

FACULTY OF SCIENCES

SYLLABUS

For

BACHELOR OF SCIENCE (Non-Medical)

(Semester I-VI)

(Under Continuous Evaluation System)

Session: 2020-21



The Heritage Institution

KANYA MAHA VIDYALAYA JALANDHAR (AUTONOMOUS)

Programme Specific Outcomes

BACHELOR OF SCIENCE (Non-Medical) (Phy. Chem. Maths.)

Upon successful completion of this course, students will be able to:

PSO1. demonstrate proficiency in mathematics and the mathematical concepts needed for a proper understanding of physics and chemistry.

PSO2: solve complex mathematical problems by critical understanding, analysis and synthesis. Student will also be able to provide a systematic understanding of the concepts and theories of mathematics and their application in the real world – to an advanced level, and enhance career prospects in a huge array of fields or suitable to succeed at an entry-level position in mathematics post graduate programme.

PSO3: demonstrate knowledge of mechanics, electromagnetism, quantum mechanics, optics & lasers, waves & vibrations, statistical physics, condensed matter physics, electronics, nuclear & particle physics and be able to apply this knowledge to analyse a variety of physical phenomena.

PSO4: demonstrate knowledge of organic, inorganic and physical chemistry and apply this knowledge to analyse a variety of chemical phenomena and will be able to interpret and analyse quantitative data.

PSO5: understand theoretical concepts of instruments that are commonly used in most physics and chemistry fields as well as interpret and use data generated in instrumental physical and chemical analyses.

PSO6: show that they have learned laboratory skills, enabling them to take measurements in a physics laboratory and analyse the measurements to draw valid conclusions. They will also be able to employ critical thinking and scientific inquiry in the performance, design, interpretation and documentation of laboratory experiments, at a level suitable to succeed at an entry-level position in industry or a physics/chemistry postgraduate program.

PSO7: capable of oral and written scientific communication i.e. able to communicate effectively by oral, written, computing and graphical means.

Bachelor of Arts/ Bachelor of Science (Economics, Non-Medical, Computer Science) Semester-I

Session: 2020-21

Course Title: Mathematics (Algebra)

Course Code: BARM/ BECM/ BCSM/ BSNM-1333(I)

Course Outcomes

After passing this course, the students will be able to:

CO 1: Distinguish between solution of cubic equations and Bi-quadratic equations.

CO 2: Classify real quadratic form in variables, definite, semi- definite and indefinite real quadratic form.

CO 3: Understand the concept of matrix congruence of skew symmetric matrices and its reduction in real field.

CO 4: Solve system of linear equations and obtain Eigen values, Eigen vectors, minimal and characteristic equation of a matrix and to apply it in advanced dynamics and electric current.

CO 5: To find the relations between the roots and coefficients of general polynomial equation in one variable.

Bachelor of Arts/ Bachelor of Science (Economics, Non-Medical, Computer Science) Semester-I

Session: 2020-21

Course Title: Mathematics (Calculus and Trigonometry)

Course Code: BARM/ BECM/ BCSM/ BSNM-1333(II)

Course Outcomes

After passing this course, the students will be able to:

CO 1: Understand real number system, lub&glb of set of real numbers, limit of a function, basic properties of limit & to apply it in real world problem.

CO 2: Analyse continuous and discontinuous function, Apply concept of continuity in uniform continuity.

CO 3: Manage to solve problems related to successive differentiation, Leibnitz theorem, Taylor's & Maclaurin's theorem with various forms of remainders and to use these expansion to compute values of Sine, Cosine, tangent or log function.

CO 4: Understand the concept of De Moivre's theorem & its applications. Identify circular, hyperbolic function and their inverses and use these function to describe the shape of the curve formed by high voltage line suspended between two towers.

CO 5: Demonstrate exponential and logarithmic function of complex numbers, and to solve Gregory's series and summation of series.

Bachelor of Science (Medical and Non-Medical) SEMESTER-I

(Session: 2020-21)

COURSE CODE: BSMM/BSNM-1084(I)

INORGANIC CHEMISTRY

(THEORY)

Course outcome:

Students will be able to

CO1: Predict electronic properties of atoms using current models and theories in chemistry

CO2: explain de-Broglie's dual behaviour of matter and Heisenberg's uncertainty principle and solve numerical problems

CO3: explain the significance of quantum numbers

CO4: sketch the probability density curves, boundary surface diagrams and shapes of s, p, d and f orbitals and write the electronic configuration of atoms

CO5: identify the periodic trends in physical and chemical properties of elements.

CO6: describe VSEPR theory and predicts the geometry of simple molecules

CO7: explain the valence bond approach for the formation of covalent bonds and the different types of hybridization involving s, p and d orbitals of simple covalent molecules

CO8: describe the molecular orbital theory of homonuclear diatomic molecules

CO9: explain the structures simple compounds.

CO10: differentiate the types of van der Waals' forces such as London forces, dipole - dipole interactions and dipole - induced dipole interactions and explain the concept of hydrogen bonding

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B.Sc (Med and Non.Medical) SEMESTER–I

(Session: 2020-21)

COURSE CODE: BSMM/BSNM-1084(II)

ORGANIC CHEMISTRY

(THEORY)

Course outcome:

Students will be able to

CO1: explain the bonding between different organic compounds

CO2: explain the various reaction mechanisms and different electron displacement effects

CO3: explain the various methods of formation and chemical reactions of alkanes, alkenes and alkynes

CO4: compare the reactivities of various alkyl and aryl halide

CO5: differentiate between aromatic, anti-aromatic and non aromatic compounds

CO6: compare the stability of various cycloalkanes

CO7: explain the effect of various substituents on the reactivity of aromatic compounds

Bachelor of Science (Medical and Non-Medical) SEMESTER-I

(Session: 2020-21)

COURSE CODE: BSMM/BSNM-1084(P)

CHEMISTRY PRACTICAL

Course outcome:

Students will be able to

CO1: separate and identify the various ions present in the mixture

CO2: accurately note down the melting and boiling point of organic compounds

SEMESTER-I
(2020-21)
PHYSICS
MECHANICS
(THEORY)

Course code: BSNM-1395 (I) for B.Sc. (Non Medical)
BCSM-1395 (I) for B.Sc. (Computer Science)

Course Outcomes: Mechanics -Paper (A)

After passing this course, students will be able to:

CO1: Understand the various coordinate systems and its applications. Students will be able to know the conservations laws and the symmetries of space & time.

CO2: Know the fundamental forces of nature, concept of centre mass, central forces and the motion of particle under central force and to determine the turning points of orbit. They will be able to understand the planetary motion by solving differential equation of orbits and studying Kepler's laws.

CO3: They will understand the origin of fictitious forces and their consequences on acceleration due to gravity, motion of a particle on earth, and Foucault's pendulum.

CO4: They will understand the elastic scattering in lab and centre of mass systems. They will learn the rotational motion of a body in general by studying the Euler's equations and Moment of inertia tensor.

SEMESTER–I

PHYSICS
ELECTRICITY AND MAGNETISM
(THEORY)

Course code: BSNM-1395 (II) for B.Sc. (Non Medical)
BCSM-1395 (II) for B.Sc. (Computer Science)

Course Outcomes: Electricity and magnetism

After passing this course the students will be able to:

- CO1: understand the vector calculus and vector algebra and its applications in electricity and magnetism. The students will be able to solve the electrostatic problems with the help of Gauss law and Coulomb's law.
- CO2: understand the applications of scalar potential for the calculation of electric field and electric potential due to an arbitrary charge distribution.
- CO3: solve the problems with the help of method of images and understand the conduction of electric current and fundamental laws of electricity.
- CO4: relate the electric and magnetic fields in two inertial frames of reference.

SEMESTER-I
PHYSICS
PHYSICS PRACTICAL
Course code: BSNM-1395 (P) for B.Sc. (Non Medical)
BCSM-1395 (P) for B.Sc. (Computer Science)

Course Outcomes : Physics Lab Sem I

CO1: Students will be able to find the value of acceleration due to gravity using pendulums.

CO2 : It will give understanding of collisions In 1-Dimension.

CO3: It helps to study the moment of inertia of a body & on what factors its depends.

Bachelor of Arts/ Bachelor of Science (Economics, Non-Medical, Computer Science)

Semester–II

Session: 2020-21

Course Title: Mathematics (Calculus and Differential Equations)

Course Code: BARM/BECM/ BCSM/BSNM-2333(I)

Course Outcomes

After passing this course, the students will be able to:

CO 1: Demonstrate Asymptotes, points of inflexion, multiple points on a curve & also to differentiate between concavity and convexity & hence tracing of curve.

CO 2: Understand the concept of linear differential equation with constant and variable coefficients & also the exact differential equations & to apply in a wide variety of disciplines like Bio, Eco, Physics& Engineering.

CO 3: Demonstrate the geometrical meaning of a differential equation & the orthogonal trajectories.

CO 4: Manage to solve the problem related to series solution of differential equations like Bessel and Legendre equation by Power series method.

CO 5: Apply reduction formula on different functions & to develop the concept of variation of parameter.

Bachelor of Arts/ Bachelor of Science (Economics, Non-Medical, Computer Science)

Semester–II

Session: 2020-21

Course Title: Mathematics (Calculus)

Course Code: BARM/BECM/ BCSM/BSNM-2333(II)

Course Outcomes

After passing this course, the students will be able to:

CO 1: Understand the concept of Double and Triple integrals, & application to evaluation of areas, volumes, surfaces of solid of revolution and to apply to find out area and volume of plane and solid figure.

CO 2: Differentiate between limit and continuity of function of two variables and apply this concept in partial derivatives & differentiability of real valued function of two variables.

CO 3: Manage to solve problems related to Maxima, Minima & Saddle points of functions of two variables.

CO 4: Classify Envelopes & Evolutes, Application of inverse & implicit function theorems.

Bachelor of Science (Medical and Non Medical) SEMESTER–II

SESSION: 2020-21

COURSE CODE: BSMM/BSNM-2084(I)

COURSE TITLE: INORGANIC CHEMISTRY(I)(THEORY)

Course outcomes:

Students will be able to

CO1: explain the atomic, physical and chemical properties of alkali metals and alkaline earth metals

CO2: recognise the anomalous properties of Li and compares the properties Li with those other alkali metals

CO3: recognises the anomalous properties of Be and compares the properties of Be with those other alkaline earth metals

CO4: explains the trends in atomic and physical properties of group 13, 14, 15, 16, 17 elements

explains chemical properties of above group elements

CO5: describe allotropic forms of elements

CO6: Exhaustive understanding of d-block elements belonging to 4th, 5th and 6th period.

CO7: Understand the simple concepts of pH and complete and balance simple acid-base reactions.

Bachelor of Science (Medical and Non Medical) SEMESTER–II
SESSION: 2020-21
COURSE CODE: BSMM/BSNM-2084(II)
COURSE TITLE: PHYSICAL CHEMISTRY(II)(THEORY)

Course outcomes:

Students will be able to

CO1: acquire the knowledge of structure and intermolecular forces present between solids, liquids and gases.

CO2: demonstrate an understanding of basic principles of colligative properties

CO3: understand the basic concepts of colloidal state of matter and applications of colloids.

CO4: explain various gaseous laws and their applications.

Bachelor of Science (Medical and Non Medical) SEMESTER–II

SESSION: 2020-21

COURSE CODE: BSMM/BSNM-2084(P)

COURSE TITLE: CHEMISTRY PRACTICAL

Course outcomes:

Students will be able to

CO1: understand the technique of crystallisation

CO2: compare the viscosity and surface tension of different liquids and solutions

CO3: determine the rate of the reactions

CO4: efficiently use of calorimeter in various experiments

SEMESTER–II
PHYSICS
RELATIVITY AND ELECTROMAGNETISM
(THEORY)
Course code: BSNM-2395 (I) for B.Sc. (Non Medical)
BCSM-2395 (I) for B.Sc. (Computer Science)

Course Outcomes: Relativity & Electromagnetism -Paper (A)

After passing this course, students will be able to:

- CO1: understand special theory of relativity and related basic concepts and applications.
- CO2: derive Maxwell equations and their applications in propagation of e.m. waves in conductors and insulators.
- CO3: apply the Biot Savart's Law and Ampere's circuital law in different situations and frames.
- CO4: understand the Faraday's Law of electromagnetic induction and LCR circuits.

SEMESTER–II
PHYSICS
VIBRATION AND WAVES
(THEORY)

Course code: BSNM-2395 (II) for B.Sc. (Non Medical)
BCSM-2395 (II) for B.Sc. (Computer Science)

After passing this course the student will be able to:

CO1: demonstrate Lissajous figures by mechanical and analytical method with different cases.

CO2: understand Free, damped and resonance oscillations, both mechanical and electric using differential equations.

CO3: solve differential equation of forced oscillations & to obtain related quantities.

CO4: understand concept of coupled oscillators and wave motion. Student will also be able to apply the concept of waves and oscillations to any type of waves like e. m. waves, mechanical waves.

SEMESTER-II
PHYSICS PRACTICAL

Course code: BSNM-2395 (P) for B.Sc. (Non Medical)
BCSM-2395 (P) for B.Sc. (Computer Science)

COURSE OUTCOMES

CO1: Students will be able to study resonance in series & parallel LCR circuit.

CO2: At the end of this course, students will be able to find the value of capacitor, coefficient of self inductance, permeability & permittivity of air.

CO3: Students will be able to study the variation of magnetic field on the axis of coil & can find the value of horizontal component of magnetic field.

Bachelor of Arts/ Bachelor of Science (Economics, Non-Medical, Computer Science) Semester–III

Session: 2020-21

Course Title: Mathematics (Analysis)

Course Code: BARM/ BECM/ BCSM/ BSNM-3333(I)

Course Outcomes

After passing this course, the students will be able to:

CO 1: Demonstrate an understanding of limits and how they are used in sequences and series.

CO 2: To understand the concepts of Riemann sum, partitions, upper and lower sums, Riemann integrability of continuous functions and of monotone functions.

CO 3: To know and describe the converging behavior of improper integrals and Beta , Gamma functions.

CO 4: Distinguish between the absolute convergence and conditional convergence.

CO 5: To find the relation between Beta and Gamma functions.

Bachelor of Arts/ Bachelor of Science (Economics, Non-Medical, Computer Science) Semester–III

Session: 2020-21

Course Title: Mathematics (Analytical Geometry)

Course Code: BARM/ BECM/ BCSM/ BSNM-3333(II)

Course Outcomes

After passing this course, the students will be able to:

CO 1: Understand the concept of the geometry of lines and conics in the Euclidian plane.

CO 2: Develop geometry with a degree of confidence and will gain fluency in the basics of Euclidian geometry.

CO 3: Sketch conic sections; identify conic sections, their focal properties and classifications.

CO 4: Demonstrate the concept of parabola, ellipse, hyperbola, sphere and the general quadratic equation.

CO 5: Understand the concept of coordinate geometry on a wider scale with the help of shifting of origin and rotation of axis.

Bachelor of Science (Med & Non-Medical) SEMESTER–III
SESSION: 2020-21
COURSE CODE: BSMM/BSNM-3084
ORGANIC CHEMISTRY–I
(THEORY)

Course outcomes:

Students will be able to

CO1: to resolve the different enantiomers and differentiate between dextrorotatory and leavorotatory compounds

CO2: understand the concept of isomerism

CO3: differentiate between chiral and achiral compounds, configuration and conformation

CO4: understand the concept of axial and equatorial bonds and draw the various projection formulae

CO5: understand the methods of formation, chemical reactions, acidic character of alcohols

CO6: understand structure and bonding, preparation of phenols, acidic character of phenols

CO7: understand structure and bonding in phenols and carbonyl compounds

CO8: compare reactivity of aliphatic and aromatic aldehydes and ketones

CO9: understand the various reactions given by carbonyl compounds

Bachelor of Science (Med & Non-Medical) SEMESTER–III
SESSION: 2020-21
COURSE CODE: BSMM/BSNM-3084
PHYSICALCHEMISTRY–II
(THEORY)

Course outcomes:

Students will be able to

CO1: understand and evaluate thermodynamic property of any system and its applications to various systems.

CO2: acquire the knowledge of phase equilibria of various systems.

CO3: understand completely miscible, partially miscible and immiscible liquids.

CO4: understand concept of spontaneity of a reaction in terms of free energy change.

CO5: demonstrate Vant' Hoff equation and relationship between equilibrium constants.

CO6: demonstrate Clausius-Clapeyron equation.

Bachelor of Science (Med & Non-Medical) SEMESTER–III
SESSION: 2020-21
COURSE CODE: BSMM/BSNM-3084(P)
CHEMISTRY PRACTICAL

Course outcomes:

Students will be able to

CO1: understand and master the technique of volumetric analysis

CO1: to understand and analyze an acidic & alkali content in different samples.

CO2: to understand and analyze the calcium content in various samples permanganometrically

CO4: to understand the concept of hardness of water and its analysis by EDTA method

CO5: understand and master the technique of gravimetric analysis

CO6: to understand the concept of TLC and its applications.

SEMESTER II

Course Outcomes: PHY-Statistical Physics and Thermodynamics

Course code: BCSM-3395 (I)

After passing this programme the students will be able to:

- CO1: Understand the basic ideas and scope of probability as well as distribution of n particles in different compartments.
- CO2: Concept of different types of Statistics and the need for Quantum Statistics.
- CO3: Understand the concept of entropy, Laws of Thermodynamics and applications to thermoelectric effect.
- CO4: Understand the Maxwell Thermodynamics relations, Change of state and Claypron equation.

Course Outcomes: PHY-OPTICS

Course code: BCSM-3395 (II)

After passing this programme the students will be able to:

- CO1:** understand the concept of interference of waves by division of wave front and its different methods and concept of coherence.
- CO2:** understand the interference of waves by division of Amplitude and its methods and will have knowledge of interferometers
- CO3:** understand the Huygen's Fresnel theory and diffraction, Fraunhofer diffraction due to single slit, double slit and n slits, the concept of resolving power.
- CO4:** understand the concept the polarization of light and types of polarisers.

Course Outcomes: SEMESTER–III PHYSICS (PRACTICAL)

Course code: BCSM-3395 (P)

After passing this programme the students will be able to:

- CO1: use spectrometer to determine the refractive index of different transparent materials wills dispersive power and resolving power of different transparent prisms and liquids using spectrometer.
- CO2: use diffraction grating and apply it to determine dispersive power, resolving power, the wavelengths of Hg source and the Cauchy's constants.
- CO3: to measure an accessible (Horizontal and vertical) and inaccessible heights using sextant.
- CO4: set up of Newton's rings to determine wavelength of sodium light.
- CO5: demonstrate the verification of laws of probability distribution.

Bachelor of Arts/ Bachelor of Science (Economics, Non-Medical, Computer Science)

Semester–IV

Session: 2020-21

Course Title: Mathematics (Statics and Vector Calculus)

Course Code: BARM/BECM/ BCSM/BSNM-4333(I)

Course Outcomes

After passing this course, the students will be able:

CO 1: To apply parallelogram law of forces, triangle law of forces, Lami's theorem to real life problems.

CO 2: To understand that how one can resolve number of coplanar forces, parallel forces and concurrent forces acting at a body.

CO 3: To find the moments of number of coplanar forces acting at a particle

CO 4: To find the resultant of a force and couple acting on a body.

CO 5: To find the applications of CG of a rod, triangular lamina, solid hemisphere, hollow hemisphere, solid cone and hollow cone.

CO 6: To find the values of gradient, divergence and curl operator of given vectors.

CO 7: To find the application of Gauss theorem, Green's theorem and Stokes's theorem in real life problems.

Bachelor of Arts/ Bachelor of Science (Economics, Non-Medical, Computer Science)

Semester–IV

Session: 2020-21

Course Title: Mathematics (Solid Geometry)

Course Code: BARM/BECEM/ BCSM/BSNM-4333(II)

Course Outcomes

After passing this course, the students will be able to:

CO 1: Demonstrate the concept of cone, classification of cone, intersection of line and cone, reciprocal cone.

CO 2: Understand the concept of cylinder, enveloping cylinder and its limiting form.

CO 3: Describe the concept of conicoids or quadratic surface, its classification, trace different types of conicoids.

CO 4: Manage to find surface of revolution and concept of tangent and normal to the conicoid

CO 5: Identify the conicoids and representing it in the form of hyperboloid, ellipsoid, paraboloid.

Bachelor of Science (Medical and Non- Medical) SEMESTER–IV

SESSION: 2020-21

COURSE CODE: BSMM/BSNM-4084(I)

COURSE TITLE: INORGANIC CHEMISTRY-I (THEORY)

Course outcomes:

Students will be able to

CO1: understand the key features of coordination compounds viz. variety of structures, oxidation numbers and electronic configurations, coordination numbers and explain the bonding and stability of complexes

CO2: understand the magnetic properties of coordination compounds by using CFT.

CO3: describe the shapes and structures of coordination complexes with coordination numbers ranging from 4 to 12.

CO4: do nomenclature of coordination compounds.

CO5: write both reduction and oxidation half reactions for a simple redox reaction

CO6: identify the oxidation number (charge) on a neutral metal, metal and non-metal ion

CO7: carry out the common applications of the activity series of metals

CO8: understand the Latimer, Frost and Pourbaix diagram.

CO9: understand the positions, electronic configurations, relative stability, preparation, properties, structures and characteristics of the f-block elements in the periodic table;

CO10: understand the role of metal ions and other inorganic elements in biological systems.

CO11: understand the properties and reactions of non-aqueous solvents.

Bachelor of Science (Medical and Non- Medical) SEMESTER–IV
SESSION: 2020-21
COURSE CODE: BSMM/BSNM-4084(II)
COURSE TITLE: ORGANIC CHEMISTRY-II(THEORY)

Course outcomes:

Students will be able to

- CO1: understand structure and bonding in carboxylic acids and carboxylic acid derivatives
- CO2: Compare the acidity of alcohols, phenols and acids
- CO3: understand the effect of various substituents on the acidity of acids
- CO4: describe preparations, physical properties, and reactions of carboxylic acids and carboxylic acid derivatives
- CO5: understand preparations and reactions of ethers and epoxides
- CO6: understand various cleavages in ethers
- CO7: understand the ring opening reactions of epoxides
- CO8: understand preparation and reactions of nitroalkanes and nitroarenes
- CO9: understand nomenclature, structural features, and methods of formation and chemical reactions of Organomagnesium, Organolithium, Organozinc and Organocopper compounds.
- CO10: know the various methods of synthesis and compare electrophilic substitution, reactions of pyrrole, furan, thiophene and nucleophilic substitution reactions of pyridine.
- CO11: compare the basicity of pyridine, piperidine and pyrrole.

Bachelor of Science (Medical and Non- Medical) SEMESTER–IV

SESSION: 2020-21

COURSE CODE: BSMM/BSNM-4084(P)

COURSE TITLE: CHEMISTRY PRACTICAL

Course outcomes:

Students will be able to analyze the given organic compound through

CO1:detection of elements (N, S and halogens) in organic compounds.

CO2:detection of functional groups (phenolic, carboxylic, carbonyl, esters, carbohydrates, amines, amides, nitro and anilide) in simple organic compounds

CO3: preparation of their derivatives

Course Outcomes: Quantum Mechanics (Paper A)

Course code: BCSM-4395 (I)

After completing this course

CO1: Students will be familiar with the main aspects of the historical development of quantum mechanics

CO2: Students will understand the central concepts and principles in quantum mechanics

CO3: Students will be able to find the solution of Schrödinger wave equation for simple systems in one dimension and for Hydrogen atom.

CO4: Students will understand concept of X rays spectra and molecular spectra.

Course Outcomes: PHY- ATOMIC SPECTRA & LASERS

Course Code: BCSM-4395 (II)

After passing this programme the students will be able to:

CO1: understand fine and hyperfine spectrum of hydrogen atom and the concept of spin of an electron

CO2: demonstrate understanding of exchange symmetry of wave function, different coupling schemes and spectra of atoms with more than one electron.

CO3: understand the fundamentals of lasers and its processes

CO4: have the knowledge of different components and types of lasers and its applications

SEMESTER–IV
Session 2020-21
PHYSICS
Course Outcomes: PHY Lab Sem IV

Course code: BCSM-4395 (P)

CO1: The exercises included in this laboratory course are aimed at training the students to handle different type of equipment for verification of some of the laws and concepts studied in theory like concepts of thermodynamics, photoelectric effect and for carrying out precise measurements so that they develop confidence to use later the sophisticated instruments in their respective fields.

CO2: After the completion of this course students will be able to use spectrometer and hence will be able to study absorption spectra of iodine.

CO3: At the end of this course students will be able to prepare cane sugar solution and hence will be able to find its specific rotation by using polarimeter.

Bachelor of Arts/ Bachelor of Science (Economics, Non-Medical, Computer Science) Semester–V

Session: 2020-21

Course Title: Mathematics (Dynamics)

Course Code: BARM /BECM / BCSM/ BSNM-5333(I)

Course Outcomes

After passing this course, the students will be able to:

CO 1: Identify the basic relations between distance, time, velocity and acceleration.

CO 2: Explain the relationship between forces and motion. Differentiate between balanced and unbalanced forces and Explain how unbalanced force affect motion.

CO 3: Understand Newton's Laws of Motion and Apply the laws to solve many problems.

CO 4: Discuss the motion of particles connected by a string, motion along a smooth inclined plane.

CO 5: Solve different types of problems with Variable Acceleration.

CO 6: Discuss Simple Harmonic Motion and Illustrate it with a variety of examples.

CO 7: Solve Pendulum, Damped and forced Oscillations oscillating system problems.

CO 8: Define Work, Power and Energy and Explain their relationship. Use measurement tools to apply the concepts of Work and power to solve real life problems.

CO 9: Define Energy and Identify the different types that exist

Bachelor of Arts/ Bachelor of Science (Economics, Non-Medical, Computer Science) Semester–V

Session: 2020-21

Course Title: Mathematics (Number Theory)

Course Code: BARM/ BECM/ BCSM/ BSNM-5333(II)

Course Outcomes

Successful completion of this course will enable the students to:

CO 1: Prove results involving divisibility and greatest common divisors.

CO 2: Solve system of linear congruences.

CO 3: Find solutions of specified linear Diophantine equation.

CO 4: Apply Fermat's and Euler's theorem to prove relation involving prime numbers.

CO 5: Apply the Wilson's theorem to solve numerical problems.

CO 6: Solve system of equations using congruences.

CO 7: Understand and apply properties of phi functions in real world problems.

CO 8: Understand application of important arithmetic functions.

Bachelor of Science (Medical & Non-Medical) SEMESTER–V
SESSION: 2020-21
COURSE CODE: BSMM/BSNM-5084
INORGANIC CHEMISTRY–I
(THEORY)

Course outcomes

Students will be able to:

CO1: understand structure and bonding in molecules / ions and predict the structure of molecules / ions.

CO2: use Crystal Field Theory to understand the structure, hybridisation, geometry and predict the colour of the complexes.

CO3: describe the stability of metal complexes by the use of formation constants and to calculate thermodynamic parameters from them.

CO4: to describe the magnetic properties of coordination compounds.

CO5: familiar with applications of coordination compound.

CO6: to draw Orgel diagrams for d^1 to d^{10} systems and predict the possible transitions.

CO7: to calculate number of microstate and ground state term symbols.

CO8: understand preparations, properties and applications of alkyls aryls of lithium and aluminium, bonding in metal-ethylenic complexes, mechanism of homogeneous hydrogenation.

Bachelor of Science (Medical & Non-Medical) SEMESTER–V

SESSION: 2020-21

COURSE CODE: BSMM/BSNM-5084

PHYSICAL CHEMISTRY–II(THEORY)

Course outcomes:

Students will be able to:

CO1: get knowledge about various electrochemical phenomena.

CO2: get the theoretical knowledge of the various spectroscopic methods on the basis of the examples from the science and industry.

CO3: use spectroscopic equipment such as MS, IR, NMR spectrometers.

CO4: identify organic compounds by analysis and interpretation of spectral data.

CO5: explain common terms in NMR spectroscopy such as chemical shift, coupling constant, and anisotropy and describe how they are affected by molecular structure.

CO6: identify and define various types of nuclear transmutation including fission, fusion and decay reactions.

CO7: define binding energy and mass defect and be able to calculate each for a given nucleus.

CO8: understand and explain the concept of ionizing radiation and distinguish between the three different types of radiation.

CO9: understand the concept of rate of change and half-life in the context of nuclear decay.

CO10: understand the basics of nuclear chemistry applications.

CO11: identify an oxidation – reduction (redox) reaction based on changes in oxidation numbers across the chemical change.

CO12: recognize degrees of reactivity based on an activity series table or a standard reduction potential table.

CO13: describe fully the relationship between the free energy and the cell potential.

CO14: explain thermodynamically the operation of a concentration cell and be able to predict the concentration in the cell based on the cell potential.

Bachelor of Science (Medical & Non-Medical) SEMESTER–V
SESSION: 2020-21
COURSE CODE: BSMM/BSNM-5084(P)
CHEMISTRY PRACTICAL

Course outcomes:

Students will be able to

CO1: synthesize and analyse the coordination compounds

CO2: determine the end point of various conductometric titrations

CO3: know the principle and working of Abbe's Refractometer

CO4: determine the composition of unknown mixture of two liquids by refractive index measurements.

CO5: learn the technique of Rast's methods

CO6: learn phenomenon of adsorption of acetic acid and oxalic acid on charcoal

CO7: learn distribution coefficient of iodine between CCl_4 and water

B.Sc. (Non Medical), Semester–V (Session 2020-21) Electronics

MICROPROCESSOR ARCHITECTURE

Course Code: BSNM-5184 (I) (THEORY)

Course Outcomes:

After passing this course, students will be able to:

CO1: Understand the concept of microprocessor architecture and its operations CO2: Demonstrate

Addressing modes, types of 8085 instructions, instruction format CO3: Understand the instruction set of 8085

CO4: Understand the concept of Memory interfacing

**B.Sc. (Non Medical) Semester–V (Session 2020-2021) ELECTRONICS
COMMUNICATION SYSTEM (502) (THEORY)
Course Code: BSNM-5184 (II)**

Course Outcomes:

After passing this course the student will be able to:

CO1- To develop an understanding of Amplitude modulation. CO2- Develop an understanding of Frequency modulation.

CO3- Develop an understanding of Radio receiver and its types.

CO4- Develop and ability to understand IF amplifiers, detection and automatic gain control (AGC)

B.Sc. (Non Medical), Semester–V (Session 2020-21)

Electronics

Electronic Communication Systems Lab

Course Code: BSNM-5184 (P) (PRACTICAL)

Course Outcomes:

CO1: Students will be able to understand amplitude and frequency modulation and demodulation.

CO2: Students will get familiarize with microprocessor 8085 kit.

CO3: Students will be able to understand the concept of a program for add and subtract 8 bit no using 8085 microprocessor.

CO4: Students will able to understand programming of divide and multiply using 8085 microprocessor.

Bachelor of Science (Semester System) (12+3 System of Education)
(Semester–V) (Session 2020-21)
PHYSICS (CONDENSED MATTER PHYSICS)
(THEORY)

Course code: BSNM-5395 (I) for B.Sc. (Non Medical)
BCSM-5395 (I) for B.Sc. (Computer Science)

Course Outcomes

After passing this course, students will be able to:

- CO 1. Understand basics about crystal structures in solids, various types of crystal structure, unit cells and symmetry operations.
- CO 2. Understand the experimental methods to determine crystal structures, reciprocal lattice, Brillouin zones and form factor.
- CO 3. Understand the concept of lattice vibrations and role of phonons in determining specific heat of solids at low temperatures and models of specific heat.
- CO 4. Build concept from free electron model to Kronig Penny model and its application to band theory to differentiate insulators, semiconductors and conductors.

Bachelor of Science (Semester System) (12+3 System of Education) (Semester–V) (Session 2020-21)
PHYSICS (NUCLEAR PHYSICS)
(THEORY)

Course code: BSNM-5395 (II) for B.Sc. (Non Medical)
BCSM-5395 (II) for B.Sc. (Computer Science)

Course Outcomes

After passing this course, students will be able to:

CO 1. Understand basic properties of nucleus and nuclear forces.

CO 2. Understand about radioactivity, theories of alpha, beta and gamma decay, neutrino hypothesis.

CO 3. Understand concepts and types about nuclear reactions, reactions cross section and compound nucleus.

CO 4. Understand nuclear models (Liquid drop and Shell model) and their failures and successes.

**Bachelor of Science (Semester System) (12+3 System of Education)
(Semester–V) (Session 2020-21)**

PHYSICS PRACTICAL

Course code: BSNM-5395 (P) for B.Sc. (Non Medical)
BCSM-5395 (P) for B.Sc. (Computer Science)

Course Outcomes : Physics Lab Sem V

CO 1. Students will be able to characterize p-n junction, zener diode, LED and LDR. CO 2. Student will be able to use CRO for AC, DC, voltages and frequencies.

CO 3. Student will be able to understand the use of GM counter.

Bachelor of Arts/Bachelor of Science (Economics/Computer Science/Non-Medical)

Semester–VI

Session- 2020-21

Course Title: Mathematics (Linear Algebra)

Course Code: BARM/BECM/BCSM/BSNM-6333(I)

Course Outcomes

After the completion of this course, students should be able to:

CO 1: Express the algebraic concepts such as binary operation, groups, rings and fields.

CO 2: Define a vector space and subspace of a vector space.

CO 3: Check the linear dependence and linear independence of vectors.

CO 4: Describe the concepts of basis and dimension of vector spaces.

CO 5: Investigate properties of vector spaces and subspaces using linear transformation.

CO 6: Express linear transformations between vector spaces.

CO 7: Perform algebra operations between linear transformations.

CO 8: Find the matrix representing a linear transformation.

Bachelor of Arts/Bachelor of Science (Economics/Computer Science/Non-Medical)

Semester–VI

Session: 2020-21

Course Title: Mathematics (Numerical Analysis)

Course Code: BARM/BECM/ BCSM/BSNM-6333(II)

After passing this course, the students will be able to:

CO 1. Perform computation for solving a system of equations.

CO 2. Understand its application in all branches of engineering.

CO 3. Know how to find the roots of transcendental equations.

CO 4. Learn how to interpolate the given set of values.

CO 5. Understand the curve fitting for various polynomials .

CO 6. Learn numerical solution of differential equations.

CO 7. Compute numerical integration and differentiation, numerical solution of ordinary differential equations.

Bachelor of Science (Medical and Non- Medical) SEMESTER-VI

SESSION: 2020-21

COURSE CODE: BSMM/BSNM-6084(I)

COURSE TITLE: ORGANIC CHEMISTRY–I (THEORY)

Course outcomes:

Students will be able to

CO1: learn about the Principle and applications of ultraviolet and Woodward Fisher Rule

CO2: understand the infra-red spectroscopy in organic structure determination

CO3: know about the Nuclear magnetic resonance spectroscopy, proton chemical shift, spin-spin coupling, coupling constants and applications to organic structures

CO4: learn about the different mechanisms involved in the polymer preparation

CO5: learn about the different polymerization techniques

CO6: Familiarize with structure, classification and the biological functioning of carbohydrates, amino acids and nucleic acids.

CO7: understand the types and reactions given by organosulphur compounds

Bachelor of Science (Medical and Non- Medical) SEMESTER–VI

SESSION: 2020-21

COURSE CODE: BSMM/BSNM-6084(II)

COURSE TITLE: PHYSICAL CHEMISTRY–II(THEORY)

Course outcomes:

Students will be able to

CO1: understand wave mechanics in three dimensions;

CO2: describe the structure of the hydrogen atom and show an understanding of quantisation of angular momentum.

CO3: understand and explain the differences between classical and quantum mechanics

CO4: understand the idea of wave function

CO5: understand the uncertainty relations

CO6: solve Schroedinger equation for simple potentials

CO7: spot, identify and relate the eigen value problems for energy, momentum, angular momentum and central potentials explain the idea of spin

CO8: apply the knowledge about photochemical and photophysical processes

CO9: acquire knowledge about the unit cell, space lattice, miller indices, symmetry operations , Bragg equation etc.

Bachelor of Science (Medical and Non- Medical) SEMESTER–VI

SESSION: 2020-21

COURSE CODE: BSMM/BSNM-6084(P)

COURSE TITLE: CHEMISTRY PRACTICAL

Course outcomes:

Students will be able to

CO1:separate the various mixtures by Column Chromatography technique

CO2:synthesize different Organic Compounds

CO3:synthesise the different compounds by Green Approach

CO4:prepare the different dyes

B.Sc. (Non Medical), Semester–VI (Session 2020-21)
Electronics
MICROPROCESSOR PROGRAMMING
Course Code: BSNM-6184 (I)
(THEORY)

Course Outcomes: After passing this course the student will be able to:

- CO1 - To understand the concept of Programming techniques
- CO2- To develop an understanding of advanced subroutine concepts.
- CO3- To understand the concept of Interrupts of 8085 and interrupt driven data transfer schemes.
- CO4- To develop an understanding of Introduction to 16 bits, 32 bits & 64 bits microprocessor.

B.Sc. (Non Medical), Semester–VI (Session 2020-21)

Electronics

Optical Fiber Communication

Course Code: BSNM-6184 (II)

(THEORY)

Course Outcomes: After passing this course the student will be able to:

CO1 - To understand the concept of overview of optical fiber communication

CO2- To develop an understanding of transmission characteristics of optical fibers

CO3- To understand the concept of optical sources and detectors

CO4- To develop an understanding of fiber couplers and connectors.

(Session 2020-21)
Electronics
Microprocessor Lab
Course Code: BSNM-6184 (P)
(PRACTICAL)

Course Outcomes:

After passing this course the student will be able to:

CO1: This course gives an overview of microprocessor.

CO2: At the end of this course student will be able to perform programs on microprocessor.

CO3: At the end of this course, the students will be able to understand conversion of programs.

CO4: Students will understand the applications of microprocessor.

Bachelor of Science (Semester System) (12+3 System of Education)
(Semester–VI) (Session 2020-21)
PHYSICS (RADIATION AND PARTICLE PHYSICS)
Course code: BSNM-6395 (I) for B.Sc. (Non Medical)
BCSM-6395 (I) for B.Sc. (Computer Science)

Course Outcome:

After successfully completing this course a student will be able to:

CO1: understand interaction of radiation and charged particles with matter.

CO2: understand theory and working of various types of nuclear detectors like gas filled, semiconductor, solid state track detectors and nucleus emulsions.

CO3: understand theory and working of various particle accelerators, linear and cyclic and phase stability conditions.

CO4: understand about elementary particles, different types of interactions and quark mode.

Bachelor of Science (Semester System) (12+3 System of Education)
(Semester–VI) (Session 2020-21)
PHYSICS (ELECTRONICS)

Course code:BSNM-6395 (II) for B.Sc. (Non Medical)
BCSM-6395 (II) for B.Sc. (Computer Science)

Course Outcomes-After completing this course a student will be able to

CO1: understand, concept of voltage and current sources, working of a p-n junction diode and zener diode in rectification and voltage regulation.

CO2: understand the characteristics, biasing and working of BJT and FETs.

CO3: able to understand h-parameters, amplifiers using BJT & FETs and types of feedbacks and practical example of negative feedback (emitter follower).

CO4: understand LC and RC oscillators and their comparison.

Bachelor of Science (Semester System) (12+3 System of Education)
(Semester–VI) (Session 2020-21)

PHYSICS PRACTICAL

Course code: BSNM-6395 (P) for B.Sc. (Non Medical)
BCSM-6395 (P) for B.Sc. (Computer Science)\

Course Outcome: After successfully completing this course a student will be able to:

CO1: understand application of p-n junction diode and zener diode as rectifiers and voltage regulators respectively.

CO2: plot characteristics of BJT and FET and be able to understand h-parameters and application of BJT as amplifier and oscillator.

CO3: use of GM counter to concepts of end point energy and absorption coefficient.

B.Sc. (Medical/ Non-Medical) Semester–VI
Session: 2020-21
BIOINFORMATICS (VOCATIONAL)
Course Title: Structural Biology and Molecular Modelling
Course Code: BSMM/ BSNM- 6046
(Theory)

Course Outcomes:

On completion of this course students will be able to

CO1: understand the concept of protein sequencing.

CO2: use different protein structure prediction tools

CO3: understand the concept of drug designing.

CO4: use different simulation techniques.

B.Sc. (Medical/ Non- Medical) Semester–VI
Session: 2020-21
BIOINFORMATICS (VOCATIONAL)
Course Title: Lab in Structural Biology and Molecular Modelling
Course Code: BSMM/ BSNM- 6046(P)
(Practical)

Course Outcomes:

On completion of this course students will be able to

CO1: use different softwares for DNA and protein sequencing.

CO2: use GOR, CHOUFASMAN for protein structure prediction

CO3: use Autodock and Hex for drug designing.