# SYLLABUS

## B.Tech and Under graduate programs in Health Sciences

**PART 1 – PHYSICS (35 Questions)**

**UNIT 1: Units and Measurement**

Units for measurement, system of units-S.I., fundamental and derived units, measurements-errors in measurement-significant figures, dimensions-dimensional analysis-applications.

**UNIT 2: Mechanics**

Motion in one dimension-uniform and non-uniform motion-uniformly accelerated motion-scalar and vector quantities-Newton's laws of motion-force and inertia-impulse and momentum-law of conservation of linear momentum-applications-motions in two dimension- projectile motion-uniform circular motion-friction-laws of friction-applicationscentripetal force-centre of mass-torque-angular momentum and its conservation -moment of inertia-theorems of moment of inertia-workenergy- potential energy and kinetic energy-power-collision-elastic and inelastic collisions.

**UNIT 3: Gravitation, Mechanics of Solids and Fluids**

The universal law of gravitation, acceleration due to gravity-variation of 'g' with altitude, latitude and depth-gravitation potential-escape velocity and orbital velocity - geostationary satellites-Kepler's laws of planetary motion. Solids-elastic behaviour, stress-strain-Hooke's law-Modulli of elasticity-relation between them-surface tensioncapillarity- applications–viscosity-Poiseuille's formula-Stokes lawapplications-streamline and turbulent flow-Reynolds number-Bernoulli's theorem- applications.

**UNIT 4: Oscillations and Wave Motion** Periodic motion-simple harmonic motion-equations of motionoscillations of spring-simple pendulum-free, forced and damped oscillations-resonance-applications-wave motions-longitudinal and transverse waves-velocity of wave motion in different media-Newton's formula-Laplace's correction-super position of waves-progressive and standing waves-sonometer-air columns-Doppler effect and its applications.

**UNIT 5: Heat and Thermodynamics**

Kinetic theory of gases-postulates-pressure of a gas-specific heat capacity-relation between Cp and Cv-first law of thermodynamics thermodynamical processes-isothermal and adiabatic-reversible and irreversible process-second law of thermodynamics-Carnot's engineheat transfer-conduction-convection-radiation-thermal conductivity of solids-black body radiations-Kirchoff's law-Wien's displacement law- Stefan's law-Newton's law of cooling.

**UNIT 6: Ray and Wave Optics and Magnetism**

Reflection and refraction of light-total internal reflection-velocity of light determination-deviation and dispersion of light by a prism-lens formulamagnification- power of lens-Combination of thin lenses in contactmicroscope- astronomical telescope-wavefront-Huygens principle-wave nature of light–interference-Young's double slit experiment-diffraction and polarization

## UNIT 7: Electricity and Magnetism
Electrostatics-Coulomb's inverse square law-dielectric constant-electric field-electric lines of force-electric dipole-electric potential-potential difference-electric flux-Gauss theorem-electrostatic induction-capacitor capacitors in parallel and series-action of points-lightning arrester electric current-drift velocity of electrons-Ohm's law-electrical resistivity and conductivity-super conductivity-Kirchoff's law-Wheatstone's bridge-principle of potentiometer-electric power- Earth's magnetic field and magnetic elements-magnetic field due to a magnetic dipole-torque on a magnetic dipole-tangent law tangent galvano meter deflection magnetometer-magnetic properties of a material–dia, para and ferromagnetic materials-applications.magnetic effects of electric current-Bio Savart law-force on a moving charge in an uniform magnetic field-moving coil galvanometer-conversion of a galvanometer into voltmeter and ammeter-Faraday's law-Lenz law of electromagnetic induction-self inductance-mutual inductance-Flemming's right hand rule-methods of inducing emf-eddy current.Alternating currents-LCR
series circuit-AC generator-transformer

## UNIT 8: Atomic Physics and Relativity
Atomic structure-properties of cathode rays and positive rays-specific charge of an electron-atom model-Thomson atom model-Rutherford atom model-Bohr atom model-merits and demerits-quantum numbers- X-rays-production-properties-Bragg's law-Bragg's X-ray spectro meter photo electric effect-laser-spontaneous and stimulated emission-laser action-characteristics of laser light-ruby laser-applications of laser relativity-Einstein's mass energy relation-variation of mass with velocity.

## UNIT 9: Dual Nature of Matter and Nuclear Physics
Matter waves-wave nature of particles-De Broglie wavelength-electron microscope. Nuclear properties; radius, mass, binding energy, density, isotopes, mass defect-Bainbridge mass spectrometer-nuclear forces neutron discovery-radioactivity-α, β and γ decay-half life and mean life-artificial radio activity-radio isotopes-radio carbon dating-radiation hazards. Nuclear fission-nuclear reactor-nuclear fusion-hydrogen bomb cosmic rays-elementary particles.

## UNIT 10: Electronics and Communication
Semiconductors-doping-types-PN junction diode-biasing-diode as a Rectifier-transistors-transistor characteristics-amplifier-gain-feedback in amplifiers-logic gates-basic logic gates-NOT, OR, AND, NOR, NAND-universal gates-De Morgan's theorems-space communication propagation of electromagnetic waves in atmosphere-sky and space wave propagation-modulation types–demodulation-microwaves-radars.
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## PART 2 – CHEMISTRY (35 Questions)
### UNIT 1: Some Basic Concepts in Chemistry
Matter and its nature, Dalton's atomic theory; concept of atom, molecule, element and compound; physical quantities and their measurements in chemistry, precision and

accuracy, significant figures, S.I. Units, dimensional analysis; laws of chemical combination; atomic and molecular masses, mole concept, molar mass, percentage composition, empirical and molecular formulae; chemical equations and stoichiometry.

## UNIT 2: States of Matter
Classification of matter into solid, liquid and gaseous states.
Solid State: Classification of solids: molecular, ionic, covalent and metallic solids, amorphous and crystalline solids (elementary idea); Bragg's Law and its applications; unit cell and lattices, packing in solids (fcc, bcc and hcp lattices), voids, calculations involving unit cell parameters, imperfection in solids; electrical, magnetic and dielectric properties.

Liquid State: Properties of liquids - vapour pressure, viscosity and surface tension and effect of temperature on them (qualitative treatment only). Gaseous State: Measurable properties of gases; Gas laws-Boyle's law, Charles' law, Graham's law of diffusion, Avogadro's law, Dalton's law of partial pressure; concept of absolute scale of temperature; ideal gas equation, kinetic theory of gases (only postulates); concept of average, root mean square and most probable velocities; real gases, deviation from ideal behaviour, compressibility factor, Van der Waals equation, liquefaction of gases, critical constants.

## UNIT 3: Chemical Families–Periodic Properties
Modern periodic law and present form of the periodic table, s & p block elements, periodic trends in properties of elements, atomic and ionic radii, ionization enthalpy, electron gain enthalpy, valence, oxidation states and chemical reactivity. Transition elements–d-block elements, inner transition elements–f-block elements. Ionization energy, electron affinity, lanthanides and actinides-general characteristics. Coordination Chemistry: Coordination compounds, nomenclature: terminology - Werner's coordination theory. Applications of coordination coampounds.

## UNIT 4: Atomic Structure
Discovery of sub-atomic particles (electron, proton and neutron); Thomson and Rutherford atomic models and their limitations; nature of electromagnetic radiation, photoelectric effect; spectrum of hydrogen atom, Bohr model of hydrogen atom-its postulates, derivation of the relations for energy of the electron and radii of the different orbits, limitations of Bohr's model; dual nature of matter, De-Broglie's relationship, Heisenberg uncertainty principle. Elementary ideas of quantum mechanics, quantum mechanical model of atom, its important features, various quantum numbers (principal, angular momentum and magnetic quantum numbers) and their significance; shapes of s, p and d-orbitals, electron spin and spin quantum number; rules for filling electrons in orbitals–Aufbau principle, Pauli's exclusion principle and Hund's rule, electronic configuration of elements, extra stability of halffilled and completely filled orbitals.

## UNIT 5: Chemical Bonding and Molecular Structure
Covalent bonding: Concept of electronegativity, Fajan's rule, dipole moment; Valence Shell Electron Pair Repulsion (VSEPR) theory and shapes of simple molecules. Quantum mechanical approach to covalent bonding: Valence bond theory–Its important features, concept of hybridization involving s, p and d orbitals; resonance. Molecular orbital theory–Its important features, LCAOs, types of molecular orbitals (bonding, anti-

bonding), sigma and pi-bonds, molecular orbital electronic configurations of homonuclear diatomic molecules, concept of bond order, bond length and bond energy. Elementary idea of metallic bonding. Hydrogen bonding and its applications. Extractive metallurgyof sodium, lithium, properties of alkali metals, basic nature of oxides and hydroxides, compounds of alkaline earth metals, compounds of boron. Oxides, carbides, halides and sulphides of carbon group. Oxides–classification–acidic, basic, neutral, peroxide and amphoteric oxides.

### UNIT 6: Chemical Energetics
First law of thermodynamics, Energy changes during a chemical reaction, Internal energy and Enthalpy, Hess's law of constant heat summation, numerical, based on these concepts. Enthalpies of reactions (enthalpy of neutralization, enthalpy of combustion, enthalpy of fusion and vaporization).

### UNIT 7: Chemical Thermodynamics
Second law of thermodynamics–Spontaneity of processes; S of the universe and G of the system as criteria for spontaneity, Go (Standard Gibbs energy change) and equilibrium constant.

### UNIT 8: Solutions
Different methods for expressing concentration of solution-Molality, molarity, mole fraction, percentage (by volume and mass both), vapour pressure of solutions and Raoult's law-ideal and non-ideal solutions, vapour pressure-composition plots for ideal and non-ideal solutions; colligative properties of dilute solutions-relative lowering of vapour pressure, depression of freezing point, elevation of boiling point and osmotic pressure; determination of molecular mass using colligative properties; abnormal value of molar mass, Van't Hoff factor and its significance.

### UNIT 9: Chemical Equilibrium
Meaning of equilibrium, concept of dynamic equilibrium. Equilibria involving physical processes: Solid-liquid, liquid-gas and solid-gas equilibria, Henry's law, Equilibria involving chemical processes: Law of chemical equilibrium, equilibrium constants (Kp and Kc) and their significance, significance of G and Go in chemical equilibria, factors affecting equilibrium concentration, pressure, temperature, effect of catalyst; Le Chatelier's principle.

Ionic equilibrium: Weak and strong electrolytes, ionization of electrolytes, various concepts of acids and bases (Arrhenius, Bronsted-Lowry and Lewis) and their ionization, acid-base equilibria (including multistage ionization) and ionization constants, ionization of water, pH scale, common ion effect, hydrolysis of salts and pH of their solutions, solubility of sparingly soluble salts and solubility products, buffer solutions.

### UNIT 10: Electrochemistry
Electrolytic and metallic conduction, conductance in electrolytic solutions, specific and molar conductivities and their variation with concentration: Kohlrausch's law and its applications. Electrochemical cells–Electrolytic and Galvanic cells, different types of electrodes, electrode potentials including standard electrode potential, half-cell and cell reactions, emf of a galvanic cell and its measurement; Nernst equation and its applications; dry cell and lead accumulator; fuel cells; corrosion and its prevention.

## UNIT 11: Surface Chemistry, Chemical Kinetics and Catalysis

Adsorption–Physisorption and chemisorption and their characteristics, factors affecting adsorption of gases on solids-Freundlich and Langmuir adsorption isotherms, adsorption from solutions. Catalysis–Homogeneous and heterogeneous, activity and selectivity of solid catalysts, enzyme catalysis and its mechanism. Colloidal state–Distinction among true solutions, colloids and suspensions, classification of colloids-lyophilic, lyophobic; multi molecular, macromolecular and associated colloids (micelles), preparation and properties of colloids-Tyndall effect, Brownian movement, electrophoresis, dialysis, coagulation and flocculation; emulsions and their characteristics.

Rate of reaction, instantaneous rate of reaction and order of reaction.

Factors affecting rates of reactions–factors affecting rate of collisions encountered between the reactant molecules, effect of temperature on the reaction rate, concept of activation energy, catalyst. Rate law expression. Order of a reaction (with suitable examples). Units of rates and specific rate constants. Order of reaction and effect of concentration (study will be confined to first order only). Theories of catalysis adsorption theory-some of important industrial process using catalysts. Nuclear Chemistry: Radioactivity: isotopes and isobars: Properties of $\alpha$, $\beta$ and $\gamma$ rays; Kinetics of radioactive decay (decay series excluded), carbon datting; Stability of nuclei with respect to proton-neutron ratio; Brief discussion on fission and fusion reactions.

## UNIT 12: Purification and Characterisation of Organic Compounds

Purification–Crystallization, sublimation, distillation, differential extraction and chromatography–principles and their applications. Qualitative analysis–Detection of nitrogen, sulphur, phosphorus and halogens.

Quantitative analysis (basic principles only)–Estimation of carbon, hydrogen, nitrogen, halogens, sulphur, phosphorus. Calculations of empirical formulae and molecular formulae; numerical problems in organic quantitative analysis.

## UNIT 13: Some Basic Principles of Organic Chemistry

Tetravalency of carbon; shapes of simple molecules–hybridization (s and p); classification of organic compounds based on functional groups: -C=C-, -C C- and those containing halogens, oxygen, nitrogen and sulphur; homologous series; isomerism–structural and stereoisomerism.

Nomenclature (Trivial and IUPAC)

Covalent bond fission– Homolytic and heterolytic: free radicals, carbocations and carbanions; stability of carbocations and free radicals, electrophiles and nucleophiles. Electronic displacement in a covalent bond–inductive effect, electromeric effect, resonance and hyperconjugation. Common types of organic reactions– Substitution, addition, elimination and rearrangement.

## UNIT 14: Hydrocarbons

Classification, isomerism, IUPAC nomenclature, general methods of preparation, properties and reactions.

Alkanes–Conformations: Sawhorse and Newman projections (of ethane); mechanism of halogenation of alkanes.

Alkenes–Geometrical isomerism; mechanism of electrophilic addition: addition of hydrogen, halogens, water, hydrogen halides (Markownikoff's and peroxide effect); ozonolysis, oxidation, and polymerization.

Alkynes–Acidic character; addition of hydrogen, halogens, water and hydrogen halides; polymerization. aromatic hydrocarbons– nomenclature, benzene–structure and aromaticity; mechanism of electrophilic substitution: halogenation, nitration, Friedel-Craft's alkylation and acylation, directive influence of functional group in mono Substituted benzene.

### UNIT 15: Organic Compounds Containing Oxygen
General methods of preparation, properties, reactions and uses.
Alcohols: Identification of primary, secondary and tertiary alcohols; mechanism of dehydration. Reaction of hydroxy derivatives. Phenols: Acidic nature, electrophilic substitution reactions: halogenation, nitration and sulphonation, Reimer–Tiemann reaction. Addition to >C=O group, relative reactivities of aldehydes and ketones.

Ethers: Structure.
Aldehyde and Ketones: Nature of carbonyl group; Nucleophilic addition reactions (addition of HCN, NH3 and its derivatives), Grignard reagent; oxidation; reduction (Wolff Kishner and Clemmensen); acidity of– hydrogen, aldol condensation, Cannizzaro reaction, Haloform reaction; Chemical tests to distinguish between aldehydes and Ketones.

Carboxylic acids: Reactions, Acidic strength and factors affecting it; reactions of acid derivaties.

### UNIT 16: Organic Compounds Containing Nitrogen
General methods of preparation, properties, reactions and uses.
Amines: Nomenclature, classification, structure, basic character and identification of primary, secondary and tertiary amines and their basic character.
Diazonium salts: Importance in synthetic organic chemistry.

### UNIT 17: Polymers
General introduction and classification of polymers, general methods of polymerization–addition and condensation, copolymerization; natural and synthetic rubber and vulcanization; some important polymers with emphasis on their monomers and uses - polythene, nylon, polyester and bakelite.

### UNIT 18: Bio Molecules
Carbohydrates–Classification: aldoses and ketoses; monosaccharides (glucose and fructose), constituent monosaccharides of oligosacchorides (sucrose, lactose, maltose) and polysaccharides (starch, cellulose, glycogen). Proteins–Elementary Idea of–amino acids, peptide bond, polypeptides; proteins: primary, secondary, tertiary and quaternary structure (qualitative idea only), denaturation of proteins, enzymes. Vitamins–Classification and functions.

Nucleic acids–Chemical constitution of DNA and RNA. Biological functions of nucleic acids.

**UNIT 19: Chemistry in Everyday Life**
Chemicals in medicines– Analgesics, tranquilizers, antiseptics, disinfectants, antimicrobials, antifertility drugs, antibiotics, antacids. Antihistamins–their meaning and common examples. Chemicals in food-preservatives, artificial sweetening agents–common examples. Cleansing agents–Soaps and detergents, cleansing action.

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**PART 3 – MATHEMATICS (35 Questions)**
**UNIT 1: Sets, Relations and Functions**
Sets and their representations, union, intersection and complements of sets and their algebraic properties, relations, equivalence relations, mappings, one-one, into and onto mappings, composition of mappings.

**UNIT 2: Complex Numbers**
Complex numbers in the form $a+ib$ and their representation in a plane. Argand diagram. Algebra of complex numbers, modulus and argument (or amplitude) of a complex number, square root of a complex number. Cube roots of unity, triangle inequality.

**UNIT 3: Matrices and Determinants**
Determinants and matrices of order two and three, properties of determinants, evaluation of determinants. Addition and multiplication of matrices, adjoint and inverse of matrix.

**UNIT 4: Applications of Matrices and Determinants**
Computing the rank of a matrix–test of consistency and solution of simultaneous linear equations using determinants and matrices.

**UNIT 5: Quadratic Equations**
Quadratic equations in real and complex number system and their solutions. Relation between roots and coefficients, nature of roots, formation of quadratic equations with given roots; symmetric functions of roots, equations reducible to quadratic equations.

**UNIT 6: Permutations and Combinations**
Fundamental principle of counting: permutation as an arrangement and combination as selection, meaning of $P(n,r)$ and $C(n,r)$. Simple applications.

**UNIT 7: Mathematical Induction and its Applications**
Stating and interpreting the principle of mathematical induction. Using it to prove formula and facts.

**UNIT 8: Binomial theorem and its Applications**
Binomial theorem for a positive integral index; general term and middle term; Binomial theorem for any index. Properties of binomial coefficients. Simple applications for approximations.

**UNIT 9: Sequences and Series**

Arithmetic, geometric and harmonic progressions. Insertion of arithmetic, geometric and harmonic means between two given numbers. Relation between A.M., G.M. and H.M. arithmetic, geometric series, exponential and logarithmic series.

### UNIT 10: Differential Calculus
Polynomials, rational, trigonometric, logarithmic and exponential functions. Inverse functions. Graphs of simple functions. Limits, continuity, differentiation of the sum, difference, product and quotient of two functions, differentiation of trigonometric, inverse trigonometric, logarithmic, exponential, composite and implicit functions, derivatives of order up to two.

### UNIT 11: Applications of Differential Calculus
Rate of change of quantities, monotonic–increasing and decreasing functions, maxima and minima of functions of one variable, tangents and normals, Rolle's and Lagrange's mean value theorems.

### UNIT 12: Integral Calculus
Integral as an anti-derivative. Fundamental integrals involving algebraic, trigonometric, exponential and logarithmic functions. Integration by substitution, by parts and by partial fractions. Integration using trigonometric identities. Integral as limit of a sum. Properties of definite integrals. Evaluation of definite integrals; Determining areas of the regions bounded by simple curves.

### UNIT 13: Differential Equations
Ordinary differential equations, their order and degree. Formation of differential equations. Solution of differential equations by the method of separation of variables. Solution of homogeneous and linear differential equations and those of the type d2y / dx2 = f(x).

### UNIT 14: Straight Lines in Two Dimensions
Cartesian system of rectangular co-ordinates in plane, distance formula, area of a triangle, condition for the collinearity of three points and section formula, centroid and in-centre of a triangle, locus and its equation, translation of axes, slope of a line, parallel and perpendicular lines, intercepts of a line on the coordinate axes. Various forms of equations of a line, intersection of lines, angles between two lines, conditions for concurrence of three lines, distance of a point from a line. Equations of internal and external bisectors of angles between two lines, coordinates of centroid, orthocentre and circumcentre of a triangle, equation of family of lines passing through the point of intersection of two lines, homogeneous equation of second degree in x and y, angle between pair of lines through the origin, combined equation of the bisectors of the angles between a pair of lines, condition for the general  second degree equation to represent a pair of lines, point of intersection and angle between two lines.

### UNIT 15: Circles in Two Dimensions
Standard form of equation of a circle, general form of the equation of a circle, its radius and centre, equation of a circle in the parametric form, equation of a circle when the end points of a diameter are given, points of intersection of a line and a circle with the centre at the origin and condition for a line to be tangent to the circle, length of the tangent, equation of the tangent, equation of a family of circles through the intersection of two circles, condition for two intersecting circles to be orthogonal.

## UNIT 16: Conic Sections in Two Dimensions

Sections of cones, equations of conic sections (parabola, ellipse and hyperbola) in standard form, condition for y = mx+c to be a tangent and point(s) of tangency.

## UNIT 17: Vector Algebra

Vectors and scalars, addition of vectors, components of a vector in two dimensions and three dimensional space, scalar and vector products, scalar and vector triple product. Application of vectors to plane geometry.

## UNIT 18: Measures of Central Tendency and Dispersion

Calculation of mean, median and mode of grouped and ungrouped data. Calculation of standard deviation, variance and mean deviation for grouped and ungrouped data.

## UNIT 19: Probability

Probability of an event, addition and multiplication theorems of probability and their applications; Conditional probability; Baye's theorem, probability distribution of a random variate; binomial and poisson distributions and their properties.

## UNIT 20: Trigonometry

Trigonometrical identities and equations. Inverse trigonometric functions and their properties. Properties of triangles, including, incentre, circumcentre and orthocenter, solution of triangles.

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## PART 4: BIOLOGY (50 QUESTIONS)

### BOTANY

### Unit 1: Taxonomy of Angiosperm

Types of classifications -Artificial, Natural, Phylogenetic – Biosystematics - Binomial Nomenclature - Herbaria and their uses – Bentham and Hooker's classification of plants - Families Malvaceae, Solanaceae - Euphorbiaceae, Musaceae and Economic Importance.

### Unit 2: Plant Anatomy

Tissues and Tissue System - anatomy of monocot and dicot roots - anatomy of Monocot and dicot stem and anatomy of dicot leaf.

### Unit 3: Cell Biology and Genetics

Chromosomes - Structure and types - genes and genome – Linkage and crossing over – Gene mapping - recombination of chromosomes - mutation - chromosomal aberration – DNA as genetical material - Structure of DNA - replication of DNA - Structure of RNA and its type.

### Unit 4: Biotechnology

Recombinant DNA technology - Transgenic plants with beneficial traits – plant tissue culture and its application - Protoplasmic fusion – Bioethics in plant genetic engineering.

### Unit 5: Plant Physiology

Photosynthesis - Significance - site of photosynthesis – photochemical and biosynthetic phases - electron transport system - cyclic and non cyclic photophosphorylation - C3 and C4 pathway – photorespiration – factor affecting photosynthesis – mode of nutrition – autotrophic - heterotropic – saprophytic – parasitic and insectivorous plants –

chemosynthesis – respiration – mechanism of glycolysis – Kreb's cycle – pentose pathway – anaerobic respiration – respiratory quotient – compensation point - fermentation – plant growth – growth regulators – phytohormones – auxin – gibberellins – cytokinins – ethylene and abscisic acid – photoperiodism and vernalisation.

## Unit 6: Biology in Human Welfare

Food production – breeding experiments – improved varieties and role of biofertilizer – crop diseases and their control – biopesticides – genetically modified food – biowar – biopiracy – biopatent – sustained agriculture and medicinal plants including microbes – Economic importance food yielding (rice) – Oil yielding (groundnut) fibre yielding (cotton) and timber yielding (teak).

## ZOOLOGY

## Unit 1: Human Physiology

Nutrition – introduction – carbohydrates – proteins – lipids – vitamins mineral – water – balanced diet – calorie value – (ICBM standard) – obesity – hyperglycemia – hypoglycemia – malnutrition. Digestion – enzymes and enzyme action – brief account of following – dental caries – root canal therapy – peptic ulcer-Hernia-Appendicitis – Gallbladder stone – Liver cirrhosis – Hepatitis.

Bones and joints (major types) fractures – Dislocations – Arthritis – Rickets and Osteomalasia – orthopaedies – Gout.

Muscles – muscle action – muscle tone – Rigor mortis – muscle pull (hernia) isometric and aerobic exercises (body building) myasthenia gravis.

Respiration – Process of pulmonary respiration – Inspiration Expiration – Exchange of gases at alveolar level – control of respiration – pneumonia – pleurisy – tuberculosis – bronchitis – breathing exercise.

Circulation – functioning of heart origin and conduction of heart beat – artificial pacemaker – coronary blood vessels and its significance – myocardial infraction – angina pectoria – angiogram – angioplasty and coronary bypass surgery – atherosclerosis – heart attack – heart block – ECG and echo cardiography-heart valves-rheumatic heart

disease (RHD) ICCU-arterial and venous systems-blood pressure pulse rate-heart transplantation- resuscitation in heart attack (First aid) blood components-functions-plasma-corpuscles-blood clottinganti coagulants- thrombosis-embolism-blood related diseases like polycythemia-leukemia-lymph fluid.

Physiological Co-ordination System:

Brain-functioning of different regions-memory-sleep-stroke- Alzheimer's disease-meningitis-Brain fever-conditioned reflex electro encephalography- right brain left brain concept-spinal cord – functioning-reflex action-CSF-chemical coordination-pituitary

(Hormones of adeno hypophysis and their regulation) thyroid-parathyroid hormones-insulin and glucogon-hormones of adrenal cortex and medulla-Reproductive hormones-problems related to secretion, non secretion of hormones.

Receptor Organs:

Eye-focussing mechanism and photo chemistry of retina-short sightedness-longsightedness-optometry-retinopathy- cataract –Lens replacement- nectalopia-eye infection-conjunctivities-glaucoma- eye care-ear-hearing mechanism-organ of corti-hearing impairments and aids- noise pollution and its importance-skin-melanin functions-Effect of solar radiation/UV skin grafting-dermatitis-tongue-gustatory reception.

Excretion:

Ureotelism-urea-biosynthesis (ornithine cycle) nephron ultrafiltration -tubular reabsorption and tubular secretion-renal failure-dialysis kidney stone formation kidney transplantation-diabetes.
Reproductive System:
Brief account of spermatogenesis and oogenesis-menstrual cycle-in vitro fertilization-birth control

## Unit 2: Microbiology
Introduction-history of medical microbiology-The influence of Pasteur, Koch and Lister-virology-structure genetics culture and diseases-AIDS and its control-bacteriology structure, genetics and diseases-protozoan microbiology-Diseases oriented-pathogenecity of micro organism-anti microbial resistance chemotherapy. Single cell protein. Microbial culture technique and its applications –strain Isolation and Improvement - Isolation of microbial products.

## Unit 3: Immunology
Innate immunity (Non specific)- anatomical barriers-physiological barriers-phagocytic barriers lymphoidal organs-thymus- bursa of fabricius-peripheral lymphoid organs-lymph nodes-spleen-antibodiesimmuno globulins-regions of polypeptide chain-Transplantation immunology-classification of grafts-genetic basis of organ transplantimmune system disorder.

## Unit 4: Modern Genetics and Animal Biotechnology
Introduction-scope-human genetics karyotyping chromosome gene mapping-recombinant DNA technology and segmenting- genetic diseases – human genome project-cloning- transgenic organisms- Genetically Modified Organism(GMO)-gene therapy- animal cell culture and its applications – stem cell technology – bioethics of genetic engineering in animals. bio informatics application DNA sequencing and protein structure-biological database.

## Unit 5: Environmental Science
Human population and explosion-issue-global warming crisis – green house effect - ozone layer depletion- waste management- biodiversity conservation (biosphere reserve) government and non-governmental organization involved-energy crisis and environmental impact-poverty and environment-freshwater crisis and management.

## Unit 6: Applied Biology
Livestock and management dairy-breed of cattle-miltch breed –drought breed dual purpose-common diseases and control-exotic and cross breeds–techniques adapted in cattle breeding. Poultry-farming techniques- breeds- farming method - poultry
diseases-economic value Pisciculture-fish farming- edible fishes of Tamil Nadu. Medical lab techniques-stethescope-sphygmomonometer Haemocytometer-urine sugar analysis-ECG-PQRST Wave CT Scan-Endoscopic (laproscopic) techniques artificial pace maker-auto analyzer.

## Unit 7: Theories of Evolution
Lamarckism-Darwinism-Neodarwimsm/Modern concept of natural selection- species of concept-origin of species and isolating mechanism.