepts in physical sciences. The MO theory may be transacted with the help of computer technology. Alongwith theoretical classroom discussions, to effectively teach the spectroscopy ideas a visit to a nearby instrumental laboratory may be fruitful. The technique of open-ended learning may be encouraged in giving treatment to the subject of photochemistry. Students may be encouraged to take some project work on the study of properties associated with the substances as they effect molecular mass calculation and elucidation of structures. The idea of individual learning may be encouraged for some concepts of electrochemistry
Syllabus:	UNIT – I Elementary Quantum Mechanics: Black-body radiation, Planck's radiation law, photoelectric effect, heat capacity of solids, Bohr's model of hydrogen atom (no derivation) and its defects. Compton effect. De Broglie Hypothesis, the Heisenberg's uncertainty principle, Sinusoidal wave equation, Hamiltonian operator, Schrodinger wave equation and its importance, physical interpretation of the wave function, postulates of quantum mechanics, particle in a one

	dimensional box. Molecular orbital theory, basic ideas-criteria for forming M.O. from A.O., construction of M.O.'s by LCAO-H2+ ion, calculation of energy levels from wave functions, physical picture of bonding and antibonding wave functions, concept of □, □*, □, □* orbitals and their characteristics. Hybrid orbitals –sp, sp2, sp3-, calculation of coefficients of A.O.'s used in these hybrid orbitals. Introduction to valence bond model of H2, comparison of M.O. and V.B. models. UNIT – II Spectroscopy: Introduction: electromagnetic radiation, regions of the spectrum, basic features of different spectrometers, statement of the Born-Oppenheimer approximation, degrees of freedom. Rotational Spectrum: Diatomic molecules, Energy levels of a rigid rotor (semi-classical principles), selection rules, spectral intensity, distribution using population distribution (Maxwell-Boltz man distribution) 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 of anharmonic motion and isotope on the spectrum, Idea of vibrational frequencies of different functions groups. Raman spectrum: Concept of polarizability, pure rotational and pure vibrational Raman spectra of diatomic molecules, selection rules. Electronic Spectrum: Concept of potential energy curves for bonding and antibonding molecular orbitals, qualitative description of selection rules and Franck-Condon principle. Qualitative description of □,□ and □M.O., their energy levels and the respective transitions. UNIT – III Photo Chemistry: Interaction of radiation with matter, difference between thermal and photochemical processes. Laws of photochemistry: Grothus-Draper law, Stark-Einstein law, Jablonski diagram depicting various processes occurring in the excited state, qualitative description of fluorescence, phosphorescence, non-radiative processes (internal conversion, intersystem crossing), quantum yield, photosensitized reactions energy transfer processes (simple examples). UNIT – IV

	(A) Physical Properties and Molecular Structure: Optical activity, polarization (Clausius-Mossoti equation), orientation of dipoles in an electric field, dipole moment, induced dipole moment, measurement of dipole moment temperature method and refractivity method, dipole moment and structure of molecules, magnetic properties-paramagnetism, diamagnetism and ferromagnetics. (B) Solutions, Dilute Soluctions and Colligative Properties: Ideal and non-ideal solutions, methods of expressing concentrations of solutions, activity and activity coefficient. Dilute solutions, colligative properties, Raoult's law, relative lowering of vapour pressure, molecular weight determination. Osmosis, law of osmotic pressure and its measurement, determination of molecular weight from osmatic pressure. Elevation of boiling point and depression of freezing point. Thremodynamic derivation of relation between molecular weight and elevation in boiling point and depression in freezing point. Experimental methods for determining various colligative properties. Abnormal moloar mass, degree of dissociation and association of solutes. UNIT – V 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. Electrolytic 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 reactions (□G, □H and K), polarization, over potential and hydrogen overvoltage. Concentration cell with and without transport, liquid junction potential, application of concentration cells, valency of ions, solubility product and activity coefficient, potentiomentric titrations. Definition of pH and PKa determination of pH using hydrogen, quinhydrone and glass electrodes, by potentiometric methods. Buffers – mechanism of buffer action, Henderson-Hazel equation. Hydrolysis of salts. Corrosion – types, theories and methods of combating it.
Reference:	1. Chandra ,A.K., Quantum Chemistry TMH Publication 2. . Levine, I.N., Quantum Chemistry, Prentice Hall of India Pvt. Ltd. 3. Banwell, C.N., Spectroscopy , TMH Publication

	4. Sharma ,Y.R., Elementary Organic Spectroscopy , S. Chand & Company 5. Glastone, S. Theoretical Chemistry, East-West Publication 6. Puri, Sharma & Pathania, Physical Chemistry, Soban Lal Nagin Chand & Company 7. Atkins, P.W., & Paula, J.D., Physical Chemistry , Oxford Press 8. Vemulapalli , G.K., Physical Chemistry , Prentice Hall of India Pvt. Ltd. 9. Rohtagi Mukherjee ,K.K., Photochemistry , Wiley Eastern Ltd. 10. Barrow .G.M., Physical Chemistry , Mc Graw Hill Kogakusha Ltd. Tokyo 4th Edition 1979.

Chemistry Practical VIII

Objectives:	
Syllabus:	Investigatory Projects Project Work
Reference:	

Course Name: Elective III-Botany VIII/Zoology VIII/Mathematics VIII

Credits: 5(Theory 3+2 Practical)

Course Code: SS-3

Botany Theory VIII

Objectives:	To enable the student teacher to understand the plants in relation to their environment. To provide the knowledge of different types of vegetation of Madhya Pradesh and Chhattisgarh. To provide an understanding for the improvement of plants by different methods
Syllabus:	Unit I Plants and environment : Atmosphere (gaseous composition), water (properties of water cycle), light (global radiation, photosynthetically active radiation), temperature, soil (development, soil profiles, physicochemical properties) and biotic factors. Morphological anatomical and physiological responses of plants to water (hydrophytes and xerophytes), temperature (thermoperiodicity and vernalization), light (photoperiodism, heliophytes and sciophytes) and salinity. Unit II Population ecology : Growth curves, ecotypes and ecads. Community ecology : Community characteristics, frequency, density, cover, Raunkiar's life forms, biological spectrum; ecological succession. Unit III Ecosystems : Structure, abiotic and biotic components; food chain, food

	web. Ecological pyramids, energy flow; biogeochemical cycles of carbon, nitrogen and phosphorus. Unit IV Biogeographical regions of India, vegetation types of India with special reference to Madhya Pradesh and Chhattisgarh, National Parks in M.P. and Chhattisgarh, endangered plant species and their conservation. Unit V Improvement of Plants : Plant breeding, nature scope and methods of plant breeding. Breeding for disease resistance. Vegetative propagation methods, micropropagation, grafting and their economic aspects.
Reference:	• Kumar, H.D. Modern concepts of Ecology 1992. Vikas Publishing House, New Delhi • Koromondy, E.J. 1996. Concepts of Ecology Prentice Hall of India Ltd., New Delhi • Odum, E.P., 1983, Basic Ecology Saunders, Philadelphia • Ganguly, A.K. and Kumar, N.C. Cytology, Genetics Plant Breeding and Organic Evolution Emkay Publications Delhi – 110051 • Singh B.D. 1997 Plant Breeding • Gupta, S.K. 2000, Plant Breeding Agrobios Jodhpur • Ambasht, R.S. 2001, A Text Book of Ecology Student's Friends & Co. New Delhi • Shukla, S. and Chandel P.S. 2005, A Text Book of Plant Ecology. S. Chand & Co. New Delhi • Pandey B.P. 2000 Economic Botany, S. Chand & Co. New Delhi • Bhattacharya, S.K. 2001, Handbook of Medicinal Plants Pointer Publishers, Jaipur

Botany Practical VIII

Objectives:	To develop the skills of designing an experiment, collection of data, and its interpretation for making generalization/testing of hypothesis.
Syllabus:	List of Suggestive Projects 1. Acquaintance with the local herbaceous flora and an ecological note about these. 2. Preparation of inventory of tree species of RIE Campus. 3. Listing of soil types in relation to altitude from Shyamla Hills. 4. Enumeration of physical and chemical attributes of soil samples from Shyamla Hills and their relevance to the

	vegetation. 5. Listing of ephemerals from Van Vihar. 6. Phytosociological study of vegetation of Shyamla Hills in terms of density, frequency, abundance of important species. 7. Preparation of Raunkiar's frequency classes of an area.
Reference:	• Kumar, H.D. Modern concepts of Ecology 1992. Vikas Publishing House, New Delhi • Koromondy, E.J. 1996. Concepts of Ecology Prentice Hall of India Ltd., New Delhi • Odum, E.P., 1983, Basic Ecology Saunders, Philadelphia • Ganguly, A.K. and Kumar, N.C. Cytology, Genetics Plant Breeding and Organic Evolution Emkay Publications Delhi – 110051 • Singh B.D. 1997 Plant Breeding • Gupta, S.K. 2000, Plant Breeding Agrobios Jodhpur • Ambasht, R.S. 2001, A Text Book of Ecology Student's Friends & Co. New Delhi • Shukla, S. and Chandel P.S. 2005, A Text Book of Plant Ecology. S. Chand & Co. New Delhi • Pandey B.P. 2000 Economic Botany, S. Chand & Co. New Delhi • Bhattacharya, S.K. 2001, Handbook of Medicinal Plants Pointer Publishers, Jaipur

Zoology Theory VIII

Objectives:	To gain knowledge on biodiversity & ecology with ecosystem, pollution, animal behaviour and applied aspects of zoology
Syllabus:	Unit 1: Biodiversity **a.** Zoo-geographical Regions, Wallece & Webers line, Continental Drifts. **b.** Wild life & its conservation **c.** National Parks & Sanctuaries of India. **d.** Threatened & Endangered species of animals of India **e.** Natural Resources and its conservation. Unit 2: Ecology (a)Concept of Ecosystem, (b) biotic & abiotic factors, (c) energy flow, (d) food chain, (e) food web, (f) Population & community concept, (g) population explosion and control. Unit 3: Pollution a. Air, water and sound pollution and their management, waste matter management b. Occupational health hazards & their control c. Global warming & Green house effect d. Basic concept of toxicology, LC 50, LD 50 e. Heavy metals, Pesticides & Insecticides Toxicities f. Radiation and it effect.

	Unit 4: Animal behaviour b. Homing, territorial, courtship & mating c. Learning, animal communication, Taxis, Reflexes, Instincts analysis of Instinctive behaviour. d. Concept of motivated behaviour e. Physiological analysis of motivated behaviour. Unit 5: Applied Zoology a. Fresh water fisheries in India, monoculture, Polyculture and composite culture. b. Aquaculture, mixed farming and Prawn fisheries c. Brief account of Fish industries , Sericulture, Apiculture and Pearloyster Industries d. Poultry & Dairy Industries.
Reference:	Bethiar and sellar: Animal Behaviour 2. C.S.I.R. (Special lSupplement) wealth of India Fisheries 3. E. Odum, Ecology (Amerind 4. Jhingeran V.G: Fish and fisheries of India 5. Khanna S.S: An Introduction of Fishes, central Book Depot, Allahabad 6. Kenedieh, Ecology 7. Manning and introduction to animal behaviour (Addison-Wesley) 8. R.C. Dalela: Ecology and Evolution 9. Reena Mathur: Animal Behaviour 10. Rao Chellappa : Animal Physiology & Ecology 11. Singh Sardar : Bee Keeping in India 12. Shukla and Upadhyay: Economic Zoology 13. Vinod Kumar: Animal Behaviour

Zoology Practical VIII

Objectives:	To develop in the students – The skills of data collection & interpretation of data, hypothesis and generalization.
Syllabus:	Effect of thyroxine on development of tadpol of frog. 2. Influence of vitamin A on the regeneration of wall lizard tail. 3. Influence of toxicants / Industrial effluents / Insecticides / Biocides/ sewage contamination/ heavy metals/ DO & CO2 of tap water. 4. Influence of sublethal & lethal toxicant on behaviour and survival of fish species. 5. Affect of heavy metals on coelomic protein on earthworm/ and blood serum of rat or any animal 6. Visit to natural places upper lake, lower lake, shahpura lake & different ponds estimation of water quality. 7. Identification of fauna of Shyamla Hills for study of Biodiversity. 8. Comparison of histological of reproductive organ/digestive organs/ visceral organ in different vertebrates using microtomy technique.

Reference:	1. Bethiar and sellar: Animal Behaviour 2 C.S.I.R. (Special lSupplement) wealth of India Fisheries 3 E. Odum, Ecology (Amerind 4. Jhingeran V.G: Fish and fisheries of India 5. Khanna S.S: An Introduction of Fishes, central Book Depot, Allahabad 6. Kenedieh, Ecology 7. Manning and introduction to animal behaviour (Addison-Wesley) 8. R.C. Dalela: Ecology and Evolution 9. Reena Mathur: Animal Behaviour 10. Rao Chellappa : Animal Physiology & Ecology 11. Singh Sardar : Bee Keeping in India 12. Shukla and Upadhyay: Economic Zoology 13. Vinod Kumar: Animal Behaviour

Mathematics VIII

Course Name: Elective Project I (Physics/Computer Science)

Credit: 2

Course Code: SS-1

Physics

Objectives:	
Syllabus:	DOING A PROJECT INNOVATIVE APPROACH TO EXPERIMENTS Instructions for students 1. Choose an experiment you want to conduct in a project mode – get allotted. 2. Write its objectives to make it open-ended. 3. Collect literature relevant to it. 4. Collect and sequence all material for conducting it. 5. Formulate hypothesis. 6. Envisage process to attack problems and verify hypothesis. 7. Conduct experiments. 8. Tabulate observation for each objective separately. 9. Plot graphs for finding any relationship. 10. Infer from graphs. 11. Discuss reliability of result. 12. Make error analysis. 13. Write questions that need to be answered on the project. 14. Whether the stated objectives have been realized or not. If not what were the constraints. (Sources of error) 15. Number of consultation done with the teacher, experts and peer group about the project. 16. Write utility and scope of your investigation. 17. Provide references and acknowledgement.

	18. Submit project by 15 march of each session. Topics for suggestive projects (interdisciplinary projects are welcome) 1. Communication Electronics 2. Nano technology 3. Superconductivity 4. Projects based innovative experiments like half life simulations, Galileo's experiments Cart experiment, Projectile motions, head on collision, Rutherford's scattering. 5. Atmospheric physics 6. Plasma Physics 7. Biophysics Design of power
Reference:	Latest version of the books may be preferred Feynman,P., Lighto n,R.B. and sands, M., The Feynman Lectures on Physics Vol I,II,III, Narosa Publishing House, New-Delhi. Khandelwal, D.P., Oscillations and Waves, Himalaya Publishing House, Bombay. Unified Physics , Shivlal Agrawal and Yugbodh Prakashan Pugh, E.M. and Pugh, E.W., Principles of Electricity and Magnetism, Adison-Welsely, London. Purcell, E.M., Electricity and Magnetism, Berkeley Physics Course, McGraw-Hill Co., Bombay. Haung, K., Statistical Physics, Wiley Eastern Ltd., New-Delhi. Jenkins, F.M. and White, H.E.;Fundamentals of Optics, McGraw-Hill, Bombay. Smith, F.R.S. and Thomson, J.H., Optics; John Wiley and sons, London. Main, I.G.; Vibrations and Waves, Cambridge University Press. Sadiku, M.N.O., Elements of Electromagnetism, Oxford University Press Halliday, D. and Resnik, R., Physics, Wiley Eastern, London. Jordan, E.C.; Electromagnetic Waves and Radiating Systems, Prentice-Hall of India Patel, Y.I., Verma, L.R.; Yugbodh Physics, Yugbodh Prakashan , Raipur. Bapat, M.N., DS Mathur's Heat and Thermodynamics; Sultan Chand and Sons, New Delhi Rajam, J.B., Atomic Physics; S Chand & Co., New Delhi.

Computer Science

Course Name: Elective Project II (Chemistry/Informatics Practices)

Credit: 2

Course Code: SS-2

Chemistry

Objectives:	
Syllabus:	
Reference:	

Informatics Practices

Course Name: Elective Project III (Botany/Zoology/Mathematics)

Credit: 2

Course Code: SS-3

Botany

Objectives:	To develop the skills of designing an experiment, collection of data, and its interpretation for making generalization/testing of hypothesis
Syllabus:	List of Suggestive Projects 1. Acquaintance with the local herbaceous flora and an ecological note about these. 2. Preparation of inventory of tree species of RIE Campus. 3. Listing of soil types in relation to altitude from Shyamla Hills. 4. Enumeration of physical and chemical attributes of soil samples from Shyamla Hills and their relevance to the vegetation. 5. Listing of ephemerals from Van Vihar. 6. Phytosociological study of vegetation of Shyamla Hills in terms of density, frequency, abundance of important species. 7. Preparation of Raunkiar's frequency classes of an area.
Reference:	• Kumar, H.D. Modern concepts of Ecology 1992. Vikas Publishing House, New Delhi

	• Koromondy, E.J. 1996. Concepts of Ecology Prentice Hall of India Ltd., New Delhi • Odum, E.P., 1983, Basic Ecology Saunders, Philadelphia • Ganguly, A.K. and Kumar, N.C. Cytology, Genetics Plant Breeding and Organic Evolution Emkay Publications Delhi – 110051 • Singh B.D. 1997 Plant Breeding • Gupta, S.K. 2000, Plant Breeding Agrobios Jodhpur • Ambasht, R.S. 2001, A Text Book of Ecology Student's Friends & Co. New Delhi • Shukla, S. and Chandel P.S. 2005, A Text Book of Plant Ecology. S. Chand & Co. New Delhi • Pandey B.P. 2000 Economic Botany, S. Chand & Co. New Delhi • Bhattacharya, S.K. 2001, Handbook of Medicinal Plants Pointer Publishers, Jaipur

Zoology

Objectives:	To develop in the students – The skills of data collection & interpretation of data, hypothesis and generalization
Syllabus:	. Effect of thyroxine on development of tadpol of frog. 2. Influence of vitamin A on the regeneration of wall lizard tail. 3. Influence of toxicants / Industrial effluents / Insecticides / Biocides/ sewage contamination/ heavy metals/ DO & CO2 of tap water. 4. Influence of sublethal & lethal toxicant on behaviour and survival of fish species. 5. Affect of heavy metals on coelomic protein on earthworm/ and blood serum of rat or any animal 6. Visit to natural places upper lake, lower lake, shahpura lake & different ponds estimation of water quality. 7. Identification of fauna of Shyamla Hills for study of Biodiversity. 8. Comparison of histological of reproductive organ/digestive organs/ visceral organ in different vertebrates using microtomy technique.
Reference:	Bethiar and sellar: Animal Behaviour 2. C.S.I.R. (Special lSupplement) wealth of India Fisheries 3. E. Odum, Ecology (Amerind 4. Jhingeran V.G: Fish and fisheries of India 5. Khanna S.S: An Introduction of Fishes, central Book Depot, Allahabad 6. Kenedieh, Ecology 7. Manning and introduction to animal behaviour (Addison-Wesley) 8. R.C. Dalela: Ecology and Evolution 9. Reena Mathur: Animal Behaviour 10. Rao Chellappa : Animal Physiology & Ecology 11. Singh Sardar : Bee Keeping in India 12. Shukla and Upadhyay: Economic Zoology 13. Vinod Kumar: Animal Behaviour

Mathematics

Course Name: Vision of Indian Education: Issues & Concerns

Credit: 4

Course Code: CC-8

Objectives:	Education is essentially a normative endeavour, hence is intentional. It intends, rather deliberately, to socialize children into a value frame or normative structure. That is why history reveals that every education system, at different historical periods, had been guided by certain value concerns. In contemporary times, the education system in India derives its values from the Constitution of India. While socializing children education has to negotiate within the frame of Constitutional values. Indian Constitution envisioned a humane society based on freedom, equality and justice, and this led to evolving many institutions to realize the vision. In this regard, education has been considered as an agency of social transformation and classroom as the shaper of the envisioned destiny. Since teachers ought to play crucial role in realizing the vision, they are to be informed the Constitutional vision so as to develop normative perspectives regarding education and thereby emerging concerns and issues. This normative perspective a teacher holds in turn guides his/her actions and acquires a meaning to action. Education being an operational area, every citizen perceives several issues related to it through personal experience. The student-teachers need to understand the main issues that touch their functioning as also situate themselves in context. Such an understanding on at least a few issues and concerns will equip student teachers to be ready for dealing with other issues and concerns in the field. This is very relevant as it may not be possible to bring under scrutiny all issues and concerns. Since, concerns and issues cannot and should not be 'informed' like 'ready to cook facts', the course is designed in such a fashion that prospective teachers would be encouraged to come to terms with concerns and issues that would emerge out of their reasoned engagement with contemporary educational reality in the light of professed humanistic values. The course is intended to enable the development of perspectives about vision of contemporary educational reality, its concerns and issues Therefore, this course is called 'Seminar Course' which will

	be provided through deliberations, discussions, dialogues, reflections, library reading and presentations, instead of the usual classroom lectures.
Syllabus:	Unit 1: Normative Vision of Indian Education • Normative orientation of Indian Education: A historical enquiry • Determinants of purpose and process of Education: Communities, Religion, State and Market. • Constitutional provisions on education that reflect national ideals: Democracy, Equality, Liberty, Secularism, and Social Justice. • India as an evolving Nation State: Vision, Nature and Salient Features- Democratic and Secular polity, federal structure: Implications for Educational system • Aims and purposes of contemporary education drawn from the normative vision Unit 2: Vision of Education: Four Indian Thinkers An overview of salient features of the 'philosophy and practice' of education advocated by these thinkers • Rabindranath Tagore: Liberationist pedagogy • M.K.Gandhi: Basic education OR Education for self sufficiency • Aurobindo Ghosh: Integral education • J. Krishnamurthi: Education for individual and social transformation Unit 3: Contemporary Indian Schooling: concerns and issues • Universalization of School Education - Right to Education and Universal access: i. Issues of a) Universal enrollment b) Universal retention c) Universal success: ii. Issues of quality and equity The above to be discussed with specific reference to physical, economic, social and cultural access particularly to girl child and weaker sections as well as differently abled children • Equality of Educational Opportunity: - Meaning of Equality and Constitutional Provisions - Prevailing nature and forms of Inequality including Dominant and Minor groups and the related issues - Inequality in Schooling: Public- private schools, Rural-urban schools, single teachers' schools and many other forms of inequalities in school systems; and the processes leading to disparities - Differential quality in Schooling: variations in school quality • Idea of 'common school' system Unit 4: Rights of Child: Schooling: • Child Rights: - International covenants and Indian Constitu

	Provisions. - Rights of Girl Child. - Education as Fundamental Right of Children: to Education Bill its provisions. - Child labour: Right to Education: Alternative S their nature. - Right to Education: School Practices: A critical Unit 5: Education and Development- an Interface • Education for National Development: Education Commission (1964-66) • Emerging trends in the interface between: - Political process and education - Economic developments and education - Socio-Cultural changes and education Modes of Learning Engagement This is intended to be a seminar course, where students engage with diverse activities around the themes, issues and concerns highlighted in the course. They would engage in a range of self-study and discussion activities. Suggested modes of learning engagement are: • Sourcing and studying relevant portions of documents relevant to the themes • Presentations based on readings (including original writing of at least one educational thinker) • Conduct surveys of various educational contexts (eg Schools of different kinds) and make interpretative presentations based on these • Study writings on analysis of education-development interface and make presentations • Group discussions, debates and dialogue on the themes
Reference:	• Agrawal, J.C. & Agrawal S.P. (1992). Role of UNESCO Educational, Vikas Publishing House, Delhi. • Anand, C.L. et.al. (1983). Teacher and Education in Emergi in Indian Society, NCERT, New Delhi. • Govt. of India (1986). National Policy on Education, Min. HRD, New Delhi. • Govt. of India (1992). Programme of Action (NPE). Min HRD. • Mani, R.S. (1964). Educational Ideas and Ideals of Gand and Tagore, New Book Society, New Delhi. • Manoj Das (1999). Sri Aurobindo on Education, Nation Council for Teacher Education, New Delhi. • Mistry, S.P. (1986). Non-formal Education-An Approach Education for All, Publication, New Delhi. • Mohanty, J., (1986). School Education in Emerging Societ sterling Publishers. • Mukherji, S.M., (1966). History of Education in Indi Acharya Book Depot, Baroda. • Naik, J.P. & Syed, N., (1974). A Student's History Education in India, MacMillan, New Delhi. • NCERT (1986). School Education in India – Present Stat and Future Needs, New Delhi. • Ozial, A.O. 'Hand Book of School Administration a Management', London, Macmillan.

	• Radha Kumud Mookerji. Ancient Indian Educatic (Brahmanical and Buddhist), Cosmo Publications, New Del – 1999. • Sainath P. (1996). Every body loves a good drought. Pengu Books New Delhi. • Salamatullah, (1979). Education in Social context, NCER New Delhi. • Sykes, Marjorie (1988): The Story of Nai Talim, Naitali Samiti: Wardha. • UNESCO; (1997). Learning the Treasure Within. • Dr. Vada Mitra. Education in Ancient India, Arya boc Depot, New Delhi – 1967 • Ministry of Education. 'Education Commission "Kotha Commission". 1964-1966. Education and Nation Development. Ministry of Education, Government of Ind 1966. • Learning without Burden, Report of the National Adviso Committee. Education Act. Ministry of HRD, Department Education, October, 2004. • National Policy on Education. 1986. Ministry of HRI Department of Education, New Delhi. • Seventh All India School Education Survey, NCERT: Ne Delhi. 2002 • UNDPA. Human Development Reports. New Delhi. Oxfor Oxford University Press. • UNESCO. (2004) Education for All: The Quality Imperativ EFA Global Monitoring Report. Paris. • Varghese, N.V. (1995). School Effects on Achievement: Study of Government and Private Aided Schools in Kerala. Kuldip Kumar (Ed.) School effectiveness and learnir achievement at primary stage: International perspective NCERT. New Delhi. • World Bank, (2004). Reaching The Child: An Integrate Approach to Child Development. Oxford University Pres Delhi.

Course Name: Learning Management and E-Learning

Credit: 4

Course Code: CC-9

Objectives:	To enable the Learner: To become effective user of technology in education and research To integrate of emerging technology in educational process To get acquainted with e-learning and development of ICT To get develop ability to apply theoretical knowledge gained through the course.
Syllabus:	Unit 1- Educational Technology • Evaluation Technology • educational Technology as a system approach • Approaches to educational technology • Educational Technology – Evaluation. Research & Implications • Global overview on Educational technology Policy • Committers and commission: Indian Perspective Unit2 – ICT and emotional multimedia • Communication for Education & training

	• Process of communication • Modes of communication- Berlo model. Shanon's model, Geor Gerbuner model • Instructional System design • Multimedia application – CAI,CAL,CBT • Multimedia and visual reality Mass media/print media-approach Unit 3 – Designing Coursework • Designing technology –application • Coursework development process- Audio/Video/Computer • Design for Digital delivery • Management of coursework development • Delivery mechanism of coursework Courseware evaluation Unit 4 E-learning • E- learning : Scope, trends. Attributes, opportunities • Pedagogical design for operation • MOOC-development and operation • E-learning – assessment and feedback mechanism e-portfolio • Management and implementation of e-learning • Evaluation-impact of e-learning
Reference:	References : Pathak, R.P. & Chaudhary, J (2012). Educational Technology, Pearson, New Delhi. Richard Andrews & Caroline (2007). E-learning Research - A handbook of, SAGE, New Delhi. Sharma, R.N. & Chandra, S.S. (2003) Advanced Educational Technology, Atlantic Publications Distributor, New Delhi. Mason Robin & Frank R. (2006) . E-learning - The key concepts. Routledge, New York. Gayaeski, D. M. (1993). Multimedia for learning: Development, application and Evaluation and Evaluation Hedberg, John G. & Harper, Barry (1995). NJ: Educational Exploring Interactive Multimedia Technology Publications. Information Landscapes. Educational Gibbons, A. S., & Fairweather, T. J. (1998). Multimedia and Hypermedia, Computer-based instruction: Design Proceedings of ED-MEDIA 95 World and development. NJ: Educational Conference on Educational Technology Publications

Course Name: Community Work

Credit: 2

Course Code: AC-13

Objectives:	To provide the teacher trainees with actual life experiences, - To bring in direct contact with community and develop the abilities and skills

	of interacting with it, - To make him/her understand and realize the complex socio-economic, cultural and educational problems through actual work situations in the community, - To develop insight and attitude towards social problems.
Syllabus:	Concept of Working with Community (WWC). - Aims and objectives of WWC. - Methods of interacting with community & developing rapport. - Planning of community work by involving its members. - Understanding the relationship between school & community. - Identification of social, cultural, economic and educational problems of the community and preparing a comprehensive list. (Survey). - Identification of major crops and occupations of community. - Identification of illiterate youths and organizing classes for them. - Interacting with school teachers and students to find out their problems and help to overcome them. - Interacting with the community members with reference to enrolment, academic and drop out rate of children of the community. - Organising enrolment drive with the help of local community. - Prepare a report of the work done during the session. - Explore the possibility of generating human as well as physical resources from the community for improving the schools. - Determine the role of local self-government institutions such as Village Education Committee (VEC), Gram Panchayat etc. and voluntary organizations working in the area of elementary education. - Arrange meeting talks demonstration exhibition to develop awareness about the problems of the community. - Utilization of community resources for securing books, stationary, medicines, mid-day meals etc. - Organization of social, cultural and physical activities by involving community members. - Participating in a camp organized with the community and actively involve in the following activities . (a) Survey of nutritional status, health and hygiene and way of living of villagers. (b) Interviewing village craftsmen, artisans and farmers regarding their work and related problems. (c) Participation in cleaning the surroundings repairing roads of the village, tree plantation (by involving community members).
Reference:	Mistry, S.P. – Non Formal Education: An Alternative Approach to education for all, Radha Publications, New Delhi, 1998. 2.Sen Gupta, M-Community Work and Social Science – Exemplar Instructional Materials in Work-Experience, NCERT, New Delhi, 1989

Course Name: Entrepreneurship Development

Credit: 2

Course Code: AC-14

Objectives:	After completion of this course the learners will be able to: 1. Explain the entrepreneurship and its significance in modern age. 2. Describe entrepreneurial project. 3. Describe entrepreneurial opportunities for the deprived groups.

Syllabus:	UNIT I: Introductory: Entrepreneurship- Concept, characteristics and significance of entrepreneurship development in modern age. UNIT II: Entrepreneurship: Concept and types of enterprises and entrepreneurs; Role and functions of entrepreneurs. Educational-trusts, societies, etc. UNIT III: Entrepreneurship for Deprived groups: Deprived groups: problem Opportunities and privileges to the deprived groups in establishing business/industries. UNIT IV: Business Idea: Business Idea - Source, search and selection. UNIT V: Business projects: Business project - Concepts and characteristics of business project.
Reference:	