

BP101T. HUMAN ANATOMY AND PHYSIOLOGY-I (Theory) 45Hrs

Scope: To know the structure and functions of the various systems of the human body.

Course Content:

Unit I

10 hours

- ▶ **Introduction to human body:** Definition and scope of anatomy and physiology, levels of structural organization and body systems, basic life processes, homeostasis, basic anatomical terminology.
- ▶ **Cellular level of organization:** Structure and functions of cell, transport across cell membrane, cell division, cell junctions. General principles of cell communication, intracellular signaling pathway activation by extracellular signal molecule, Forms of intracellular signaling: a) Contact-dependent b) Paracrine c) Synaptic d) Endocrine
- ▶ **Tissue level of organization:** Classification of tissues, structure, location and functions of epithelial, muscular and nervous and connective tissues.

Unit II

10 hours

- ▶ **Integumentary system:** Structure and functions of skin
- ▶ **Skeletal system:** Divisions of skeletal system, types of bone, salient features and functions of bones of axial and appendicular skeletal system, Organization of skeletal muscle, physiology of muscle contraction, neuromuscular junction
- ▶ **Joints:** Structural and functional classification, types of joints movements and its articulation

Unit III

10 hours

- ▶ **Body fluids and blood:** Body fluids, composition and functions of blood, hemopoiesis, formation of hemoglobin, anemia, mechanisms of coagulation, blood grouping, Rh factors, transfusion, its significance and disorders of blood, Reticulo endothelial system.
- ▶ **Lymphatic system :** Lymphatic organs and tissues, lymphatic vessels, lymph circulation and functions of lymphatic system

Unit IV

08 hours

- ▶ **Peripheral nervous system:** Classification of peripheral nervous system: Structure and functions of sympathetic and parasympathetic nervous system. Origin and functions of spinal and cranial nerves.
- ▶ **Special senses:** Structure and functions of eye, ear, nose and tongue and their disorders.

Unit V

07 hours

- ▶ **Cardiovascular system:** Heart – anatomy of heart, blood circulation, blood vessels, structure and functions of artery, vein and capillaries, elements of conduction system of heart and heart beat, its regulation by autonomic nervous system, cardiac output, cardiac cycle. Regulation of blood pressure, pulse, electrocardiogram and disorders of heart.

BP107P. HUMAN ANATOMY AND PHYSIOLOGY (Practical) 4 Hours/week

1. Study of compound microscope.	8. Enumeration of total red blood corpuscles (RBC) count
2. Microscopic study of epithelial and connective tissue	9. Determination of bleeding time
3. Microscopic study of muscular and nervous tissue	10. Determination of clotting time
4. Identification of axial bones	11. Estimation of hemoglobin content
5. Identification of appendicular bones	12. Determination of blood group.
6. Introduction to hemocytometry.	13. Determination of erythrocyte sedimentation rate (ESR).
7. Enumeration of white blood cell (WBC) count	14. Determination of heart rate and pulse rate.
	15. Recording of blood pressure.

Recommended Books (Latest Editions)

1. Essentials of Medical Physiology by K. Sembulingam and P. Sembulingam. Jaypee brothers medical publishers, Delhi.
2. Anatomy and Physiology in Health and Illness by Kathleen J.W. Wilson, Churchill Livingstone, New York
3. Physiological basis of Medical Practice-Best and Tailor. Williams & Wilkins Co, Riverview, MI USA
4. Text book of Medical Physiology- Arthur C, Guyton and John E. Hall. Miamisburg, OH, U.S.A.
5. Principles of Anatomy and Physiology by Tortora Grabowski. Palmetto, GA, U.S.A.
6. Textbook of Human Histology by Inderbir Singh, Jaypee brother's medical publishers, New Delhi.
7. Textbook of Practical Physiology by C.L. Ghai, Jaypee brother's medical publishers, New Delhi.
8. Practical workbook of Human Physiology by K. Srinageswari and Rajeev Sharma, Jaypee brother's medical publishers,

BP102T. PHARMACEUTICAL ANALYSIS (Theory) 45 Hrs

Scope: To know the fundamentals of analytical chemistry and principles of electrochemical analysis of drugs.

Course Content:

UNIT-I

10 Hours

(a) **Pharmaceutical analysis**- Definition and scope;

- i) Different techniques of analysis; ii) Methods of expressing concentration; iii) Primary and secondary standards.
- iv) Preparation and standardization of various molar and normal solutions- Oxalic acid, sodium hydroxide, HCl, sodium thiosulphate, sulphuric acid, potassium permanganate and ceric ammonium sulphate

(b) **Errors:** Sources of errors, types of errors, methods of minimizing errors, accuracy, precision & significant figures

(c) Pharmacopoeia, Sources of impurities in medicinal agents, limit tests.

UNIT-II

10 Hours

► **Acid base titration:** Theories of acid base indicators, classification of acid base titrations and theory involved in titrations of strong, weak, and very weak acids and bases, neutralization curves

► **Non aqueous titration:** Solvents, acidimetry and alkalimetry titration and estimation of Sodium benzoate and Ephedrine HCl

UNIT-III

10 Hours

► **Precipitation titrations:** Mohr's method, Volhard's, Modified Volhard's, Fajans method, estimation of NaCl.

► **Complexometric titration:** Classification, metal ion indicators, masking and demasking reagents, estimation of Magnesium sulphate, and calcium gluconate.

► **Gravimetry:** Principle and steps involved in gravimetric analysis. Purity of the precipitate: co-precipitation and post precipitation, Estimation of barium sulphate.

► Basic Principles, methods and application of diazotisation titration.

UNIT-IV

08 Hours

► **Redox titrations:** (a) Concepts of oxidation and reduction; (b) Types of redox titrations (Principles and applications); Cerimetry, Iodimetry, Iodometry, Bromatometry, Dichrometry, Titration with potassium iodate

UNIT-V

07 Hours

► **Electrochemical methods of analysis**

- **Conductometry**- Introduction, Conductivity cell, Conductometric titrations, applications.
- **Potentiometry** - Electrochemical cell, construction and working of reference (Standard hydrogen, silver chloride electrode and calomel electrode) and indicator electrodes (metal electrodes and glass electrode), methods to determine end point of potentiometric titration and applications.
- **Polarography** - Principle, Ilkovic equation, construction and working of dropping mercury electrode and rotating platinum electrode, applications

BP108P. PHARMACEUTICAL ANALYSIS (Practical) 4 Hours / Week

I. **Limit Test of the following:** (1) Chloride; (2) Sulphate; (3) Iron; (4) Arsenic

II. **Preparation and standardization of**

(1) NaOH; (2) Sulphuric acid; (3) Sodium thiosulfate; (4) Potassium permanganate; (5) Ceric ammonium sulphate;

III. **Assay of the following compounds along with Standardization of Titrant**

(1) NH_4Cl by acid base titration; (2) FeSO_4 by Cerimetry; (3) CuSO_4 by Iodometry; (4) Calcium gluconate by complexometry; (5) Hydrogen peroxide by Permanganometry; (6) Sodium benzoate by non-aqueous titration; (7) NaCl by precipitation titration;

IV. **Determination of Normality by electro-analytical methods**

(1) Conductometric titration of strong acid against strong base; (2) Conductometric titration of strong acid and weak acid against strong base; (3) Potentiometric titration of strong acid against strong base;

Recommended Books: (Latest Editions)

1. A.H. Beckett & J.B. Stenlake's, Practical Pharmaceutical Chemistry Vol I & II, Stahlone Press of Uni of London
2. A.I. Vogel, Text Book of Quantitative Inorganic analysis; 3. P. Gundu Rao, Inorganic Pharmaceutical Chemistry
4. Bentley and Driver's Textbook of Pharmaceutical Chemistry; 5. John H. Kennedy, Analytical chemistry principles
6. Indian Pharmacopoeia.

BP103T.**PHARMACEUTICS- I (Theory)****45 Hours**

Scope: To know about preparation of the different conventional dosage forms.

Course Content:**UNIT – I****10 Hours**

- ▶ **Historical background and development of profession of pharmacy:** History of profession of Pharmacy in India in relation to pharmacy education, industry and organization, Pharmacy as a career,
- ▶ **Pharmacopoeias:** Introduction to IP, BP, USP and Extra Pharmacopoeia.
- ▶ **Dosage forms:** Introduction to dosage forms, classification and definitions
- ▶ **Prescription:** Definition, Parts of prescription, handling of Prescription and Errors in prescription.
- ▶ **Posology:** Definition, Factors affecting posology. Pediatric dose calculations based on age, body weight and body surface area.

UNIT – II**10 Hours**

- ▶ **Pharmaceutical calculations:** Weights and measures – Imperial & Metric system, Calculations involving percentage solutions, alligation, proof spirit and isotonic solutions based on freezing point and molecular weight.
- ▶ **Powders:** Definition, classification, advantages and disadvantages, Simple & compound powders – official preparations, dusting powders, effervescent, efflorescent and hygroscopic powders, eutectic mixtures. Geometric dilutions.
- ▶ **Liquid dosage forms:** Advantages and disadvantages of liquid dosage forms. Excipients used in formulation of liquid dosage forms. Solubility enhancement techniques

UNIT – III**10 Hours**

- ▶ **Monophasic liquids:** Definitions and preparations of Gargles, Mouthwashes, Throat Paint, Eardrops, Nasal drops, Enemas, Syrups, Elixirs, Liniments and Lotions.
- ▶ **Biphasic liquids:**
 - **Suspensions:** Definition, advantages and disadvantages, classifications, Preparation of suspensions; Flocculated and Deflocculated suspension & stability problems and methods to overcome.
 - **Emulsions:** Definition, classification, emulsifying agent, test for the identification of type of Emulsion, Methods of preparation & stability problems and methods to overcome.

UNIT – IV**08 Hours**

- ▶ **Suppositories:** Definition, types, advantages and disadvantages, types of bases, methods of preparations. Displacement value & its calculations, evaluation of suppositories.
- ▶ **Pharmaceutical incompatibilities:** Definition, classification, physical, chemical and therapeutic incompatibilities with examples.

UNIT – V**07 Hours**

- ▶ **Semisolid dosage forms:** Definitions, classification, mechanisms and factors influencing dermal penetration of drugs. Preparation of ointments, pastes, creams and gels. Excipients used in semi solid dosage forms. Evaluation of semi solid dosages forms

BP109P.**PHARMACEUTICS I (Practical)****3 Hours / Week**

1. **Syrups:** a) Syrup IP'66 ; b) Compound syrup of Ferrous Phosphate BPC'68
2. **Elixirs:** a) Piperazine citrate elixir ; b) Paracetamol pediatric elixir
3. **Linctus:** a) Terpin Hydrate Linctus IP'66 ; b) Iodine Throat Paint (Mandles Paint)
4. **Solutions:** a) Strong solution of NH₄ acetate; b) Cresol with soap solution; c) Lugol's solution
5. **Suspensions:** a) Calamine lotion ; b) Mg Hydroxide mixture; c) Aluminium Hydroxide gel
6. **Emulsions:** a) Turpentine Liniment ; b) Liquid paraffin emulsion
7. **Powders and Granules:** a) ORS powder (WHO) ; b) Effervescent granules
c) Dusting powder ; d) Divided powders
8. **Suppositories:** a) Glycero gelatin suppository; b) Cocoa butter suppository; c) ZnO suppository
9. **Semisolids:** a) Sulphur ointment; b) Non staining-iodine ointment with methyl salicylate
c) Carbopal gel
9. **Gargles and Mouthwashes:** a) Iodine gargle ; b) Chlorhexidine mouthwash

Recommended Books: (Latest Editions)

1. H.C. Ansel et al., Pharmaceutical Dosage Form and Drug Delivery System.
2. Carter S.J., Cooper and Gunn's-Dispensing for Pharmaceutical Students
3. M.E. Aulton, Pharmaceutics, The Science & Dosage Form Design.
4. Indian pharmacopoeia. ; 5. British pharmacopoeia.
6. Lachmann. Theory and Practice of Industrial Pharmacy.
7. Alfonso R. Gennaro Remington. The Science and Practice of Pharmacy.
8. Carter S.J., Cooper and Gunn's. Tutorial Pharmacy.
9. E.A. Rawlins, Bentley's Text Book of Pharmaceutics.

BP104T. PHARMACEUTICAL INORGANIC CHEMISTRY (Th) 45 Hrs

Scope: To know the inorganic drugs and pharmaceuticals.

Course Content:

UNIT I

10 Hours

- ▶ **Impurities in pharmaceutical substances:** History of Pharmacopoeia, Sources and types of impurities, principle involved in the limit test for Chloride, Sulphate, Iron, Arsenic, Lead and Heavy metals, modified limit test for Chloride and Sulphate
- ▶ **General methods of preparation,** assay for the compounds superscripted with **asterisk (*)**, properties and medicinal uses of inorganic compounds belonging to the following classes

UNIT II

10 Hours

- ▶ **Acids, Bases and Buffers:** Buffer equations and buffer capacity in general, buffers in pharmaceutical systems, preparation, stability, buffered isotonic solutions, measurements of tonicity, calculations and methods of adjusting isotonicity.
- ▶ **Major extra and intracellular electrolytes:** Functions of major physiological ions, Electrolytes used in the replacement therapy: Sodium chloride*, Potassium chloride, Calcium gluconate* and Oral Rehydration Salt (ORS), Physiological acid base balance.
- ▶ **Dental products:** Dentifrices, role of fluoride in the treatment of dental caries, Desensitizing agents, Calcium carbonate, Sodium fluoride, and Zinc eugenol cement.

UNIT III

10 Hours

- ▶ **Gastrointestinal agents**
 - **Acidifiers:** Ammonium chloride* and Dil. HCl
 - **Antacid:** Ideal properties of antacids, combinations of antacids, Sodium Bicarbonate*, Aluminum hydroxide gel, Magnesium hydroxide mixture
 - **Cathartics:** Magnesium sulphate, Sodium orthophosphate, Kaolin and Bentonite
 - **Antimicrobials:** Mechanism, classification, Potassium permanganate, Boric acid, Hydrogen peroxide*, Chlorinated lime*, Iodine and its preparations

UNIT IV

08 Hours

- ▶ **Miscellaneous compounds**
 - **Expectorants:** Potassium iodide, Ammonium chloride*.
 - **Emetics:** Copper sulphate*, Sodium potassium tartarate
 - **Haematinics:** Ferrous sulphate*, Ferrous gluconate
 - **Poison and Antidote:** Sodium thiosulphate*, Activated charcoal, Sodium nitrite
 - **Astringents:** Zinc Sulphate, Potash Alum

UNIT V

07 Hours

- ▶ **Radiopharmaceuticals:** Radio activity, Measurement of radioactivity, Properties of α , β , γ radiations, Half life, radio isotopes and study of radio isotopes - Sodium iodide I131, Storage conditions, precautions & pharmaceutical application of radioactive substances.

BP110P. PHARMACEUTICAL INORGANIC CHEMISTRY (Practical) 4 Hours / Week

I. Limit tests for following ions:

Limit test for Chlorides and Sulphates; Modified limit test for Chlorides and Sulphates;
Limit test for Iron; Limit test for Heavy metals; Limit test for Lead; Limit test for Arsenic;

II. Identification test:

MgCl₂; FeSO₄; NaHCO₃; Calcium gluconate; CuSO₄

III. Test for purity:

Swelling power of Bentonite; Neutralizing capacity of aluminum hydroxide gel;
Determination of potassium iodate and iodine in potassium Iodide.

IV. Preparation of inorganic pharmaceuticals:

Boric acid; Potash alum; Ferrous sulphate;

Recommended Books (Latest Editions)

1. A.H. Beckett & J.B. Stenlake's, Practical Pharmaceutical Chemistry Vol I & II.
2. A.I. Vogel, Text Book of Quantitative Inorganic analysis
3. P. Gundu Rao, Inorganic Pharmaceutical Chemistry, 3rd Edition
4. M.L Schroff, Inorganic Pharmaceutical Chemistry
5. Bentley and Driver's Textbook of Pharmaceutical Chemistry
6. Anand & Chatwal, Inorganic Pharmaceutical Chemistry
7. Indian Pharmacopoeia

BP105T. COMMUNICATION SKILLS (Theory) 30 Hours

Scope: To develop communication skill to interact with doctors, dentists, and other health workers.

Course content:

UNIT – I

07 Hours

- ▶ **Communication Skills:** Introduction, Definition, The Importance of Communication, The Communication Process – Source, Message, Encoding, Channel, Decoding, Receiver, Feedback, Context
- ▶ **Barriers to communication:** Physiological Barriers, Physical Barriers, Cultural Barriers, Language Barriers, Gender Barriers, Interpersonal Barriers, Psychological Barriers, Emotional barriers
- ▶ **Perspectives in Communication:** Introduction, Visual Perception, Language, Other factors affecting our perspective - Past Experiences, Prejudices, Feelings, Environment

UNIT – II

07 Hours

- ▶ **Elements of Communication:** Introduction, Face to Face Communication - Tone of Voice, Body Language (Non-verbal communication), Verbal Communication, Physical Communication
- ▶ **Communication Styles:** Introduction, The Communication Styles Matrix with example for each -Direct Communication Style, Spirited Communication Style, Systematic Communication Style, Considerate Communication Style

UNIT – III

07 Hours

- ▶ **Basic Listening Skills:** Introduction, Self-Awareness, Active Listening, Becoming an Active Listener, Listening in Difficult Situations
- ▶ **Effective Written Communication:** Introduction, When and When Not to Use Written Communication - Complexity of the Topic, Amount of Discussion' Required, Shades of Meaning, Formal Communication
- ▶ **Writing Effectively:** Subject Lines, Put the Main Point First, Know Your Audience, Organization of the Message

UNIT – IV

05 Hours

- ▶ **Interview Skills:** Purpose of an interview, Do's and Dont's of an interview
- ▶ **Giving Presentations:** Dealing with Fears, Planning your Presentation, Structuring Your Presentation, Delivering Your Presentation, Techniques of Delivery

UNIT – V

04 Hours

- ▶ **Group Discussion:** Introduction, Communication skills in group discussion, Do's and Dont's of group discussion

BP111P. COMMUNICATION SKILLS (Practical) 2 Hours / week

The following learning modules are to be conducted using wordsworth® English language lab software

Basic communication covering the following topics:

Meeting People; Asking Questions; Making Friends; What did you do? Do's and Dont's

Pronunciations covering the following topics:

Pronunciation (Consonant Sounds); Pronunciation and Nouns; Pronunciation (Vowel Sounds);

Advanced Learning:

Listening Comprehension / Direct and Indirect Speech; Figures of Speech; Effective Communication; Writing Skills; Effective Writing; Interview Handling Skills; E-Mail etiquette; Presentation Skills

Recommended Books: (Latest Edition)

1. Basic communication skills for Technology, Andreja. J. Ruther Ford, 2nd Edition, Pearson Education,
2. Communication skills, Sanjay Kumar, Pushpalata, 1st Edition, Oxford Press, 2011
3. Organizational Behaviour, Stephen .P. Robbins, 1st Edition, Pearson, 2013
4. Brilliant- Communication skills, Gill Hasson, 1st Edition, Pearson Life, 2011
5. The Ace of Soft Skills: Attitude, Communication and Etiquette for success, GopalaSwamy Ramesh,
6. Developing your influencing skills, Deborah Dalley, Lois Burton, Margaret, Green hall, 1st Edition
7. Communication skills for professionals, Konar nira, 2nd Edition, New arrivals –PHI, 2011
8. Personality development and soft skills, Barun K Mitra, 1st Edition, Oxford Press, 2011
9. Soft skill for everyone, Butter Field, 1st Edition, Cengage Learning india pvt.ltd, 2011
10. Soft skills and professional communication, Francis Peters SJ, 1st Edition, Mc Graw Hill Education,
11. Effective communication, John Adair, 4th Edition, Pan Mac Millan, 2009
12. Bringing out the best in people, Aubrey Daniels, 2nd Edition, Mc Graw Hill, 1999

BP107P. HUMAN ANATOMY AND PHYSIOLOGY (Practical) 4 Hours/week

1. Study of compound microscope. 2. Microscopic study of epithelial and connective tissue 3. Microscopic study of muscular and nervous tissue 4. Identification of axial bones 5. Identification of appendicular bones 6. Introduction to hemocytometry. 7. Enumeration of white blood cell (WBC) count	8. Enumeration of total red blood corpuscles (RBC) count 9. Determination of bleeding time 10. Determination of clotting time 11. Estimation of hemoglobin content 12. Determination of blood group. 13. Determination of erythrocyte sedimentation rate (ESR). 14. Determination of heart rate and pulse rate. 15. Recording of blood pressure.
---	---

BP108P. PHARMACEUTICAL ANALYSIS (Practical) 4 Hours / Week

I. **Limit Test of the following:** (1) Chloride ; (2) Sulphate ; (3) Iron ; (4) Arsenic

II. **Preparation and standardization of**

(1) NaOH; (2) Sulphuric acid; (3) Sodium thiosulfate; (4) Potassium permanganate; (5) Ceric ammonium sulphate;

III. **Assay of the following compounds along with Standardization of Titrant**

(1) NH_4Cl by acid base titration; (2) FeSO_4 by Cerimetry; (3) CuSO_4 by Iodometry; (4) Calcium gluconate by complexometry; (5) Hydrogen peroxide by Permanganometry; (6) Sodium benzoate by non-aqueous titration; (7) NaCl by precipitation titration;

IV . **Determination of Normality by electro-analytical methods**

(1) Conductometric titration of strong acid against strong base; (2) Conductometric titration of strong acid and weak acid against strong base; (3) Potentiometric titration of strong acid against strong base;

BP109P. PHARMACEUTICS I (Practical)**3 Hours / Week**

- 1. Syrups:** a) Syrup IP'66 ; b) Compound syrup of Ferrous Phosphate BPC'68
- 2. Elixirs:** a) Piperazine citrate elixir ; b) Paracetamol pediatric elixir
- 3. Linctus:** a) Terpin Hydrate Linctus IP'66 ; b) Iodine Throat Paint (Mandles Paint)
- 4. Solutions:** a) Strong solution of NH_4 acetate; b) Cresol with soap solution; c) Lugol's solution
- 5. Suspensions:** a) Calamine lotion ; b) Mg Hydroxide mixture; c) Aluminium Hydroxide gel
- 6. Emulsions:** a) Turpentine Liniment ; b) Liquid paraffin emulsion
- 7. Powders and Granules:** a) ORS powder (WHO) ; b) Effervescent granules
c) Dusting powder ; d) Divded powders
- 8. Suppositories:** a) Glycero gelatin suppository; b) Coca butter suppository; c) ZnO suppository
- 9. Semisolids:** a) Sulphur ointment; b) Non staining-iodine ointment with methyl salicylate
c) Carbopal gel
- 9. Gargles and Mouthwashes:** a) Iodine gargle ; b) Chlorhexidine mouthwash

BP110P. PHARMACEUTICAL INORGANIC CHEMISTRY (Practical) 4 Hours / Week**I. Limit tests for following ions:**

Limit test for Chlorides and Sulphates; Modified limit test for Chlorides and Sulphates;
Limit test for Iron; Limit test for Heavymetals; Limit test for Lead; Limit test for Arsenic;

II. Identification test:

MgCl_2 ; FeSO_4 ; NaHCO_3 ; Calcium gluconate; CuSO_4

III. Test for purity:

Swelling power of Bentonite; Neutralizing capacity of aluminum hydroxide gel;
Determination of potassium iodate and iodine in potassium Iodide.

IV. Preparation of inorganic pharmaceuticals:

Boric acid; Potash alum; Ferrous sulphate;

BP 106RBT. REMEDIAL BIOLOGY (Theory)**30 Hours****Course Content:****UNIT I****07 Hours****► Living world:**

- Definition and characters of living organisms; • Diversity in the living world; • Binomial nomenclature;
- Five kingdoms of life and basis of classification. Salient features of Monera, Protista, Fungi, Animalia and Plantae, Virus,

► Morphology of Flowering plants

- Morphology of different parts of flowering plants – Root, stem, inflorescence, flower, leaf, fruit, seed.
- General Anatomy of Root, stem, leaf of monocotyledons & Dicotyledons.

UNIT II**07 Hours****► Body fluids and circulation**

- Composition of blood, blood groups, coagulation of blood; • Composition and functions of lymph;
- Human circulatory system; • Structure of human heart and blood vessels;
- Cardiac cycle, cardiac output and ECG

► Digestion and Absorption

- Human alimentary canal and digestive glands; • Role of digestive enzymes;
- Digestion, absorption and assimilation of digested food

► Breathing and respiration

- Human respiratory system; • Mechanism of breathing and its regulation;
- Exchange of gases, transport of gases and regulation of respiration; • Respiratory volumes

UNIT III**07 Hours**

- Excretory products and their elimination:** • Modes of excretion; • Renin-angiotensin system;
- Urine formation; • Human excretory system- structure and function;

► Neural control and coordination

- Definition and classification of nervous system; • Structure of a neuron;
- Generation and conduction of nerve impulse; • Structure of brain and spinal cord;
- Functions of cerebrum, cerebellum, hypothalamus and medulla oblongata

► Chemical coordination and regulation

- Endocrine glands and their secretions; • Functions of hormones secreted by endocrine glands;

► Human reproduction

- Parts of female reproductive system; • Parts of male reproductive system;
- Spermatogenesis and Oogenesis; • Menstrual cycle

UNIT IV**05 Hours****► Plants and mineral nutrition:**

- Essential mineral, macro & micronutrients • Nitrogen metabolism, Nitrogen cycle, biological nitrogen fixation

► Photosynthesis

- Autotrophic nutrition, photosynthesis, Photosynthetic pigments, Factors affecting photosynthesis.

UNIT V**04 Hours**

- Plant respiration:** • Respiration, glycolysis, fermentation (anaerobic).

► Plant growth and development

- Phases and rate of plant growth, Condition of growth, Introduction to plant growth regulators

► Cell - The unit of life: • Structure and functions of cell and cell organelles. Cell division

- Tissues:** • Definition, types of tissues, location and functions.

BP112RBP.REMEDIAL BIOLOGY (Practical)

1. Introduction to experiments in biology: a) Study of Microscope; b) Section cutting techniques
- c) Mounting and staining; d) Permanent slide preparation
2. Study of cell and its inclusions; 3. Study of Stem, Root, Leaf, seed, fruit, flower and their modifications
4. Detailed study of frog by using computer models; 5. Identification of bones;
6. Microscopic study and identification of tissues pertinent to Stem, Root Leaf, seed, fruit and flower
7. Determination of blood group; 8. Determination of blood pressure; 9. Determination of tidal volume

BP 106RMT.**REMEDIAL MATHEMATICS (Theory) 30 Hours**

Course Content:

UNIT – I

06 Hours

► **Partial fraction**

Introduction, Polynomial, Rational fractions, Proper and Improper fractions, Partial fraction, Resolving into Partial fraction, Application of Partial Fraction in Chemical Kinetics and Pharmacokinetics

► **Logarithms**

Introduction, Definition, Theorems/Properties of logarithms, Common logarithms, Characteristic and Mantissa, worked examples, application of logarithm to solve pharmaceutical problems.

► **Function:**

Real Valued function, Classification of real valued functions,

► **Limits and continuity:**

Introduction, Limit of a function, Definition of limit of a function (ϵ - δ definition),

$$\lim_{x \rightarrow a} \frac{x^n - a^n}{x - a} = na^{n-1}, \quad \lim_{\theta \rightarrow 0} \frac{\sin \theta}{\theta} = 1.$$

UNIT –II

06 Hours

► **Matrices and Determinant:**

Introduction matrices, Types of matrices, Operation on matrices, Transpose of a matrix, Matrix Multiplication, Determinants, Properties of determinants, Product of determinants, Minors and co-Factors, Adjoint or adjugate of a square matrix, Singular and non-singular matrices, Inverse of a matrix, Solution of system of linear equations using matrix method, Cramer's rule, Characteristic equation and roots of a square matrix, Cayley–Hamilton theorem, Application of Matrices in solving Pharmacokinetic equations

UNIT – III

06 Hours

► **Calculus**

• **Differentiation** : Introductions, Derivative of a function, Derivative of a constant, Derivative of a product of a constant and a function, Derivative of the sum or difference of two functions, Derivative of the product of two functions (product formula), Derivative of the quotient of two functions (Quotient formula) – **Without Proof**, Derivative of x^n w.r.t. x , where n is any rational number, Derivative of e^x , Derivative of $\log_e x$, Derivative of a^x , Derivative of trigonometric functions from first principles (**without Proof**), Successive Differentiation, Conditions for a function to be a maximum or a minimum at a point. Application

UNIT – IV

06 Hours

► **Analytical Geometry**

• **Introduction:** Signs of the Coordinates, Distance formula,

• **Straight Line** : Slope or gradient of a straight line, Conditions for parallelism and perpendicularity of two lines, Slope of a line joining two points, Slope – intercept form of a straight line

• **Integration:**

Introduction, Definition, Standard formulae, Rules of integration, Method of substitution, Method of Partial fractions, Integration by parts, definite integrals, application

UNIT-V

06 Hours

► **Differential Equations** : Some basic definitions, Order and degree, Equations in separable form, Homogeneous equations, Linear Differential equations, Exact equations,

• **Application in solving Pharmacokinetic equations**

► **Laplace Transform** : Introduction, Definition, Properties of Laplace transform, Laplace Transforms of elementary functions, Inverse Laplace transforms, Laplace transform of derivatives, Application to solve Linear differential equations,

• **Application in solving Chemical kinetics and Pharmacokinetics equations**