SHAHEED BHAGAT SINGH STATE UNIVERSITY
MOGA ROAD, FEROZEPUR-152004

B.Sc. Non- Medical (Study Scheme-2022)

Course Code	Course Title	Load Allocation			Marks Distribution		Total	Credits
		L	T	P	Internal	External		
	Organic Chemistry-I	3	0	0	25	50	75	3
	Inorganic Chemistry-I	3	0	0	25	50	75	3
	Electromagnetism & Waves	3	0	0	25	50	75	3
	Mechanics-I	3	0	0	25	50	75	3
	Differential Calculus	3	0	0	25	50	75	3
	Solid Geometry	3	0	0	25	50	75	3
	English	3	0	0	25	50	75	3
	Punjabi **OR** Punjab History & Culture	3	0	0	25	50	75	3
	Chemistry Lab-I	0	0	4	30	20	50	2
	Physics Lab-I	0	0	4	30	20	50	2
	Introduction to Shaheed Bhagat Singh and his Co-Patriots	1	0	0	25	–	S/US	S/US
	Total	**25**	**0**	**8**	**2**	**440**	**700**	**28**

Dr Rohit Mehra, Associate Professor

Dr. Manoj Kumar, Professor

Dr. Gaurav Bhargav Associate Professor

Dr Arvind Gupta Associate Professor

Dr. Sushil Kumar Associate Professor

Dr. Parwinder Singh Assistant Professor

Dr. Sangeeta Sharma Professor

Dr. Kulbhushan Agnihotri Associate Professor

Dr. Rakesh Kumar Associate Professor

Dr. Kiranjeet Kaur Professor

Dr. Vishal Sharma Associate Prof. (ECE)

SHAHEED BHAGAT SINGH STATE UNIVERSITY
MOGA ROAD, FEROZEPUR-152004

B.Sc. Non- Medical Study Scheme-2022

Semester-II

Course Code	Course Title	Load Allocation L	T	P	Marks Distribution Internal	External	Total	Credits
	Inorganic Chemistry-II	3	0	0	25	50	75	3
	Organic Chemistry-II	3	0	0	25	50	75	3
	Mechanics-II	3	0	0	25	50	75	3
	Solid State Physics	3	0	0	25	50	75	3
	Integral Calculus	3	0	0	25	50	75	3
	Theory of equations	3	0	0	25	50	75	3
	English-II	3	0	0	25	50	75	3
	Punjabi / OR Punjab History & Culture	3	0	0	25	50	75	3
	Chemistry Lab-II	0	0	4	30	20	50	2
	Physics Lab-II	0	0	4	30	20	50	2
	MATLAB	0	0	2	30	20	50	1
	Total	24	0	10	290	460	750	29

Dr. Naresh Pal Singh Saini, Professor

Dr Rohit Mehra, Associate Professor

Dr. Manoj Kumar, Professor

Dr. Gaurav Bhargav Associate Professor

Dr. Karanvir Singh Professor

Dr Arvind Gupta Associate Professor

Dr. Sushil Kumar Associate Professor

Dr. Parvinder Singh Assistant Professor

Dr. Lalit Sharma Professor

Dr. Sangeeta Sharma Professor

Dr. Kulbhushan Agnihotri Associate Professor

Dr. Rakesh Kumar Associate Professor

Dr. Kanwaljeet Singh

Dr. Kiranjeet Kaur Professor

Dr. Vishal Sharma Associate Prof (ECE)

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SHAHEED BHAGAT SINGH STATE UNIVERSITY

MOGA ROAD, FEROZEPUR-152004

B.Sc. (Non-Medical) Batch 2022 onwards

Ist Semester

Course Name B.Sc. (Non-Medical) Subject Code: BSNM102C

Subject Title: INORGANIC CHEMISTRY -I Contact Hours: L:3 T:0 P:0

Credits: 3

1. Atomic Structure

Bohr's Theory, its limitations and atomic spectrum of Hydrogen ,Dual nature of matter, de Broglie equation, Heisenberg's Uncertainty Principle and its significance. Schrödinger's wave equation and its derivation, significance of ψ and $\psi 2$. Quantum numbers. Normalized and orthogonal wave functions. Sign of wave functions. Radial and angular wave functions for Hydrogen and distribution curves. Shapes of s, p, d and f orbitals. Pauli's Exclusion Principle, Hund's rule of maximum multiplicity, Aufbau principle and its limitations

2. Periodic properties of Elements

Long form of Periodic table, Effective nuclear charge, shielding or screening effect (Slater rules), variation of effective nuclear charge in periodic table. Atomic and ionic radii, Ionization enthalpy, Electron gain enthalpy and their trend in groups and periods. Electronegativity and various scales. Variation of electronegativity with bond order, partial charge, hybridization, group electronegativity.

3. Chemical Bonding-I

Ionic bond: General characteristics of ionic compounds, size effects, radius ratio rule and its limitations. Efficiency of packing, Hexagonal close packing, Cubic close packing. Structures of different crystal lattices, Sodium chloride, Cesium chloride, Wurtzite, Zinc blende, Fluorite, Calcium carbide and antifluorite structures. Born Lande Equation with derivation and importance of Kapustinskii expression for lattice Energy,, Madelung constant, Lattice energy, Born-Haber cycle and its application, Solvation energy, solubility of ionic solids.

4. Chemical Bonding-II

Covalent bond: Lewis structure, Valence Bond theory, VSEPR theory (Prediction of structures and variation of bond angles on the basis of VSEPR theory, Shortcomings of VSEPR theory), Hybridization, Molecular orbital theory (LCAO method). Molecular orbital diagrams of diatomic and simple polyatomic molecules (Be2, N2, O2, F2, LiH, NO, CO, HCl, NO2, BeF2, NO2 -), Formal charge, Covalent character in ionic compounds, polarizing power and polarizability. Fajan's rules and consequences of polarization. Ionic character in covalent compounds (Bond moment, dipole moment, Percentage ionic character) Metallic Bond: Valence bond and band theories. Semiconductors and insulators, defects in solids.

Weak Chemical forces: van der Waals forces, ion-dipole forces, dipole-dipole interactions, induced dipole interaction, Hydrogen bonding

Recommended Books:

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

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

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

Course Name	B.Sc. (Non-Medical)			
Subject Code:	BSNM-109C			
Subject Title:	CHEMISTRY LAB I			
Contact Hours:	L:0	T:0	P:4	Credits:2

Inorganic Chemistry: Semi Micro analysis. Cation analysis, Separation and identification of ions from groups I, II, III, IV, V, and VI. Anionic analysis. Four ions with no interference.

Organic Chemistry Laboratory Techniques:

Determination of Melting Point

Naphthalene 80-82°C

Cinnamic acid 132.5-133 °C

Benzoic acid 121.5-122 °C

Salicylic acid 157.5-158 °C

Urea 132.5-133 °C

Acetanilide 113.5-114 °C

Succinic Acid 184.5-185 °C

m-dinitro benzene 90 °C

p-dichlorobenzene 52 °C

Aspirin 135 °C

Determination of Boiling Point

Ethanol 78 °C

Cyclohexane 81.4 °C

Benzene 80 °C

Toluene 110°C

3.Alkanes and Cycloalkanes

Introduction, IUPAC nomenclature, Isomerism and classification of carbon atoms of 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 cyclo butane), theory of strainless rings. Energy relationships between different conformations of cycloalkanes.

4. Alkenes, Cycloalkenes, Dienes and Alkynes

Alkenes Nomenclature, methods of synthesis (mechanisms of dehydration of alcohols and dehydrohalogenation of alkyl halides, regioselectivity in alcohol dehydration. Saytzeff rule, Hofmann elimination), physical properties and relative stabilities of alkenes. Chemical reactions of alkenes - mechanisms involved in hydrogenation, electrophilic and free radical additions, Markownikoff's rule, hydroboration-oxidation, oxymercuration-reduction. Epoxidation,

ozonolysis, hydration, hydroxylation and oxidation with KMnO4, Polymerization of alkenes. Substitution at the allylic and vinylic positions of alkenes. Industrial applications of ethylene and propene.

Cycloalkenes Methods of formation, conformation and Chemical reactions of cycloalkenes. Dienes 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 addition, Diels-Alder reaction.

Alkynes 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 or Birch reduction, oxidation and polymerization.

Recommended Books:

1. Organic Chemsitry, Morrison and Boyd, Prentice- Hall.
2. Fundamentals of Organic Chemistry, Solomons, John Wiley.
3. Organic Chemistry. F.A. Carey, McGraw Hill, Inc.
4. Organic Chemistry, L.G. Wade Jr. Prentice Hall.
5. Organic ChemistryVol. I, II & III, S.M. Mukherji, S.P. Singh and R.P.Kapoor, Wiley Eastern Ltd (New Age International).
6. Introduction to organic chemistry, Stritwieser, Heathcock and Kosover, Macmilan.

Shaheed Bhagat Singh State University, Ferozepur
Bachelor of Science (Non-Medical)
Physics (Semester I)

Course Name				
Subject Code	BSNM103C			
Subject Name	**Electromagnetism and Waves**			
Contact Hours	**L: 04**	**T: 00**	**P: 00**	**Credits: 03**

Course Objective

This course deals with fundamental knowledge and background required for better understanding of Electromagnetic Waves (Light- and Acoustic-waves) and their propagation behaviour through different medium.

Course Outcomes

At the end of this course student will demonstrate the ability to:

1. Understand basic theorems and laws of Electrostatic.
2. Understand basic theorems and laws of Magnetism.
3. Understand Maxwell's equations for electromagnetic waves.
4. Understand the characteristics and propagation of light wave through vacuum and waveguides.
5. Understand the characteristics and propagation of Acoustic waves.

Units	Contents	Hours
I	**Electrostatics:** Gauss's theorem of electrostatics, Applications of Gauss theorem- Electric field due to point charge, uniformly charged spherical shell and solid sphere, plane charged sheet, charged conductor. Electric potential, potential due to a point charge, Electric dipole, Measurement of Capacitance of parallel plate, spherical and cylindrical capacitor, Dielectric medium, Gauss's theorem in dielectrics.	8
II	**Magnetism:** Magnetic intensity, permeability, and susceptibility, Magnetic induction (self- and mutual induction), Faraday's laws of electromagnetic induction, Biot-Savart's law & its applications- straight conductor, circular coil, solenoid carrying current, Divergence and curl of magnetic field, Ampere's circuital law, Magnetic properties of dia-, para- and ferro-magnetic materials, Lenz's law.	8
III	**Light waves:** Basics of Electromagnetic Waves, Electromagnetic nature of light, Displacement current, Maxwell's equations, Lorentz force equation and motion of charges, Poynting vector, Energy density in electromagnetic field, Electromagnetic wave (EM) propagation through vacuum, and dielectric waveguide. Optical Fiber as dielectric medium and its types, Refractive Index, Numerical Aperture, Measurement of Numerical aperture, Measurement of power loss, Attenuation in dielectric waveguide, Dispersion of EM waves inside a dielectric waveguide, Polarization inside a dielectric waveguide, Linear and Non-linear scattering of EM waves inside a dielectric waveguide. Resonant cavities, power losses in a cavity, Earth and ionosphere as resonant cavity. **Applications:** Futuristic telecommunication, surveillance, transportation, and Medical-related industries.	14
IV	**Acoustic Waves:** Introduction, frequency, loudness, decibel scale, octave, music scale, Fourier series, Fourier Transformation, Equation of state, continuity, Euler's equation, Linear wave equation, speed of sound in fluids, Acoustic intensity, specific acoustic impedance, spherical waves, cylindrical waves, Waveguides, transmission from one fluid to another, reflection from solid, Transmission through thin partition- Mass law. **Applications:** Underwater acoustics, Telecommunication, and Explosives.	10

Reference Books:

1. Edward M. Purcell, Electricity and Magnetism, McGraw-Hill Education 1986.
2. J.H. Fewkes & J. Yarwood. Electricity and Magnetism, Oxford Univ. Press Vol. I, 1991.
3. D C Tayal, Electricity and Magnetism, Himalaya Publishing House 1988.
4. Ronald Lane Reese, University Physics, Thomson Brooks/Cole 2003.
5. D J. Griffiths, Introduction to Electrodynamics, Benjamin Cummings 3rd Edn, 1998.
6. D. K Mynbaev, and L. L Scheiner, Fiber and Optic Communication Technology, 1st Ed., 2002, Pearson
7. Fundamentals of Acoustics, Lawrence E. Kinsler, Austin R. Frey, 4th Ed., 2000 Wiley Publishers.
8. Noise and Vibration Control, Munjal M. L., World Scientific Publishers in Collaboration with IISc Press, Singapore, 2013

Course Name	
Subject Code	BSNM104C
Subject Name	Mechanics-I
Contact Hours	L: 04 T: 00 P: 00 Credits: 03

Course Objective

This course deals with fundamental knowledge of classical physics including rotational dynamics, gravitational physics, and stress-strain theory.

Course Outcomes

At the end of this course student will demonstrate the ability to:

1. Understand basic laws of conservation of energy and its principles.
2. Understand laws of gravitational force and its industrial applications.
3. Understand fundamentals of rotational dynamics and its applications indifferent devices.
4. Understand the physics of elastic and non-elastic scattering and their utilization in spectroscopy.

Units	Contents	Hours
I	**Work and Energy:** Work and Kinetic Energy Theorem. Conservative and non-conservative forces, Potential Energy, Energy diagram, Stable and unstable equilibrium, Elastic potential energy, Force as gradient of potential energy, Work done by non-conservative forces, Law of conservation of Energy.	6
II	**Fundamentals of Gravitation:** Newton's Law of Gravitation. Motion of a particle in a central force field, Kepler's Laws, Satellite in circular orbit and applications. Geosynchronous orbits, Inertial- and non-inertial reference frames, Galilean transformations, Galilean invariance, Momentum of variable-mass system: motion of rocket, Motion of a projectile in uniform gravitational field, Movement of Galaxy. **Applications:** Global positioning system (GPS), Satellite communication system.	12
III	**Rotational Dynamics**: Newton's Laws of Motion, Dynamics of a system of particles: Centre of Mass, Principle of conservation of momentum, Impulse, Angular Momentum about the Centre of mass, Rotational invariance, Angular momentum, Torque, Rotation about a fixed axis, Moment of Inertia and its calculation for rectangular, cylindrical and spherical bodies, Kinetic energy of rotation, Cylinder on an accelerated rough plane, Behavior of angular momentum vector, Principal axes and Euler's equations. **Applications:** Gyroscope, G-Sensor	10
IV	**Scattering and Elasticity:** Elastic- and Non-elastic scattering, Elastic and Non-elastic collision of particles of different mass and its derivations, Rutherford scattering, Hooke's law, Stress-strain diagram, Relation between elastic constants, Poisson's ratio expression in terms of elastic constants, Work done in stretching and twisting of a wire, Determination of Rigidity modulus by static torsion, Torsional pendulum, Determination of Rigidity modulus and moment of inertia. **Applications:** Elastic Scattering Spectroscopy	12

Reference Books:

1. An introduction to mechanics, D. Kleppner, R.J. Kolenkow, 1973, McGraw-Hill.
2. Mechanics, Berkeley Physics, vol.1, C.Kittel, W.Knight, et.al. 2007, Tata McGraw-Hill.
3. Feynman Lectures, Vol-I, R.P Feynman, R.B. Leighton, M. Sands, 2008, Pearson Education
4. Introduction to Special Relativity, R. Resnick, 2005, John Wiley and Sons.
5. Mechanics, D.S. Mathur, S. Chand and Company Limited, 2000

Course Name	
Subject Code	BSNM110C
Subject Name	Physics Lab-I
Contact Hours	L: 00 T: 00 P: 04 Credits: 02

Course Objective

The main objective of this course is to provide lab experience to carry out basic measurements of electromagnetic waves and their behaviour through lens, prism, and waveguides.

Course Outcomes

At the end of this course student will demonstrate the ability to:

1. Measure basic parameters of electromagnetic wave, i.e. Light and dielectric waveguide, i.e. Optical Fiber
2. Measure basic parameters of a material using different optical devices and methods.
3. Measure basic parameter like intensity and wavelength of laser light
4. Understand the working and uses of Sonometer.
5. Understand the working of Polarimeter for measuring specific rotation.

S.No	Experiments
1.	To measure Numerical Aperture, Refractive index, and loss of optical signal of an Optical Fibre.
2.	To measure angular divergence of a Laser beam.
3.	To determine the number of lines per cm on a plane grating using laser.
4.	To measure focal length of Convex lens by displacement method.
5.	To determine the magnifying power of an Astronomical telescope.
6.	To determine the Refractive Index of the Material of a given Prism using Sodium Light.
7.	To determine Dispersive Power of the Material of a given Prism using Mercury Light.
8.	To determine the intensity of laser in diffraction patterns of single and double slits.
9.	To determine the wavelength of Laser light using diffraction of single and double Slits.
10.	To determine the frequency of alternating current using a sonometer and an electromagnet.
11.	To determine the Resolving Power of a Prism.
12.	To determine the Polarizability of a dielectric material.
13.	To determine Wavelength of sodium light using Newton's Rings and Fresnel Biprism.
14.	To determine (1) wavelength and (2) angular spread of He-Ne laser using plane diffraction grating.
15.	To study the specific rotation of sugar using Laurent's half shade polarimeter.

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Course Name	B.Sc. (Non-Medical)			
Subject Code:	BSNM			
Subject Title:	DIFFERENTIAL CALCULUS			
Contact Hours:	L:3	T:0	P:0	Credits:3

Details of the Course:

Unit	Content
I	Definition of a sequence, limit of a sequence, theorems on limits of sequences, bounded, monotonic sequences. Least upper bound and greatest lower bound of a sequence. Limit superior, limit inferior. Nested Intervals. Cauchy's convergence criterion, infinite series.
II	Limits of Functions, $\varepsilon-\delta$ definition, right- and left-hand limits. Theorems on limits. Infinity. Special Limits. Continuity, $\varepsilon-\delta$ definition, right- and left-hand Continuity, continuity in an interval, theorems on continuity, piecewise continuity, uniform Continuity.
III	The concept and definition of a derivative, right- and left-hand derivatives, differentiability in an interval, piecewise differentiability, differentials, differentiation of composite functions, implicit differentiation, mean value theorems, Taylor theorem, applications.
IV	Functions of two or more variables, neighborhoods, regions, limits, iterated limits, continuity, uniform continuity, partial derivatives, higher-order partial derivatives, differentials, theorems on differentials, differentiation of composite functions, Euler's theorem on homogeneous functions. Implicit functions, Jacobians, partial derivatives using Jacobians, theorems on Jacobians, applications.

Reference Books:

1. Robert Wrede and Murray R. Spiegel, Advanced Calculus, 3rd Edition, Schaum's Outline Series (McGraw Hill),2010.
2. Maurice D Weir, Frank R. Giordano and Joel Hass, Thomas' Calculus, 11th Edition, Pearson, 2008.
3. James Stewart, Calculus, 5th Edition, Brooks/Cole(Thomson),2003.
4. Advanced Engineering Mathematics, Erwin Kreyszig, 2008, WileyIndia.
5. Higher Engineering Mathematics, B.S. Grewal, Khanna Publishers, 36th Edition, 2010.
6. Calculus and Analytical Geometry, Thomas and Finney

Course Name	B.Sc. (Non-Medical)			
Subject Code:				
Subject Title:	SOLID GEORMETRY			
Contact Hours:	L:3	T:0	P:0	Credits:3

Details of the Course:

Unit	Content
I	The concept of co-ordinates, co-ordinate of a point in space, distance between two points. Plane: Definition of a plane, Normal form of the equation of a plane, Transformation from general form to normal form, Equation of plane in terms of its intercepts on the axis, Equations of the plane through the given points, Length of the perpendicular from a given point to a given plane, Bisectors of angles between two planes, Combined equation of two planes. Orthogonal projection on a plane.
II	Sphere: Definition and equation of the sphere; Equation of the sphere through four given points; Plane sections of a sphere; Intersection of two spheres; Equation of a circle; Sphere through a given circle; Intersection of a sphere and a line; Power of a point; Tangent plane; Plane of contact; Polar plane; Pole of a plane; Conjugate points; Conjugate planes; Angle of intersection of two spheres; Conditions for two spheres to be orthogonal; Radical plane; Coaxial system of spheres.
III	Cone: Definitions of a cone; vertex; guiding curve; generators; Equation of the cone with a given vertex and guiding curve; Enveloping cone of a sphere; Equations of cones with vertex at origin are homogenous; Condition that the general equation of the second degree should represent a cone; Condition that a cone may have three mutually perpendicular generators; Intersection of a line and a quadric cone; Tangent lines and tangent plane at a point; Condition that a plane may touch a cone; Reciprocal cones; Intersection of two cones with a common vertex; Right circular cone. Equation of the right circular cone with a given vertex; axis and semi-vertical angle.
IV	Cylinder: Definition of a cylinder, Equation to the cylinder whose generators intersect a given conic and are parallel to a given line; Enveloping cylinder of a sphere; The right circular cylinder; Equation of the right circular cylinder with a given axis and radius.
	Reference Books: 1. Shanti Narayan and P. K. Mittal, Analytical Solid Geometry, 17th Edition, S. Chand & Company,2007. 2. P. K. Jain, A Textbook of Analytical Geometry of Three Dimensions, New Age International,2005. 3. Higher Engineering Mathematics, B.S. Grewal, Khanna Publishers, 36th Edition, 2010. 4. Calculus and Analytical Geometry, Thomas and Finney

Shaheed Bhagat Singh State University, Ferozepur

B.Sc. (Non-Medical) Batch 2022onwards

Semester I

Subject Code:

Subject: English

Contact Hours: L:3 T:0 P:0 Credits:3

Course Contents

Unit I

The following stories from Prose Parables (Orient Black Swan, 2013) are prescribed:

a. The Eyes Are Not Here: Ruskin Bond
b. Grief: Anton Chekov
c. The Doctor's Word: R.K. Narayan
d. The Doll's House: Katherine Mansfield
e. Dusk: H.H. Munroe (Saki)
f. The Kabuli wallah : Rabindranath Tagore

Unit 2

The following poems from The Poetic Palette (Orient Black Swan, Second Edition, 2016) are prescribed:

1. Apparently With No Surprise: Emily Dickinson
2. Fool and Flea: Jeet Thayil
3. The Soul's Prayer: Sarojini Naidu
4. I Sit and Look Out: Walt Whitman
5. Women's Rights: Annie Louise Walker
6. Pippa's Song: Robert Browning

Unit 3

Reading Skills & Writing Skills

Ranjeet Kaur

Reading Skills: Close Reading; Comprehension; Summarizing; Paraphrasing; Analysis and Interpretation

Writing Skills: Essay Writing -Descriptive/Narrative/Argumentative; Précis Writing, Business letters; email writing

Unit 4

Grammar: Parts of Speech; Articles, Determiners; Modals; Modifiers; Prepositions; Voice; Transformation of sentences

Vocabulary Building: Antonyms; Synonyms; One-word substitution; Homophones/Homonyms; Abbreviations

Recommended Books:

1. Oxford Practice Grammar by John Eastwood (Ed. 2014)

2. Business English, Pearson, 2008.

3. Language, Literature and Creativity, Orient Black swan, 2013.

4. Language through Literature (forthcoming) ed. Dr. Gauri Mishra, Dr. Ranjana Kaul, Dr. Brati Biswas

5. Study Writing. Liz Hamp-Lyons and Ben Heasly. Cambridge University Press. 2006.

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Shaheed Bhagat Singh State University, Ferozepur

2022 Batch Onwards

ਬੀ.ਐਸ.ਸੀ. ਨਾਨ-ਮੈਡੀਕਲ
ਸਮੈਸਟਰ-ਪਹਿਲਾ
ਸਲੇਬਸ-ਪੰਜਾਬੀ
ਪੰਜਾਬੀ-3L-3 ਕਰੈਡਿਟ

ਪਾਠ-ਕ੍ਰਮ:

ਯੂਨਿਟ-1 (ਸਾਹਿਤ)

(ੳ) ਕਵਿਤਾ ਭਾਗ :

1. ਰਉਂ ਰੁੱਖ- ਭਾਈ ਵੀਰ ਸਿੰਘ
2. ਰਾਧਾ ਸੰਦੇਸ਼-ਧਨੀ ਰਾਮ ਚਾਤ੍ਰਿਕ
3. ਪੁਰਾਣੇ ਪੰਜਾਬ ਨੂੰ ਆਵਾਜ਼ਾਂ-ਪ੍ਰੋ. ਪੂਰਨ ਸਿੰਘ
4. ਆਉ ਨੱਚੀਏ-ਪ੍ਰੋ.ਮੋਹਨ ਸਿੰਘ
5. ਤੇਰੇ ਹਜ਼ੂਰ ਮੇਰੀ ਹਾਜ਼ਰੀ ਦੀ ਦਾਸਤਾਨ-ਹਰਿਭਜਨ ਸਿੰਘ
6. ਚੌਂਕ ਸ਼ਹੀਦਾਂ ਵਿਚ ਉਸਦਾ ਆਖਰੀ ਭਾਸ਼ਣ- ਸੁਰਜੀਤ ਪਾਤਰ

(ਅ) ਕਹਾਣੀ ਭਾਗ :

1. ਭੂਆ-ਨਾਨਕ ਸਿੰਘ
2. ਪੇਮੀ ਦੇ ਨਿਆਣੇ-ਸੰਤ ਸਿੰਘ ਸੇਖੋਂ
3. ਧਰਤੀ ਹੇਠਲਾ ਬੋਲਦ- ਕੁਲਵੰਤ ਸਿੰਘ ਵਿਰਕ
4. ਦੂਜੀ ਵਾਰ ਜੇਬ ਕੱਟੀ ਗਈ-ਨਵਤੇਜ ਸਿੰਘ
5. ਬੁੱਤ ਸ਼ਿਕਨ-ਅਜੀਤ ਕੌਰ
6. ਬੱਸ ਕੰਡਕਟਰ-ਦਲੀਪ ਕੌਰ ਟਿਵਾਣਾ

ਯੂਨਿਟ-2 (ਭਾਸ਼ਾ ਤੇ ਲਿਪੀ)

ਭਾਸ਼ਾ ਦਾ ਟਕਸਾਲੀ ਰੂਪ, ਭਾਸ਼ਾ ਤੇ ਉਪ-ਭਾਸ਼ਾ ਵਿਚ ਅੰਤਰ, ਪੰਜਾਬੀ ਦੀਆਂ ਉਪ-ਭਾਸ਼ਾਵਾਂ,**ਪੰਜਾਬੀ ਭਾਸ਼ਾ:ਨਿਕਾਸ** ਤੇ ਵਿਕਾਸ।
ਭਾਸ਼ਾ ਤੇ ਲਿਪੀ, ਗੁਰਮੁਖੀ ਲਿਪੀ ਦੀਆਂ ਵਿਸ਼ੇਸ਼ਤਾਵਾਂ, ਗੁਰਮੁਖੀ ਲਿਪੀ: ਨਿਕਾਸ ਤੇ ਵਿਕਾਸ।

Kuldeep Kaur

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ਯੂਨਿਟ-3 (ਵਿਆਕਰਣ)

ਮੂਲ ਵਿਆਕਰਣਕ ਇਕਾਈਆਂ :
ਭਾਵੈਸ਼
ਸ਼ਬਦ
ਵਾਕੰਸ਼
ਉਪ-ਵਾਕ
ਵਾਕ

ਯੂਨਿਟ-4 (ਲੇਖਣੀ-ਕਲਾ)

ਸੰਖੇਪ ਰਚਨਾ (ਪ੍ਰੈਸੀ)
ਪੈਰ੍ਹਾ ਰਚਨਾ
ਸਰਲ ਅੰਗਰੇਜ਼ੀ ਪੈਰ੍ਹੇ ਦਾ ਪੰਜਾਬੀ ਅਨੁਵਾਦ

ਸਹਾਇਕ ਪੁਸਤਕਾਂ:

ਦੋ ਰੰਗ , ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ,ਅੰਮ੍ਰਿਤਸਰ (ਸੰਪ. ਹਰਜਿੰਦਰ ਸਿੰਘ ਢਿੱਲੋਂ ਤੇ ਪ੍ਰੀਤਮ ਸਿੰਘ ਸਰਗੋਧੀਆ), ਦੂਜਾ ਐਡੀਸ਼ਨ, 2014.

ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਵਿਗਿਆਨ (ਸੁਖਵਿੰਦਰ ਸਿੰਘ ਸੰਘਾ), ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਅਕਾਦਮੀ, 2006.

Kiranjeet Kaur

Shaheed Bhagat Singh State University, Ferozepur

B.Sc. (Non-Medical)

Semester -1

Punjab History & Culture

L	T	P
3	0	0

Course Content

Unit 1: Physical Features of the Punjab and impact on history. Sources of the ancient history of Punjab

Unit2: Harappan Civilization : Town planning ; Social, economic and religious life of the Indus valley people

The indo-Aryans: original home and settlement in Punjab.

Unit 3 : Social, Religious and Economic life during later Rig Vedic age. Social, Religious and Economic life during later Vedic Age.

Unit 4: Teaching and impact of Buddhism, Jainism in the Punjab.

Recommended Books:

1. L. joshi (ed): History and Culture of the Punjab, Art-1, Patiala, 1989(3rd edition)
2. L.M joshi and fauja singh (ed); History of Punjab, Vol.I, Patiala 1977.

3. Budha Parkash: Glimpses of Ancient Punjab, Patiala, 1983

Ranjeet Kaur

SHAHEED BHAGAT SINGH STATE UNIVERSITY
MOGA ROAD, FEROZEPUR-152004

B.Sc. Non- Medical Study Scheme-2022

Semester-II

Course Code	Course Title	Load Allocation			Marks Distribution		Total	Credits
		L	T	P	Internal	External		
	Inorganic Chemistry-II	3	0	0	25	50	75	3
	Organic Chemistry-II	3	0	0	25	50	75	3
	Mechanics-II	3	0	0	25	50	75	3
	Solid State Physics	3	0	0	25	50	75	3
	Integral Calculus	3	0	0	25	50	75	3
	Theory of equations	3	0	0	25	50	75	3
	English-II	3	0	0	25	50	75	3
	Punjabi / OR Punjab History & Culture	3	0	0	25	50	75	3
	Chemistry Lab-II	0	0	4	30	20	50	2
	Physics Lab-II	0	0	4	30	20	50	2
	MATLAB	0	0	2	30	20	50	1
	Total	**24**	**0**	**10**	**290**	**460**	750	29

Dr. Naresh Pal Singh Saini, Professor

Dr Rohit Mehra, Associate Professor

Dr. Manoj Kumar, Professor

Dr. Gaurav Bhargav Associate Professor

Dr Karanvir Singh Professor

Dr Arvind Gupta Associate Professor

Dr. Sushil Kumar Associate Professor

Dr. Parwinder Singh Assistant Professor

Dr Lalit Sharma, Professor

Dr. Sangeeta Sharma Professor

Dr. Kulbhushan Agnihotri Associate Professor

Dr. Rakesh Kumar Associate Professor

Dr Rajvinder Pal Singh Professor

Dr. Kiranjeet Kaur Professor

Dr. Mohit Sharma Associate Prof. (ECE)

SHAHEED BHAGAT SINGH STATE UNIVERSITY
MOGA ROAD, FEROZEPUR-152004

B.Sc. Non- Medical Study Scheme-2022

Semester-II

Course Code	Course Title	Load Allocation			Marks Distribution		Total	Credits
		L	T	P	Internal	External		
	Inorganic Chemistry-II	3	0	0	25	50	75	3
	Organic Chemistry-II	3	0	0	25	50	75	3
	Mechanics-II	3	0	0	25	50	75	3
	Solid State Physics	3	0	0	25	50	75	3
	Integral Calculus	3	0	0	25	50	75	3
	Theory of equations	3	0	0	25	50	75	3
	English-II	3	0	0	25	50	75	3
	Punjabi / OR Punjab History & Culture	3	0	0	25	50	75	3
	Chemistry Lab-II	0	0	4	30	20	50	2
	Physics Lab-II	0	0	4	30	20	50	2
	MATLAB	0	0	2	30	20	50	1
	Total	**24**	**0**	**10**	**290**	**460**	**750**	**29**

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Dr Arvind Gupta Associate Professor

Dr. Sushil Kumar Associate Professor

Dr. Parwinder Singh Assistant Professor

Dr. Lalit Sharma, Professor

Dr. Satgeet Sharma Professor

Dr. Krishnan Agnihotri Associate Professor

Dr. Rakesh Kumar Associate Professor

Dr. Ranjodh Pal Singh Professor

Dr. Kiranjeet Kaur Professor

Dr. Nishal Sharma Associate Prof (ECE)

Shaheed Bhagat Singh State University, Ferozepur
B.Sc (Non-Medical) Batch 2022 onwards

Semester – II

Course Name	**B.Sc (Non-Medical)**
Subject Code	
Subject Title	**INORGANIC CHEMISTRY - II**
Contact Hours	**L:3 ; T:0 : P:0**
Credits	**3**

Details of the course:

Unit	Contents
I	**s Block Elements** General characteristics of group I & II elements : Melting and Boiling Point, electropositive character, ionisation energies, atomic and ionic radii, flame coloration, reactions with water, oxygen, hydrogen and nitrogen, ease of formation, thermal stability and solubility of carbonates, hydrides, nitrates, oxides, peroxides, sulphates and superoxides, anomalous behaviour of lithium and its diagonal relationship with magnesium. Complexation tendencies: solutions of alkali metals in liquid ammonia and their properties, crown ethers, cryptands and podands of alkali metals, EDTA complexes of calcium and magnesium.
II	**p Block elements** General characteristics of p group elements : Melting and Boiling Point, electropositive character, ionisation energies, atomic and ionic radii, oxidation states, electonegativity, anomalous behaviour of first member of each group. **Group III (Boron Group):** Oxides, halides and hydrides of group III elements, boron sesquioxide and borates structure of borates, trihalides and lower halides of boron, preparation of boron hydrides reactions and structures of boranes. **Group IV (Carbon Group):** Structure and allotropy of the elements, catenation, types and structure of carbides, oxides of carbon and silicon, types and structures of silicates, Organo – silicon compounds and the silicones, halides, Fullerenes **Group V (Nitrogen Group):** Hydrides, properties and structure of ammonia, hydrazine, hydroxylamine, trihalides and Pentahalides of group V elements, oxides of nitrogen, structure of N_2O, NO, N_2O_3, N_2O_4 and N_2O_5, oxo acids of nitrogen and phosphorous (structure and basicity), Nitric acid: Properties and preparation by Ostwald's Process. **Group VI (Oxygen Group):** Structure and allotropy of the elements. Oxides of sulfur (structure of SO_2 and SO_3) oxoacids of sulphur, halides of sulfur, selenium and tellurium, compounds of Sulfur and nitrogen (S_4N_4).

	Group VII: Oxides of halogens (OF_2, O_2F_2, Cl_2C, ClO_2, Cl_2O_6, BrO_2, I_2O5) (structures), Preparation, reaction and structure of interhalogen compounds. (ClF_3, BrF_3, I_2, Cl_5, IF_5, IF_7), Polyhalides, acidic strengths of hydroacids and oxoacids.
III	**Transition Elements** General characteristics of Transition Elements: Properties of the elements of the first transition series, Relative stability of their oxidation state, Coordination number and geometry. General characteristics of elements of Second and Third Transition Series. Difference in the properties of first transition elements with second and third transition series elements in respect of ionic radii, oxidation states, magnetic behaviour.
IV	**Acids and bases** Classification of acids and bases as hard and soft, Pearson's HSAB concept, acid-base strength and hardness and softness. Arrhenius, Bronsted-Lowry and Lewis concept of acids and bases, Lewis interactions in non-polar solvents.
	Recommended Books: 1. J.D. Lee, Concise Inorganic Chemistry, 4th Ed. 2. A.G.Sharpe, ELBS 3. F.A.Cotton and G. Wilinson, Advanced Inorganic Chemistry, Interscience Publishers. 4. J.E. Huheey, Inorganic Chemistry, Harper & Row. 5. B.R. Puri, L.R Sharma., K.K. Kalia, Principles of Inorganic Chemistry; 30th edition, Pubs: Milestones Publisher, 2006-07

B.Sc (Non-Medical) Batch 2022 onwards

Semester – II

Course Name	B.Sc (Non-Medical)
Subject Code	
Subject Title	ORGANIC CHEMISTRY - II
Contact Hours	L:3 ; T:0 : P:0
Credits	3

Details of the course:

Unit	Contents
I	**Stereochemistry** Concept and types of isomerism: Structural isomers and stereo isomers, Optical isomerism- elements of symmetry, molecular chirality, enantiomers, stereogenic centre, optical activity, properties of enantiomers, chiral and achiral molecules with two stereogenic centres, diastereomers, threo and erythro diasteremers, 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.
II	**Arenes and Aromaticity** Nomenclature of benzene derivatives. The aryl 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. Side chain reactions of benzene derivatives. Methods of formation and chemical reactions of alkylbenzenes. Aromaticity : the Huckel's rule, aromatic ions. Aromatic electrophilic substitution–general pattern of the mechanism, role of σ and π complexes. Mechanism of nitration, halogenation, sulphonation, mercuration and Friedel Crafts reaction. Activating and deactivating substituents, orientation and ortho/para ratio.
III	**Aldehydes and Ketones** Nomenclature and structure of the carbonyl group. Synthesis of aldehydes and ketones: synthesis of aldehydes from acid chlorides, synthesis of aldehydes and ketones using 1,3-dithianes, synthesis of ketones from nitriles and from carboxylic acids. Physical properties. Mechanism of nucleophilic additions to carbonyl 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. Halogenation of enolizable ketones. Halogenation of enoliable ketones. Oxidation of aldehydes, Baeyer-Villiger oxidation of Ketones, Cannizzaro reaction. MPV, Clemmensen, Wolff-Kishner, $LIAlH_4$ and $NaBH_4$ reductions.
IV	**Alcohols and Phenols**

	Classification and nomenclature. Monohydric alcohols—nomenclature. Acidic nature. Reactions of alcohols, cleavage of O-H bond, C-O bond and dehydration reactions, regioselectivity of dehydration. Dihydric alcohols—nomenclature, methods of formation, chemical reactions of vicinal glycols, oxidative cleavage [$Pb(OAC)_4$] and [HIO_4] and pinacol-pinacolone rearrangement. Phenols Nomenclature, structure and bonding, Preparation of phenols, physical properties and acidic character, Comparative acidic strengths of alcohols and phenols, resonance stabilization of phenoxide ion. Reactions of phenols—electrophilic aromatic substitution, acylation and carboxylation. Mechanisms of Fries rearrangement, Claisen rearrangement, Reimer Tiemann reaction, Gatterman synthesis,.
	Recommended Books: 1. Organic Chemsitry, Morrison and Boyd, Prentice- Hall. 2. Fundamentals of Organic Chemistry, Solomons, John Wiley. 3. Organic Chemistry. F.A. Carey, McGraw Hill, Inc. 4. Organic Chemistry, L.G. Wade Jr. Prentice Hall. 5. Organic Chemistry Vol. I, II & III, S.M. Mukherji, S.P. Singh and R.P. Kapoor, Wiley Eastern Ltd (New Age International).

Shaheed Bhagat Singh State University, Ferozepur
Bachelor of Science (Non-Medical)
Physics (Semester II)

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Course Name				
Subject Code				
Subject Name	**Solid State Physics**			
Contact Hours	**L: 04**	**T: 00**	**P: 00**	**Credits: 03**

Course Objective

This course deals with design, basic theory, and analytical concepts of various Solid state devices like Semiconductor diodes, Transistors, FETs and their utilization in designing of different electronic circuits.

Course Outcomes

At the end of this course student will be able to:

1. Understand the basic theory of Solid state devices, materials and their properties
2. Understand the characteristics and working of different Semiconductor diodes and Transistor along with their biasing.
3. Familiar with the working and characteristics of different Rectifiers circuits
4. Understand different Fabrication processes of PCB design.
5. Understand the working of basic Electronic devices and their applications.

Units	Contents	Hours
I	**Fundamentals of Solid State Physics:** Introduction, Semiconductor materials, Metals, Insulators, Semiconductor, Passive and active electronic components, Structure of an atom, Energy bands, Crystal structure, atomic bonding, atomic packing, atomic shape and size, crystal imperfection, atomic diffusion, thermal properties of materials, electrical properties of materials, optical properties of materials, Local field and Clausius-Mossotti equation, free electron model of metals, density of states, Intrinsic semiconductors, Extrinsic semiconductors and their types. Industrial applications of semi-conductor physics.	8
II	**Semiconductor diodes**: PN junction, Junction Theory, PN Junction diode, V-I characteristics of PN-Junction diode, Ideal diode, Static and dynamic resistance of diode, Zener diode, Laser Diodes, Schotteky Diode, Light Emitting diode, Varacter diode, Tunnel diodes and their applications. Rectifiers: Half wave rectifiers, Full wave rectifiers (Centre-tap and Bridge), Efficiency calculations and comparison, Regulated Power supply design.	12
III	**Transistors:** Types, Theory of operation, different configurations and their comparison, Input and Output characteristics of different configurations, Basic CE amplifier circuit, Transistor datasheets, Thermal runaway and heat sinks, Field-effect Transistor, MOSFETs, Different transistor biasing circuits and stabilization of operating points.	12
IV	**Fabrication Processes**: Oxidation; diffusion; Ion-implantation; Annealing; Photolithography; Etching; Chemical Vapour Deposition (CVD); Sputtering; Twin-tub CMOS process. Electronic Devices: CRO, Multimeter, Signal Generator, DSO.	8

Reference Books:

1. Andre Moliton, Solid-State Physics for Electronics, Wiley, 2010
2. James Patterson, Bernard Bailey, Solid State Physics, 2nd Edition, Springer, 2012
3. N N Bhargava, D C Kulshreshtha, S C Gupta, Basic electronics & Linear Circuits, Tata McGraw- Hill Publishing Company limited, 1996.
4. B L Threja, Basic Electronics- Solid state, S Chand & Company, 2012
5. G. Streetman, and S. K. Banerjee, Solid State Electronic Devices, Pearson.
6. 2. D. Neamen, D. Biswas, Semiconductor Physics and Devices, McGraw-Hill Education

Course Name	
Subject Code	
Subject Name	Mechanics-II
Contact Hours	L: 04 T: 00 P: 00 Credits: 03

Course Objective

This course deals with law of physics in rotating coordinate systems, oscillations and special theory of relativity.

Course Outcomes

At the end of this course student will demonstrate the ability to:

1. Understand basic laws of physics in rotating coordinate systems.
2. Understand principles and physics of oscillations and measurements of their related physical quantities.
3. Understand fundamentals of special theory of relativity and transformation theories.

Units	Contents	Hours
I	**Central Force Motion:** Motion of a particle under a central force field. Two-body problem and its reduction to one-body problem and its solution. The energy equation and energy diagram. Kepler's Laws. Satellite in circular orbit and applications. Geosynchronous orbits. Basic idea of global positioning system. inertial frames and fictitious forces. Uniformly rotating frame. Laws of physics in rotating coordinate systems. Centrifugal force. Coriolis force and its applications. Components of velocity and acceleration in cylindrical and spherical Coordinate systems.	12
II	**Oscillations**: Simple Harmonic Oscillations (SHM). Differential equation of SHM and its solution. Kinetic energy, potential energy, total energy and their time-average values. Damped oscillation. Forced oscillations: Transient and steady states; Resonance, sharpness of resonance; power dissipation and Quality Factor. Hooke's law, Elastic moduli-Relation between elastic constants, Poisson's Ratio-Expression for Poisson's ratio in terms of elastic constants, Work done in stretching and work done in twisting a wire, Twisting couple on a cylinder, Determination of Rigidity modulus by static torsion, Torsional pendulum, Determination of Rigidity modulus and moment of inertia, q, η and σ by Searles method.	14
III	**Special Theory of Relativity:** Michelson-Morley Experiment. Postulates of Special Theory of Relativity. Lorentz Transformations. Simultaneity and order of events. Lorentz contraction. Time dilation. Relativistic transformation of velocity, frequency and wave number. Relativistic addition of velocities. Variation of mass with velocity. Massless Particles. Mass-energy Equivalence. Relativistic Kinematics. Transformation of Energy and Momentum.	14

Reference Books:

1. Mechanics, Berkeley Physics, vol.1, C.Kittel, W.Knight, et.al. 2007, Tata McGraw-Hill.
2. Physics, Resnick, Halliday and Walker 8/e. 2008, Wiley.
3. Analytical Mechanics, G.R. Fowles and G.L. Cassiday. 2005, Cengage Learning.
4. Feynman Lectures, vol-I, R. P. Feynman, R. B. Leighton, M. Sands, 2008, Pearson Education
5. Introduction to Special Relativity, R. Resnick, 2005, John Wiley and Sons.
6. Mechanics, D.S. Mathur, S. Chand and Company Limited, 2000
7. Theoretical Mechanics, M.R. Spiegel, 2006, Tata McGraw Hill.

125

7

Name
ect Code
oject Name **Physics Lab-II**
Contact Hours **L: 00** **T: 00** **P: 04** **Credits: 02**

Course Objective

This is basic course meant to give hands on experience of semiconductor devices and making them to use in circuits & projects.

Course Outcomes

At the end of this course student will demonstrate the ability to:

1. Understand characteristics & working of BJT in different configurations.
2. Understand characteristics & working of MOSFET in circuits.
3. Design working circuits based on diodes, BJTs and MOSFETs in different circuits.
4. Measure Modulus of rigidity, spring constant, moment of inertia etc. using different methods.

S.No	Experiments
1	To determine the energy band of a semiconductor medium.
2	To study the characteristics of p-n junction diode (Forward and Reverse biased)
3	To study a zener diode as voltage regulator.
4	To study the output waveform of a Half-wave rectifier.
5	To study the output waveform of a Full-wave centre-tapped and bridge rectifier.
6	To study Input & output V-I characteristics of NPN/PNP transistors in CE configuration
7	To study Input & output V-I characteristics of NPN/PNP transistors in CB configuration
8	To study Input & output V-I characteristics of NPN/PNP transistors in CC configuration
9	To study the functioning of a BJT as a switch.
10	To study V-I Characteristics of a MOSFET
11	To study the Motion of Spring and calculate (a) Spring constant, (b) g and (c) Modulus of rigidity.
12	To establish a relation between angular acceleration α and torque τ, and hence to find out the moment of Inertia of flywheel.
13	Study the dependence of the moment of Inertia on distribution of mass (by noting the time periods of oscillations) using objects of various shape but of same mass.
14	To determine the Young's Modulus of a Wire by Optical Lever Method.
15	To determine the Young's Modulus of a Wire by Searle's method.
16	To determine the Modulus of Rigidity of a Wire by Maxwell's needle.

Course Name	B.Sc. (Non-Medical)			
Subject Code:				
Subject Title:	INTEGRAL CALCULUS			
Contact Hours:	L:3	T:0	P:0	Credits:3

Details of the Course:

Unit	Content
I	Integrals of functions of one variable, geometrical interpretation of integral as area, integration of standard functions, integration by substitution and parts, Integration by Partial fractions, integration of rational and irrational functions. Properties of definite integrals.
II	Reduction formulae for integrals of rational, trigonometric, exponential and logarithmic functions and of their combinations. Areas and lengths of curves in the plane, volumes and surfaces area of solids of revolution.
III	Integrals of functions of two variables, double integrals, Applications to evaluation of area, volumes and surfaces of solids of revolution, Change of order of Integration. Change of variables.
IV	Integrals of functions of three variables, Triple integral, Evaluation of volume, density etc., Change of order of Integration. Change of variables. Implicit and Explicit functions, Integration of hyperbolic and inverse hyperbolic functions.
	Reference Books: 1. Erwin Kreyszig: Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006. 2. G. B. Thomas, M. D. Weir, J. Hass: Thomas' Calculus (Twelfth Edition), Pearson Education. 3. Gorakh Prasad: Integral Calculus, Fourteenth Edition, Reprint 2007, Pothishala Private Limited, Allahabad. 4. Ulrich L. Rohde, G. C. Jain, Ajay K. Poddar, A. K. Ghosh, Introduction to Integral Calculus: Systematic Studies with Engineering Applications for Beginners 1st Edition, Kindle Edition, Wiley 2012 5. P K Mittal, Integral Calculus, S. Chand Publishing, 2005

Course Name	B.Sc. (Non-Medical)			
Subject Code:				
Subject Title:	THEORY OF EQUATIONS			
Contact Hours:	L:3	T:0	P:0	Credits:3

Details of the Course:

Unit	Content
I	Euclid's algorithm, synthetic division, roots and their multiplicity. Complex roots of real polynomials occur in conjugate pairs with same multiplicity. Relation between roots and coefficients. Transformation of equations. Descartes' Rule of Signs.
II	Solution of cubic and bi-quadratic equations, Cardon's method of solving a cubic, discriminant and nature of roots of real cubic, trigonometric solutions of a real cubic with real roots. Ferrari's method for a bi-quadratic equation.
III	Computer arithmetic and errors: Floating point representation of numbers, numbers and their accuracy, significant digits, source of errors, types of errors, errors in arithmetic operations. Numerical instability.
IV	Algorithms, convergence, solution of nonlinear equations: Bisection method, False position method, Secant method, Newton-Raphson's method, Fixed point iteration method.

Reference Books:

1. Turnbull,H.W., Theory Of Equations, Oliver And Boyd, 1947.
2. Chandrika Prasad, Text Book on Algebra and Theory of Equations, Pothishala Pvt. Ltd., 2017.
3. Richard L. Burden and J. Douglas Faires, Numerical Analysis, 9th Edition, Cengage Learning, 2012.
4. M. K. Jain, S. R. K. Iyengar and R. K. Jain, Numerical Methods for Scientific and Engineering Computation, 6th Edition, New Age International Publisher,2012.
5. B. S. Grewal, Higher Engineering Mathematics, Khanna Publishers.

Shaheed Bhagat Singh State University, Ferozepur

B.Sc. (Non-Medical) Batch 2022 onwards

Semester II

Subject Code:

Subject: English

Contact Hours: L:3 T:0 P:0 Credits:3

Course Contents

Unit I

The following Prose from **Textbook entitled 'Prism: Spoken and Written Communication, Prose & Poetry' (published by Orient Longman)** are prescribed:

i. The Bet – Anton Chekov
ii. An Astrologer's Day – R. K. Narayan
iii. The Gift of the Magi – O' Henry
iv. Socrates and the Schoolmaster – F. L. Brayne
v. With the Photographer – Stephen Leacock

Unit 2

The following poems from **'Prism: Spoken and Written Communication, Prose & Poetry' (published by** Orient **Longman)** are prescribed:

i. The Felling of the Banyan Tree – Dilip Chitre
ii. Stay Calm – Grenville Kleiser
iii. On Television – Roald Dahl
iv. Say Not the Struggle Naught Availeth – Arthur Hugh Clough 3
v. Abou Ben Adhem – James Leigh Hunt

Unit 3

Speaking Skills and Listening Skills: Self-Introduction, Oral Presentation , Group Discussion
Listening Skills: Significance of Effective Listening, Barriers to Listening and Strategies to overcome barriers to Listening

Unit 4

Grammar: Parts of Speech, Adjectives and its degrees, Simple, compound and complex structures. Active and passive voices, Subject-verb agreement, Punctuation.

Recommended Books:

1. Robert Louis Stevenson, The Strange Case of Dr Jekyll and Mr Hyde, Madhuban Publications, 2005
2. Wren and Martin, High School English Grammar and Composition, S Chand (Indian edition), 2008.
3. A J Thomson and A V Martinet, A Practical English Grammar, Oxford India, 2007
4. R V Lesikar, M E Flatley, K Rentz and N Pande, Business Comminication (Making Connections in Digital World), Tata McGraw Hill, 2010
5. M Frank, Writig as Thinking: A Guided Process Approach, Englewood Cliffs, Prentice Hall Regents.
6. Fluency in English - Part II, Oxford University Press, 2006.
7. Business English, Pearson, 2008.
8. Language, Literature and Creativity, Orient Blackswan, 2013.
9. Language through Literature (forthcoming) ed. Dr. Gauri Mishra, Dr. Ranjana Kaul,Dr Brati Biswas

Kiranjeet Kaur

(12a)

ਬੀ.ਐਸ.ਸੀ. ਨਾਨ-ਮੈਡੀਕਲ
ਸਮੈਸਟਰ-ਦੂਜਾ
ਸਲੇਬਸ-ਪੰਜਾਬੀ
ਪੰਜਾਬੀ-3L-3 ਕਰੈਡਿਟ

ਪਾਠ-ਕ੍ਰਮ:

ਯੂਨਿਟ-1 (ਸਾਹਿਤ)

1. ਵਤਨ ਦਾ ਪਿਆਰ - ਪ੍ਰੋ. ਪੂਰਨ ਸਿੰਘ
2. ਸਾਕਾ ਸ੍ਰੀ ਨਨਕਾਣਾ ਸਾਹਿਬ- ਭਾਈ ਮੋਹਨ ਸਿੰਘ ਵੈਦ
3. ਘਰ ਦਾ ਪਿਆਰ - ਪ੍ਰਿੰ, ਤੇਜਾ ਸਿੰਘ
4. ਮੇਰੇ ਦਾਦੀ ਜੀ-ਗੁਰਬਖਸ਼ ਸਿੰਘ (ਪ੍ਰੀਤਲੜੀ)
5. ਮਨ ਦੀ ਮੌਜ - ਗਿ. ਲਾਲ ਸਿੰਘ ਕਮਲਾ ਅਕਾਲੀ
6. ਗੁਰ-ਸੰਗਤ ਬਾਣੀ - ਗਿ. ਹੀਰਾ ਸਿੰਘ ਦਰਦ
7. ਕਾਠ ਦੀ ਰੋਟੀ - ਪ੍ਰੋ. ਸਾਹਿਬ ਸਿੰਘ
8. ਗੁਰੂ ਅਰਜਨ ਦੇਵ ਜੀ ਦੀ ਸ਼ਹਾਦਤ - ਡਾ. ਗੰਡਾ ਸਿੰਘ
9. ਸ਼ਾਂਤੀ ਨਿਕੇਤਨ - ਸ.ਸ. ਅਮੋਲ
10. ਗਿੱਧਾ - ਦੇਵਿੰਦਰ ਸਤਿਆਰਥੀ
11. ਅੱਥਰੂ- ਬਲਰਾਜ ਸਾਹਨੀ
12. ਪੰਜਾਬ ਦਾ ਸਭਿਆਚਾਰ - ਸੂਬਾ ਸਿੰਘ
13. ਬੁਲ੍ਹੇ ਸ਼ਾਹ ਦੀ ਕਾਵਿ ਕਲਾ - ਪ੍ਰੋ. ਦੀਵਾਨ ਸਿੰਘ
14. ਸੜਕ ਪਾਰ ਕਰਦਾ ਬੁਢੇਪਾ -ਕੁਲਬੀਰ ਸਿੰਘ ਕਾਂਗ

Kulbir Singh

ਯੂਨਿਟ-੨ (ਭਾਸ਼ਾ)

ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੀਆਂ ਵਿਸ਼ੇਸ਼ਤਾਵਾਂ
ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਉਪਰ ਪਏ ਪ੍ਰਭਾਵ

ਯੂਨਿਟ-੩ (ਵਿਆਕਰਣ)

ਪੰਜਾਬੀ ਸ਼ਬਦ ਸ਼੍ਰੇਣੀਆਂ : ਨਾਂਵ, ਪੜਨਾਂਵ, ਵਿਸ਼ੇਸ਼ਣ, ਕਿਰਿਆ, ਸਹਾਇਕ ਕਿਰਿਆ, ਕਿਰਿਆ ਵਿਸ਼ੇਸ਼ਣ, ਸਬੰਧਕ, ਯੋਜਕ, ਵਿਸਮਿਕ।

ਯੂਨਿਟ-੪ (ਲੇਖਣੀ-ਕਲਾ)

ਰਿਪੋਰਟਿੰਗ, ਸਮਾਚਾਰ ਲਿਖਣ ਦੀ ਵਿਧੀ ਤੇ ਤੱਤ
ਪੰਜਾਬੀ ਪੈਰ੍ਹੇ ਦਾ ਸਰਲ ਅੰਗਰੇਜ਼ੀ ਅਨੁਵਾਦ
ਦਫਤਰੀ ਚਿੱਠੀ ਪੱਤਰ

ਸਹਾਇਕ ਪੁਸਤਕਾਂ:

ਆਧੁਨਿਕ ਪੰਜਾਬੀ ਵਾਰਤਕ (ਸੰਪ. ਗੁਰਬਚਨ ਸਿੰਘ ਤਾਲਿਬ),ਪੰਜਾਬੀ ਸਾਹਿਤ ਪ੍ਰਕਾਸ਼ਨ ਅੰਮ੍ਰਿਤਸਰ।

ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦਾ ਵਿਆਕਰਨ (ਭਾਗ-1) ਜੋਗਿੰਦਰ ਸਿੰਘ ਪੁਆਰ, ਬਲਦੇਵ ਸਿੰਘ ਚੀਮਾ, ਸੁਖਵਿੰਦਰ ਸਿੰਘ ਸੰਘਾ, ਵੇਦ ਅਗਨੀਹੋਤਰੀ), ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਅਕਾਦਮੀ, ਜਲੰਧਰ, ਐਡੀਸ਼ਨ 2009.

Kiranjeet Kaur

Shaheed Bhagat Singh State University, Ferozepur

B.Sc. (Non-Medical)

Semester -2

Punjab History & Culture

L	T	P
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Course Content

Unit 1: Foundation of Sikh Panth: Guru Nanak Dev and his Teachings: Early life, Conception of God, Importance of the Guru, Insistance on right conduct and earnest profession; Institution of community kitchen (Langer) and Congregational worship (sangat), Succession to Guruship.

Unit 2: Development of the Sikh Panth: Guru Angad Dev to Guru Arjan Dev: Increasing number of sangats: Sikh ceremonies; the Manji and Masand system, The founding of the sacred places, The Harimandir. Compilation of the Adi Granth.

Unit 3 : Transformation of the Sikh Panth: Guru Hargobind to Guru Tegh Bahadur: Martyrdom of Guru Arjan Dev and Guru Hargobind's response; Armed conflict with the state; Circumstances leading to the accession and martyrdom of Guru Tegh Bahadur

Unit 4: Creation of Khalsa: Meaning; Circumstances leading to the creation of the Khalsa (1699); New Social order; Conflict with the Hill chiefs and Mughal administrators; Legacy.

Recommended Book

1. Grewal J.S., From Guru Nanak to Maharaja Ranjit Singh, G.N.D. University, Amritsar, 1982.
2. The New Cambridge History of India: The Sikhs of the Punjab, CUP, New Delhi, 1990.
3. Guru Nanak in History, Panjab University, Chandigarh, 1969.
4. Khushwant Singh, A History of the Sikhs, Vol. I (1469-1839), OUP, Delhi, 1977.
5. McLeod, W.H., Guru Nanak and the Sikh Religion, OUP, Delhi, 1968.
6. Teja Singh and Ganda Singh, A Short History of the Sikhs Vol. (1469-1765), Patiala 1983
7. Banerjee, I.B. Evolution of the Khalsa, 2 Vols., A. Mukherjee & Co., Calcutta, 1979.8.Grewal, J.S. and S.S.Bal, Guru Gobind Singh, Panjab University, Chandigarh, 1987.

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9. Indu Banga, The Khalsa Over 300 Years, Manohar, New Delhi, 1999.
10. Harbans Singh (ed), The Encyclopedia of Sikhism, 4 Vols., Punjabi University, Patiala 1992.
11. McLeod, W.H. Evolution of the Sikh Community, OUP, Delhi, 1970.
12. Historical Dictionary of Sikhism, OUP, New Delhi, 2002.

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