

SRI GURU RAM DAS UNIVERSITY OF HEALTH SCIENCES, AMRITSAR
BACHELOR OF ANATOMY, PHYSIOLOGY & BIOCHEMISTRY (APB) (Code-BAPB.2.2)-2026

Course code	Course Title	Course Type	L+T+P	Total Credits/ Week	Weightage Theory/ Practical
Semester-I					
APB-ANT.201	Basic & Gross Anatomy-Upper Limb	Core	3+0+2	5	30+70=100T 10+40=50P
APB-PHY.201	Cellular Physiology & Hematology	Core	3+0+2	5	30+70=100T 10+40=50P
APB-BIC.201	Biomolecules	Core	3+0+2	5	30+70=100T 10+40=50P
AHCP.251	Communication and Professionalism	Elective	2+0+0	2	NC
AHCP.252	Basic Emergency care and First aid	Elective	2+0+0	2	NC
AHCP.253	Computer applications	Elective	2+0+0	2	NC
Total Credits			15+0+6	21	120/330=450
Semester-II					
APB-ANT.202	Gross Anatomy-Thorax & Systemic Embryology	Core	3+0+2	5	30+70=100T 10+40=50P
APB-PHY.202	Nerve Muscular Physiology & Gastrointestinal physiology	Core	3+0+2	5	30+70=100T 10+40=50P
APB-BIC.202	Enzymology & Vitamins	Core	3+0+2	5	30+70=100T 10+40=50P
AHCP.254	Behavioral Health Psychology	Elective	2+0+0	2	NC
Total Credits			11+0+6	17	120/330=450
Semester-III					
APB-ANT.301	Genetics & Gross Anatomy-Lower Limb	Core	3+0+2	5	30+70=100T 10+40=50P
APB-PHY.301	Cardiovascular Physiology	Core	3+0+2	5	30+70=100T 10+40=50P
APB-BIC.301	Biochemistry	Core	3+0+2	5	30+70=100T 10+40=50P
HVE.350	Human Values & Ethics	Value added course	3+0+0	3	NC
Total Credits			11+0+6	18	120/330=450
Semester-IV					
APB-ANT.302	Gross Anatomy-Abdomen & Pelvis & Embryology-GIT	Core	3+0+2	5	30+70=100T 10+40=50P
APB-PHY.302	Renal & Respiratory Physiology	Core	3+0+2	5	30+70=100T 10+40=50P
APB-BIC.302	Analytical Biochemistry	Core	3+0+2	5	30+70=100T 10+40=50P
CRP.350	Community Rehabilitation Practice	Elective	2+0+0	2	NC
Total Credits			11+0+6	17	120/330=450
Semester-V					
APB-ANT.401	Gross Anatomy -Brain & Embryology-Brain CNS & Neuro Anatomy	Core	3+1+2	6	30+70=100T 10+40=50P
APB-BIC.401	Immunology	Core	3+1+2	6	30+70=100T 10+40=50P
APB-PHY.401	Endo & reproductive physiology	Core	3+1+2	6	30+70=100T 10+40=50P

AHCP.401	Disaster Management & Environmental Science	Elective	2+0+0	2	NC
Total Credits			11+3+6	20	120/330=450
Semester-VI					
APB-ANT.402	Gross Anatomy & Embryology-Head & Neck	Core	3+1+2	6	30+70=100T 10+40=50P
APB-PHY.402	Nervous system & special senses	Core	3+1+2	6	30+70=100T 10+40=50P
APB-BIC.402	Nutrition	Core	3+0+2	5	30+70=100T 10+40=50P
RMB.401	Research Methodology & Biostatistics	Elective	2+1+0	3	30+70=100T
Total Credits			11+3+6	20	550
Grand Total Credits					

Course Structure for the Bachelors in APB (Code-BAPB.2.2) Session 2025

Course code	Course Title	Course Type	L+T+P	Total Credits/W eek	Weightage Theory/ Practical
Semester-I					
APB-ANT.201	Basic & Gross Anatomy-Upper Limb	Core	3+1+2	6	30+70=100T 10+40=50P
APB-PHY.201	Cellular Physiology & Hematology	Core	3+1+2	6	30+70=100T 10+40=50P
APB-BIC.201	Biomolecules	Core	3+1+2	6	30+70=100T 10+40=50P
ECO.250	English/ Communication skills	Elective	2+0+0	2	NC
Total Credits			11+3+6	20	450
Semester-II (Revised)					
APB-ANT.202	Gross Anatomy-Thorax & Systemic Embryology	Core	3+0+3	6	30+70=100T 10+40=50P
APB-PHY.202	Nerve Muscular Physiology & Gastrointestinal physiology	Core	3+0+3	6	30+70=100T 10+40=50P
APB-BIC.202	Enzymology & Vitamins & Physiochemical chemistry	Core	3+0+3	6	30+70=100T 10+40=50P
COM.250	Computer applications	Elective	2+0+0	2	NC
AHCP.250	Behavioral Health Psychology	Elective	2+0+0	2	NC
Total Credits			11+0+9	20	450
Semester-III					
APB-ANT.301	Genetics & Gross Anatomy-Lower Limb	Core	3+0+2	5	30+70=100T 10+40=50P
APB-PHY.301	Cardiovascular Physiology	Core	3+0+2	5	30+70=100T 10+40=50P
APB-BIC.301	Biochemistry	Core	3+0+2	5	30+70=100T 10+40=50P
HVE.350	Human Values & Ethics	Elective	3+0+0	3	NC
Total Credits			12+0+9	18	450
Semester-IV					
APB-ANT.302	Gross Anatomy-Abdomen & Pelvis & Embryology-GIT	Core	3+0+2	5	30+70=100T 10+40=50P
APB-PHY.302	Renal & Respiratory Physiology	Core	3+0+2	5	30+70=100T 10+40=50P
APB-BIC.302	Analytical Biochemistry	Core	3+0+2	5	30+70=100T 10+40=50P

CRP.350	Community Rehabilitation Practice	Elective	2+0+0	2	NC
Total Credits			11+0+6	17	450
Semester-V					
APB-ANT.401	Gross Anatomy -Brain & Embryology-Brain CNS & Neuro Anatomy	Core	3+1+2	6	30+70=100T 10+40=50P
APB-BIC.401	Immunology	Core	3+1+2	6	30+70=100T 10+40=50P
APB-PHY.401	Endo & reproductive physiology	Core	3+1+2	6	30+70=100T 10+40=50P
AHCP.401	Disaster Management & Environmental Science	Elective	2+0+0	2	NC
Total Credits			11+3+6	20	450
Semester-VI					
APB-ANT.402	Gross Anatomy & Embryology-Head & Neck	Core	3+0+3	6	30+70=100T 10+40=50P
APB-PHY.402	Nervous system & special senses	Core	3+0+3	6	30+70=100T 10+40=50P
APB-BIC.402	Nutrition	Core	3+0+2	5	30+70=100T 10+40=50P
RMB.401	Research Methodology & Biostatistics	Elective	2+1+0	3	30+70=100T
Total Credits			11+1+8	20	550
Grand Total Credits			67+7+48	115	2800

Course Structure for the Bachelors in APB (Code-BAPB.2.2) Session 2024

Course code	Course Title	Course Type	L+T+P	Total Credits/W eek	Weightage Theory/ Practical
Semester-I					
APB-ANT.201	Basic & Gross Anatomy-Upper Limb	Core	3+1+2	6	50+50=100T 50P
APB-PHY.201	Cellular Physiology & Hematology	Core	3+1+2	6	50+50=100T 50P
APB-BIC.201	Biomolecules	Core	3+1+2	6	50+50=100T 50P
ECO.250	English/ Communication skills	Elective	2+0+0	2	NC
Total Credits			11+3+6	20	450
Semester-II					
APB-ANT.202	Gross Anatomy-Thorax & Systemic Embryology	Core	3+0+3	6	50+50=100T 50P
APB-PHY.202	Nerve Muscular Physiology & Gastrointestinal physiology	Core	3+0+3	6	50+50=100T 50P
13APB-BIC.202	Enzymology & Vitamins & Physiochemical chemistry	Core	3+0+3	6	50+50=100T 50P
COM.250	Computer applications	Elective	2+0+0	2	NC
Total Credits			11+0+9	20	450
Semester-III					
APB-ANT.301	Genetics & Gross Anatomy-Lower Limb	Core	3+0+3	6	50+50=100T 50P
APB-PHY.301	Cardiovascular Physiology	Core	3+0+3	6	50+50=100T 50P
APB-BIC.301	Biochemistry	Core	3+0+3	6	50+50=100T 50P

HVE.350	Human Values & Ethics	Elective	3+0+0	3	NC
Total Credits			12+0+9	21	450
Semester-IV (Revised)					
APB-ANT.302	Gross Anatomy-Abdomen & Pelvis & Embryology-GIT	Core	3+0+3	6	30+70=100T 10+40=50P
APB-PHY.302	Renal & Respiratory Physiology	Core	3+0+3	6	30+70=100T 10+40=50P
APB-BIC.302	Analytical Biochemistry	Core	3+0+3	6	30+70=100T 10+40=50P
CRP.350	Community Rehabilitation Practice	Elective	2+0+0	2	NC
Total Credits			11+0+9	20	450
Semester-V					
APB-ANT.401	Gross Anatomy -Brain & Embryology-Brain CNS & Neuro Anatomy	Core	3+1+2	6	30+70=100T 10+40=50P
APB-BIC.401	Immunology	Core	3+1+2	6	30+70=100T 10+40=50P
APB-PHY.401	Endo & reproductive physiology	Core	3+1+2	6	30+70=100T 10+40=50P
AHCP.401	Disaster Management & Environmental Science	Elective	2+0+0	2	NC
Total Credits			11+3+6	20	450
Semester-VI					
APB-ANT.402	Gross Anatomy & Embryology-Head & Neck	Core	3+0+3	6	30+70=100T 10+40=50P
APB-PHY.402	Nervous system & special senses	Core	3+0+3	6	30+70=100T 10+40=50P
APB-BIC.402	Nutrition	Core	3+0+2	5	30+70=100T 10+40=50P
RMB.401	Research Methodology & Biostatistics	Elective	2+1+0	3	30+70=100T
Total Credits			11+1+8	20	550
Grand Total Credits			67+7+48	122	2800

Semester-I

APB-ANT.201 — Basic & Gross Anatomy—Upper Limb

Name of the Course	Basic & Gross Anatomy—Upper Limb
Course Code	APB-ANT.201
Semester	Semester-I
Credit Hours	5
Course Type	Core
Teaching Scheme	3+0+2; 45 theory + 30 practical

Teaching Objective

Provide a structured understanding of the gross and microscopic anatomy of the upper limb with emphasis on relationships, surface anatomy, radiological anatomy and clinically relevant applications.

Learning Outcomes

- Identify and describe bones, joints, muscles, vessels, nerves and lymphatics of the upper limb.
- Demonstrate anatomical relationships using dissection, models and surface landmarks.
- Interpret basic radiological images of the upper limb and relate them to gross anatomy.
- Explain common clinical conditions arising from injury to nerves, vessels, joints and compartments.

Theory/Course Content

Unit No.	Content	Lectures / Hours
1	General anatomy and upper-limb orientation: anatomical position, planes, terms of relation and movement; bones of pectoral girdle and upper limb; surface landmarks.	7
2	Shoulder region and axilla: pectoral muscles, axillary fascia, axillary artery and vein, brachial plexus, lymphatics, applied anatomy.	6
3	Arm and cubital fossa: fascial compartments, muscles, brachial artery, median/radial/ulnar nerves, venous drainage and clinical correlations.	6
4	Forearm and hand: flexor and extensor compartments, retinacula, carpal tunnel, intrinsic muscles, palmar aponeurosis, arterial arches and nerve supply.	8
5	Joints and movements: shoulder, elbow, radioulnar and wrist joints; hand joints; osteology and arthrology with functional correlations.	7
6	General embryology: gametogenesis, fertilization, cleavage, blastocyst formation, implantation, bilaminar/trilaminar germ disc, folding and fetal membranes, placenta, umbilical cord, prenatal diagnosis and twinning.	5
7	Histology, surface, radiological and applied anatomy of upper limb; skin, fascia, bone, cartilage, muscle and peripheral nerve; common injuries and nerve lesions.	6
Total Theory Hours		45

Practical / Tutorial / Applied Component

- Dissection/spotting of upper-limb regions, bones and soft parts.
- Identification of muscles, vessels, nerves and joints on models/specimens.
- Surface marking and living anatomy exercises.
- Identification of histological slides of skin, connective tissue, cartilage, bone, muscle and nervous tissue.
- Basic radiological identification of upper-limb structures.
- Viva and practical record maintenance.

APB-PHY.201 — Cellular Physiology & Hematology

Name of the Course	Cellular Physiology & Hematology
Course Code	APB-PHY.201
Semester	Semester-I
Credit Hours	5
Course Type	Core
Teaching Scheme	3+0+2; 45 theory + 30 practical

Teaching Objective

Introduce cellular mechanisms of normal human function and establish a foundation in hematology, homeostasis and membrane physiology.

Learning Outcomes

- Explain cellular organization, membrane transport and homeostatic regulation.
- Describe body-fluid compartments and major regulatory mechanisms.
- Explain formation and functions of major blood cells and plasma constituents.
- Interpret basic hematological investigations and blood-grouping principles.
- Relate membrane receptors, synapses and signalling pathways to physiological function.

Theory / Course Content

Unit No.	Content	Lectures / Hours
1	Cell as the living unit: internal environment, homeostasis, control systems, cellular organization, membrane structure and functional compartments.	7
2	Membrane transport and cell function: diffusion, osmosis, active transport, channels, carriers, membrane potentials and cell-to-cell communication.	7
3	Body fluids and regulation: fluid compartments, electrolyte distribution, acid-base principles, homeostatic mechanisms and role of hormones.	7
4	Blood: composition and functions; plasma proteins; erythrocytes, erythropoiesis, hemoglobin and anemia overview; leukocytes and immune functions.	9
5	Hemostasis: platelets, coagulation, anticoagulant mechanisms, fibrinolysis, blood groups and transfusion principles.	7
6	Cell signalling and neural basics: receptors, second messengers, generator potentials, synapses, neurotransmitters and synaptic plasticity.	8
	Total Theory Hours	45

Practical / Tutorial / Applied Component

- Microscopy and identification of blood cells.
- Hemoglobin estimation, RBC/WBC and platelet counts, DLC, PCV, ESR and reticulocyte count.
- Calculation of MCV, MCH, MCHC and color index.
- Blood grouping and compatibility exercises.
- BT/CT and demonstration of coagulation-related tests.
- Observation of body temperature and interpretation of basic hematological findings.

APB-BIC.201 — Biomolecules

Name of the Course	Biomolecules
Course Code	APB-BIC.201
Semester	Semester-I
Credit Hours	5
Course Type	Core
Teaching Scheme	3+0+2; 45 theory + 30 practical

Teaching Objective

Build a foundation in the chemistry, structure and biological significance of the major biomolecules and the physico-chemical principles underlying biochemical processes.

Learning Outcomes

- Classify major biomolecules and explain their structural features.
- Describe the biological roles of carbohydrates, lipids, proteins and nucleic acids.
- Explain pH, buffers and osmotic principles in biological systems.
- Explain enzyme classification, activity and inhibition.
- Relate plasma proteins, detoxification and radioisotopes to biomedical applications.

Theory / Course Content

Unit No.	Content	Lectures / Hours
1	Physico-chemical foundations: pH, buffers, osmotic pressure, colloids, surface tension and Donnan equilibrium; relevance to biological systems.	7
2	Proteins and amino acids: classification, properties, peptide bonds, structural levels, digestion and absorption, plasma proteins and biological functions.	8
3	Carbohydrates: classification, monosaccharides, oligosaccharides, polysaccharides and mucopolysaccharides; biological importance and reactions.	7
4	Lipids: fatty acids, glycerol, neutral fats, phospholipids and sterols; classification, properties and biological functions.	7
5	Nucleic acids: purines, pyrimidines, nucleotides and nucleic acids; structure, properties and biological importance.	7
6	Enzymes and related concepts: classification, factors affecting enzyme activity, inhibition, coenzymes; plasma proteins, detoxification and introduction to radioisotopes in medicine.	9
	Total Theory Hours	45

Practical / Tutorial / Applied Component

- Preparation of buffer solutions and pH measurement using standards and pH meter.
- Qualitative tests for carbohydrates, fats, proteins and amino acids.
- Gastric juice analysis.
- Spectroscopic examination of hemoglobin and derivatives; preparation of hematin crystals.
- Urine examination for physical properties and normal/abnormal constituents.
- Introduction to colorimetry and spectrophotometry.

AHCP.251 — Communication and Professionalism

Name of the Course	Communication and Professionalism
Course Code	AHCP.251
Semester	Semester-I
Credit Hours	2
Course Type	Elective
Teaching Scheme	2+0+0; 30 contact hours

Teaching Objective

Develop effective, respectful and professional communication skills required for safe academic, laboratory and health-care practice.

Learning Outcomes

- Demonstrate clear verbal and written communication.
- Use active listening, empathy and patient-centred interaction.
- Communicate information accurately during teamwork and handover.
- Demonstrate professional behaviour and confidentiality.
- Recognize communication barriers and adapt communication appropriately.

Theory / Course Content

Unit No.	Content	Lectures / Hours
1	Foundations of professional communication: verbal and non-verbal communication, listening, speaking, reading and writing in health-care settings.	5
2	Patient-centred communication: rapport, empathy, active listening, questioning, explaining procedures and communicating with patients and attendants.	5
3	Professional behaviour: respect, punctuality, confidentiality, accountability, teamwork and appropriate conduct in academic and clinical environments.	5
4	Health-care documentation and communication: case notes, referrals, handover, incident communication and professional correspondence.	5
5	Interprofessional communication: team roles, conflict management, feedback, leadership and collaborative decision-making.	5
6	Ethical and culturally sensitive communication: informed communication, difficult conversations, privacy, consent and communication with vulnerable persons.	5
Total Theory Hours		30

AHCP.252 — Basic Emergency Care and First Aid

Name of the Course	Basic Emergency Care and First Aid
Course Code	AHCP.252
Semester	Semester-I
Credit Hours	2
Course Type	Elective
Teaching Scheme	2+0+0; 30 contact hours

Teaching Objective

Provide basic knowledge and practical readiness for immediate first aid and emergency support until definitive medical care is available.

Learning Outcomes

- Recognize common emergencies and initiate an appropriate first response.
- Demonstrate basic life-support steps in a simulated setting.
- Apply first-aid measures for bleeding, trauma, burns and common medical emergencies.
- Use safe communication, documentation and referral principles.

Theory / Course Content

Unit No.	Content	Lectures / Hours
1	Principles of first aid and emergency response: scene safety, initial assessment, activation of emergency services and basic triage.	5
2	Basic life support: recognition of cardiac arrest, CPR sequence, recovery position and introduction to automated external defibrillation.	5

3	Airway, breathing and circulation emergencies: airway obstruction, respiratory distress, shock and basic supportive measures.	5
4	Trauma and bleeding: wounds, hemorrhage control, fractures, sprains, immobilization, burns and soft-tissue injuries.	5
5	Common medical emergencies: syncope, seizures, hypoglycemia, chest pain, stroke warning signs, poisoning and heat/cold-related illness.	5
6	First-aid organization and safe transfer: emergency kits, documentation, infection precautions and referral/transport principles.	5
Total Theory Hours		30

AHCP.253 — Computer Applications

Name of the Course	Computer Applications
Course Code	AHCP.253
Semester	Semester-I
Credit Hours	2
Course Type	Elective
Teaching Scheme	2+0+0; ['Practical exercises in Word, Excel and PowerPoint.', 'Creation of a formatted academic document and table.', 'Mail-merge exercise.', 'Preparation of a slide presentation with images, tables and graphs.', 'Creation of a worksheet with formulas and charts.', 'Internet searching, file transfer and email with attachments.'] contact hours

Teaching Objective

Develop basic digital literacy for academic, administrative and health-care applications.

Learning Outcomes

- Use basic computer hardware and operating-system concepts.
- Create and format academic documents.
- Use spreadsheets for simple data entry, calculations and charts.
- Prepare structured presentations.
- Use internet and email functions safely and appropriately.
- Describe basic applications of computers in health care.

Theory / Course Content

Unit No.	Content	Lectures / Hours
1	Computer fundamentals: input/output devices, memory, RAM/ROM, storage units, computer types, operating systems and basic networking concepts including LAN, WAN and MAN.	5
2	MS Word: text entry and manipulation, formatting, alignment, page setup, headers/footers, page numbering, spell check, find/replace, tables and printing.	5

3	MS Word applications: insertion of pictures/files, document organization and mail merge for academic and administrative work.	5
4	MS Excel: worksheet creation, cell editing, formulas, functions, data sorting, charts/graphs, auto-formatting and data transfer between worksheets.	5
5	MS PowerPoint: slide creation, templates, transitions, animation, text, pictures, tables, graphs, sound and presentation tools.	5
6	Internet and health-care applications: search engines, file upload/download, email and attachments; health information systems, medical equipment, inventory and patient records.	5
Total Theory Hours		30

Semester-II

APB-ANT.202 — Gross Anatomy—Thorax & Systemic Embryology

Name of the Course	Gross Anatomy—Thorax & Systemic Embryology
Course Code	APB-ANT.202
Semester	Semester-II
Credit Hours	3
Course Type	Core
Teaching Scheme	3+0+0; 45 theory + 15 practical/tutorial

Teaching Objective

Provide detailed knowledge of thoracic anatomy and the embryological basis of cardiovascular and respiratory development.

Learning Outcomes

- Identify major thoracic structures and explain their anatomical relationships.
- Describe the heart, lungs, mediastinum, vessels, nerves and lymphatics.
- Explain major stages of early human development and folding.
- Describe cardiovascular and respiratory embryogenesis and selected congenital anomalies.
- Correlate thoracic anatomy with surface, radiological and clinical findings.

Theory / Course Content

Unit No.	Content	Lectures / Hours
1	Thoracic cage and mediastinum: sternum, ribs, vertebrae, intercostal spaces, thoracic inlet/outlet and divisions of mediastinum.	7
2	Respiratory system: pleura, lungs, tracheobronchial tree, pulmonary vessels, root of lung and applied anatomy.	7
3	Heart and pericardium: chambers, valves, coronary circulation, conducting system, great vessels and surface anatomy.	8
4	Major thoracic vessels and nerves: aorta, pulmonary vessels, SVC, vagus and phrenic nerves, thoracic duct and lymphatics.	7

5	Related Histology: Cardiovascular & Respiratory System	8
6	Systemic embryology: cardiovascular and respiratory development, congenital anomalies.	8
Total Theory Hours		45

Practical / Tutorial / Applied Component

- Thoracic dissection/identification and osteology.
- Identification of heart, lungs, pleura, mediastinal structures and vessels.
- Embryology models and identification exercises.
- Histological identification of slides of cardiovascular & respiratory system
- Surface anatomy and basic radiological anatomy of thorax.
- Viva and practical record.

APB-PHY.202 — Nerve-Muscular Physiology & Gastrointestinal Physiology

Name of the Course	Nerve-Muscular Physiology & Gastrointestinal Physiology
Course Code	APB-PHY.202
Semester	Semester-II
Credit Hours	3
Course Type	Core
Teaching Scheme	3+0+0; 45 theory + 15 tutorial

Teaching Objective

Explain nerve and muscle function and the integrated physiology of the gastrointestinal tract, emphasizing mechanisms of secretion, motility and absorption.

Learning Outcomes

- Explain generation and propagation of action potentials.
- Describe skeletal muscle contraction and neuromuscular transmission.
- Explain regulation of gastrointestinal motility and secretions.
- Describe digestion and absorption of major nutrients.
- Integrate neural, hormonal and local mechanisms controlling gastrointestinal function.

Theory / Course Content

Unit No.	Content	Lectures / Hours
1	Excitable tissues: resting membrane potential, action potential, nerve conduction, synaptic transmission and neuromuscular junction.	8
2	Skeletal muscle: excitation-contraction coupling, muscle proteins, motor unit, twitch, summation, tetanus, fatigue and smooth/cardiac muscle comparison.	8
3	Gastrointestinal organization: enteric nervous system, gastrointestinal motility, secretions and mechanisms regulating digestive function.	7
4	Salivary, gastric and pancreatic secretion: composition, regulation and functional significance; digestion of major nutrients.	7

5	Intestinal function: bile, intestinal secretion, digestion and absorption of carbohydrates, proteins, lipids, vitamins and minerals.	7
6	Integrated GI physiology: liver and gastrointestinal hormones, defecation, gut-brain interactions and physiological adaptation.	8
	Total Theory Hours	45

Practical / Tutorial / Applied Component

- Tutorials using diagrams, graphs and physiological case scenarios; demonstration of basic muscle/nerve and gastrointestinal concepts where facilities permit.

APB-BIC.202 — Enzymology, Vitamins & Physicochemical Chemistry

Name of the Course	Enzymology, Vitamins & Physicochemical Chemistry
Course Code	APB-BIC.202
Semester	Semester-II
Credit Hours	3
Course Type	Core
Teaching Scheme	3+0+0; 45 theory + 15 tutorial

Teaching Objective

Develop an integrated understanding of enzymes, vitamins and physicochemical principles essential to biochemical and clinical interpretation.

Learning Outcomes

- Explain physicochemical principles relevant to biological fluids.
- Classify enzymes and describe mechanisms affecting their activity.
- Explain the role of vitamins as nutrients and coenzymes.
- Recognize major deficiency manifestations and biochemical consequences.
- Relate enzyme abnormalities and isoenzymes to clinical investigation.

Theory / Course Content

Unit No.	Content	Lectures / Hours
1	Physicochemical chemistry in biological systems: pH, buffers, osmotic pressure, colloids, surface tension, diffusion and Donnan equilibrium.	7
2	Enzyme fundamentals: classification, nomenclature, active site, factors affecting activity, kinetics and enzyme inhibition.	9
3	Coenzymes and metalloenzymes: role of vitamins in coenzyme formation, enzyme regulation and clinical significance of enzyme abnormalities.	7
4	Fat-soluble vitamins: vitamins A, D, E and K—sources, chemistry, functions, deficiency and toxicity.	7
5	Water-soluble vitamins: B-complex group and vitamin C—biochemical functions, deficiency states and clinical relevance.	8
6	Applied enzymology: isoenzymes, diagnostic enzymes, enzyme induction/inhibition and interpretation of basic enzyme-related clinical findings.	7
	Total Theory Hours	45

Practical / Tutorial / Applied Component

- Tutorial-based interpretation of enzyme kinetics and inhibition.
- Problem-solving on buffer and osmotic principles.
- Interpretation of vitamin deficiency case scenarios and enzyme reports.

AHCP.254 — Behavioral Health Psychology

Name of the Course	Behavioral Health Psychology
Course Code	AHCP.254
Semester	Semester-II
Credit Hours	2
Course Type	Elective
Teaching Scheme	2+0+0; None contact hours

Teaching Objective

Introduce behavioural and psychological principles relevant to health, learning, interpersonal relationships and support of young adults.

Learning Outcomes

- Describe major concepts of human behaviour and development.
- Explain cognitive and social factors affecting behaviour.
- Recognize common behavioural problems and risk factors.
- Describe substance-use prevention, treatment and rehabilitation principles.
- Demonstrate basic supportive communication and referral skills.

Theory / Course Content

Unit No.	Content	Lectures / Hours
1	Introduction to behavioural health: psychology, behaviour, personality, emotion, motivation and determinants of health-related behaviour.	5
2	Human development: adolescence, socio-psychological development of adolescents and young adults, identity formation and developmental transitions.	5
3	Cognitive and social processes: attention, memory, learning, decision-making, social influence and behaviour in educational and health settings.	5
4	Common behavioural problems: aggression, violence, stress, anxiety, adjustment difficulties and their social determinants.	5
5	Substance use and abuse: causes, risk factors, effects, prevention, treatment principles and rehabilitation.	5
6	Guidance and counselling: principles, communication, basic counselling skills, referral and support for students and young adults.	5
	Total Theory Hours	30

Semester-III

APB-ANT.301 — Genetics & Gross Anatomy—Lower Limb

Name of the Course	Genetics & Gross Anatomy—Lower Limb
Course Code	APB-ANT.301
Semester	Semester-III
Credit Hours	4
Course Type	Core
Teaching Scheme	3+1+0; 45 theory + 15 tutorial

Teaching Objective

Provide comprehensive knowledge of lower-limb anatomy while introducing medical genetics and its relevance to health and disease.

Learning Outcomes

- Describe the osteology, joints, muscles, vessels, nerves and lymphatics of the lower limb.
- Explain regional anatomical relationships and common clinical correlations.
- Interpret basic surface and radiological anatomy of the lower limb.
- Explain chromosomes, genes, inheritance patterns and pedigree analysis.
- Recognize the role of genetics in common inherited disorders and counselling.

Theory / Course Content

Unit No.	Content	Lectures / Hours
1	General anatomy and osteology of lower limb: anatomical terminology, bones of pelvis and lower limb, landmarks and surface anatomy.	7
2	Gluteal region and hip: muscles, gluteal vessels and nerves, sciatic nerve, hip joint and applied anatomy.	7
3	Thigh and femoral triangle: fascial compartments, muscles, femoral vessels, femoral canal, adductor canal and nerve supply.	8
4	Knee, leg and ankle: knee joint, popliteal fossa, anterior/lateral/posterior compartments, tibial and fibular nerves, ankle structures.	8
5	Foot and vascular/lymphatic anatomy: arches, intrinsic muscles, plantar vessels and nerves, venous and lymphatic drainage, surface and radiological anatomy.	7
6	Medical genetics: chromosomes, genes, inheritance patterns, pedigree analysis, common genetic disorders, genetic variation and principles of genetic counselling.	8
Total Theory Hours		45

Practical / Tutorial / Applied Component

- Tutorials on lower-limb osteology, joints and clinical cases.
- Surface marking and radiological anatomy exercises.
- Pedigree construction and interpretation exercises.
- Basic case-based genetic counselling scenarios.

APB-PHY.301 — Cardiovascular Physiology

Name of the Course	Cardiovascular Physiology
Course Code	APB-PHY.301
Semester	Semester-III
Credit Hours	4
Course Type	Core
Teaching Scheme	3+1+0; 45 theory + 15 tutorial

Teaching Objective

Explain the mechanisms regulating cardiac function, circulation, blood pressure and cardiovascular adaptation in health.

Learning Outcomes

- Describe the cardiac cycle and electrical activity of the heart.
- Explain determinants and regulation of cardiac output.
- Interpret basic ECG components and arterial pressure relationships.
- Explain microcirculation, venous return and blood-pressure control.
- Relate cardiovascular responses to exercise, posture and shock.

Theory / Course Content

Unit No.	Content	Lectures / Hours
1	Functional organization of cardiovascular system; properties of cardiac muscle; cardiac cycle and pressure-volume relationships.	8
2	Electrical activity of heart: conducting system, action potentials, pacemaker activity, ECG principles and interpretation basics.	7
3	Cardiac output and its regulation: heart rate, stroke volume, venous return, preload, afterload and autonomic regulation.	7
4	Hemodynamics: blood flow, resistance, arterial pressure, microcirculation, capillary exchange and lymphatic circulation.	8
5	Blood pressure regulation: short- and long-term mechanisms, baroreceptor reflex, chemoreceptors, renin-angiotensin-aldosterone system and local control.	7
6	Special circulations and integrated responses: coronary and cerebral circulation, exercise, posture, shock and cardiovascular adaptation.	8
	Total Theory Hours	45

Practical / Tutorial / Applied Component

- Tutorial interpretation of ECG, pulse and blood-pressure recordings.
- Case-based exercises on cardiovascular regulation and exercise.
- Demonstration/interpretation of heart sounds, arterial pulse, JVP and BP as facilities permit.

APB-BIC.301 — Biochemistry

Name of the Course	Biochemistry
Course Code	APB-BIC.301
Semester	Semester-III
Credit Hours	4
Course Type	Core
Teaching Scheme	3+1+0; 45 theory + 15 tutorial

Teaching Objective

Explain major metabolic pathways and their regulation, integrating biochemical mechanisms with nutritional and clinical relevance.

Learning Outcomes

- Describe pathways of carbohydrate, lipid and amino-acid metabolism.
- Explain nucleotide, water and mineral metabolism.
- Describe biochemical actions of major hormones.
- Explain clinical enzymology and isoenzymes.
- Describe electron transport and oxidative phosphorylation and their inhibitors.

Theory / Course Content

Unit No.	Content	Lectures / Hours
1	Carbohydrate metabolism: glycolysis, TCA cycle, gluconeogenesis, glycogen metabolism, pentose/uronic pathways, galactose and fructose metabolism and blood-glucose regulation.	9
2	Lipid metabolism: fatty-acid synthesis and oxidation, ketogenesis, triglyceride and cholesterol metabolism, lipoproteins, obesity, fatty liver and atherosclerosis.	8
3	Amino-acid metabolism: transamination, deamination, ammonia transport, urea cycle, individual amino-acid pathways, nitrogen balance and inborn errors.	8
4	Nucleotide metabolism: purine and pyrimidine metabolism, salvage pathways and selected inborn errors.	6
5	Water and mineral metabolism: body water, electrolyte balance, calcium/phosphate and related biochemical regulation.	6
6	Hormones and enzymes: chemistry and functions of hormones; clinical enzymes, metalloenzymes and isoenzymes; biological oxidation, ETC and oxidative phosphorylation.	8
Total Theory Hours		45

Practical / Tutorial / Applied Component

- Tutorial problem-solving on metabolic pathways and clinical correlations.
- Interpretation of basic serum biochemical values from case scenarios.

HVE.350 — Human Values & Ethics

Name of the Course		HUMAN VALUES AND ETHICS
Course Code		HVE.501
Credit hours		02
Teaching Objective		1. To help the students appreciate the essential complementarity between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings. 2. To facilitate the development of a Holistic perspective among students towards life and profession as well as towards happiness and prosperity based on a correct understanding of the Human reality and the rest of existence. Such a holistic perspective forms the basis of Universal Human Values and movement towards value-based living in a natural way. 3. To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually fulfilling human behavior and mutually enriching interaction with Nature. Thus, this course is intended to provide a much needed orientational input in value education to the young enquiring minds.
Learning Outcomes		By the end of the course, students are expected to become more aware of themselves, and their surroundings (family, society, nature); they would become more responsible in life, and in handling problems with sustainable solutions, while keeping human relationships and human nature in mind. They would have better critical ability. They would also become sensitive to their commitment towards what they have understood (human values, human relationship and human society). It is hoped that they would be able to apply what they have learnt to their own self in different day-to-day settings in real life, at least a beginning would be made in this direction.
Unit No.	Content	L+T
Module 1	Introduction to Value Education (6 lectures and 3 tutorials for practice session) Lecture 1: Understanding Value Education Lecture 2: Self-exploration as the Process for Value Education Tutorial 1: Practice Session PS1 Sharing about Oneself Lecture 3: Continuous Happiness and Prosperity – the Basic Human Aspirations Lecture 4: Right Understanding, Relationship and Physical Facility Tutorial 2: Practice Session PS2 Exploring Human Consciousness Lecture 5: Happiness and Prosperity – Current Scenario Lecture 6: Method to Fulfill the Basic Human Aspirations Tutorial 3: Practice Session PS3 Exploring Natural Acceptance	5+4
Module 2	Harmony in the Human Being Lecture 7: Understanding Human being as the Co-existence of the Self and the Body Lecture 8: Distinguishing between the Needs of the Self and the Body Tutorial 4: Practice Session PS4 Exploring the difference of Needs of Self and Body Lecture 9: The Body as an Instrument of the Self Lecture 10: Understanding Harmony in the Self Tutorial 5: Practice Session PS5 Exploring Sources of Imagination in the Self Lecture 11: Harmony of the Self with the Body Lecture 12: Programme to ensure self-regulation and Health Tutorial 6: Practice Session PS6 Exploring Harmony of Self with the Body	7+3
Module 3	Harmony in the Family and Society (6 lectures and 3 tutorials for practice session) Lecture 13: Harmony in the Family – the Basic Unit of Human Interaction Lecture 14: Values in Human-to-Human Relationship Lecture 15: 'Trust' – the Foundational Value in Relationship Tutorial 7: Practice Session PS7 Exploring the Feeling of Trust	6+3

	Lecture 16: 'Respect' – as the Right Evaluation Tutorial 8: Practice Session PS8 Exploring the Feeling of Respect Lecture 17: Understanding Harmony in the Society Lecture 18: Vision for the Universal Human Order Tutorial 9: Practice Session PS9 Exploring Systems to fulfil Human Goal	
Module 4	Harmony in the Nature/Existence (4 lectures and 2 tutorials for practice session) Lecture 19: Understanding Harmony in the Nature Lecture 20: Interconnectedness, self-regulation and Mutual Fulfilment among the Four Orders of Nature Tutorial 10: Practice Session PS10 Exploring the Four Orders of Nature Lecture 21: Realizing Existence as Co-existence at All Levels Lecture 22: The Holistic Perception of Harmony in Existence Tutorial 11: Practice Session PS11 Exploring Co-existence in Existence	4+2
Module 5	Implications of the Holistic Understanding – a Look at Professional Ethics (6 lectures and 3 tutorials for practice session) Lecture 23: Natural Acceptance of Human Values Lecture 24: Definitiveness of (Ethical) Human Conduct Tutorial 12: Practice Session PS12 Exploring Ethical Human Conduct Lecture 25: A Basis for Humanistic Education, Humanistic Constitution and Universal Human Order Lecture 26: Competence in Professional Ethics Tutorial 13: Practice Session PS13 Exploring Humanistic Models in Education Lecture 27: Holistic Technologies, Production Systems and Management Models Typical Case Studies Lecture 28: Strategies for Transition towards Value-based Life and Profession Tutorial 14: Practice Session PS14 Exploring Steps of Transition towards Universal Human Order	6+3
Suggested Readings:		
Text Book and Teachers Manual The Textbook A Foundation Course in Human Values and Professional Ethics, R R Gaur, R Asthana, G P Bagaria, 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-47-1 b. The Teacher's Manual Teachers' Manual for A Foundation Course in Human Values and Professional Ethics, R R Gaur, R Asthana, G P Bagaria, 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-53-2		
Reference Books		
1. Jeevan Vidya: EkParichaya, A Nagaraj, Jeevan Vidya Prakashan, Amarkantak, 1999. 2. Human Values, A.N. Tripathi, New Age Intl. Publishers, New Delhi, 2004. 3. The Story of Stuff (Book). 4. The Story of My Experiments with Truth - by Mohandas Karamchand Gandhi 5. Small is Beautiful - E. F Schumacher. 6. Slow is Beautiful - Cecile Andrews 7. Economy of Permanence - J C Kumarappa 8. Bharat Mein Angreji Raj – Pandit Sunderlal 9. Rediscovering India - by Dharampal 10. Hind Swaraj or Indian Home Rule - by Mohandas K. Gandhi		

Semester-IV

APB-ANT.302 — Gross Anatomy—Abdomen & Pelvis & Embryology—GIT

Name of the Course	Gross Anatomy—Abdomen & Pelvis & Embryology—GIT
Course Code	APB-ANT.302
Semester	Semester-IV
Credit Hours	5
Course Type	Core
Teaching Scheme	3+0+2; 45 theory + 30 practical

Teaching Objective

Provide detailed regional anatomy of abdomen and pelvis and explain the embryological development of the gastrointestinal tract.

Learning Outcomes

- Identify major abdominal and pelvic structures and explain their relationships.
- Describe vascular, lymphatic and neural supply of abdominal and pelvic viscera.
- Explain peritoneal arrangements and clinically important spaces.
- Describe development and rotation of the gastrointestinal tract.
- Correlate anatomy with common clinical and radiological findings.

Theory / Course Content

Unit No.	Content	Lectures / Hours
1	Anterior abdominal wall and peritoneum: layers, inguinal region, abdominal cavities, mesenteries, omenta and peritoneal spaces.	5
2	Stomach, duodenum, jejunum and ileum: gross anatomy, blood supply, lymphatics, nerve supply and applied anatomy.	6
3	Large intestine, rectum and anal canal: relations, blood supply, lymphatics, nerve supply and clinical anatomy.	5
4	Liver, biliary apparatus, pancreas and spleen: structure, relations, vessels, ducts, lymphatics and applied anatomy.	7
5	Pelvis and pelvic viscera: pelvic walls/floor, vessels and nerves, urinary bladder, reproductive organs and rectum; surface anatomy.	6
6	Embryology of alimentary system: gut formation, rotation and fixation, vitelline duct, foregut/midgut/hindgut derivatives and common congenital anomalies. Embryology of Genitourinary System	8
7.	Histology of alimentary tract, Liver, gall bladder, Pancreas, Excretory & Reproductive Systems	8
Total Theory Hours		45

Practical / Tutorial / Applied Component

- Dissection of abdomen/pelvis regions and identification of viscera.
- Osteology, surface marking and radiological anatomy.

- Identification of abdominal and pelvic histology slides where applicable.
- Embryology models of gut development, genitourinary system
- Viva and practical record.

APB-PHY.302-Renal & Respiratory Physiology

Name of the Course	Renal & Respiratory Physiology
Course Code	APB-PHY.302
Semester	Semester-IV
Credit Hours	5
Course Type	Core
Teaching Scheme	3+0+2; 45 theory + 30 practical

Teaching Objective

Explain respiratory and renal mechanisms responsible for gas exchange, fluid-electrolyte balance, acid-base homeostasis and excretion.

Learning Outcomes

- Explain mechanics of ventilation and gas exchange.
- Interpret basic spirometric measurements.
- Describe regulation of breathing and gas transport.
- Explain glomerular filtration and tubular handling of solutes and water.
- Describe renal regulation of acid-base and electrolyte balance.

Theory / Course Content

Unit No.	Content	Lectures / Hours
1	Respiratory system organization: mechanics of breathing, lung volumes and capacities, compliance, airway resistance and work of breathing.	8
2	Gas exchange and transport: diffusion, ventilation-perfusion relationships, oxygen and carbon-dioxide transport and acid-base role of lungs.	8
3	Regulation of respiration: respiratory centres, chemoreceptors, neural and chemical control, adaptation and responses to exercise.	7
4	Kidney function: nephron structure, renal blood flow, glomerular filtration and determinants of GFR.	7
5	Tubular function: reabsorption and secretion, concentration/dilution of urine, counter-current mechanisms and regulation of sodium/water balance.	7
6	Renal homeostasis: acid-base balance, potassium handling, endocrine functions of kidney and integrated responses to fluid disturbances.	8
Total Theory Hours		45

Practical / Tutorial / Applied Component

- Spirometry and interpretation of lung volumes/capacities.
- Demonstration/interpretation of respiratory responses to exercise where feasible.

- Urine-related physiological demonstrations and case interpretation.
- Tutorials on GFR, clearance and acid-base balance.

APB-BIC.302 — Analytical Biochemistry

Name of the Course	Analytical Biochemistry
Course Code	APB-BIC.302
Semester	Semester-IV
Credit Hours	5
Course Type	Core
Teaching Scheme	3+0+2; 45 theory + 30 practical

Teaching Objective

Develop competence in fundamental analytical methods and interpretation of common biochemical investigations used in clinical laboratories.

Learning Outcomes

- Explain principles of major biochemical analytical methods.
- Select appropriate analytical approaches for common laboratory investigations.
- Interpret basic biochemical and enzyme results in clinical context.
- Describe quality-control principles and sources of analytical error.
- Demonstrate safe and systematic laboratory practice.

Theory / Course Content

Unit No.	Content	Lectures / Hours
1	Biophysical and analytical foundations: thermodynamics of biochemical reactions, molecular weight, high-energy bonds, solution properties and analytical measurement.	7
2	Analytical methods: chromatography, electrophoresis, colorimetry, fluorimetry, viscosity, ultracentrifugation, dialysis and principles of separation.	8
3	Laboratory assessment of carbohydrates, proteins and renal function: glucose, urea, creatinine, proteins and urine constituents.	7
4	Liver, lipid and mineral investigations: bilirubin, proteins, cholesterol/lipid profile, calcium, phosphate and uric acid.	7
5	Enzyme and immunological assays: ELISA, clinical enzymes, principles of immunoassay and interpretation of laboratory results.	7
6	Quality and clinical interpretation: analytical errors, reference intervals, internal/external quality control and integration of laboratory results with clinical context.	9
Total Theory Hours		45

Practical / Tutorial / Applied Component

- Quantitative serum estimation: glucose, urea, creatinine, phosphate, calcium, uric acid, cholesterol, bilirubin and proteins.

- Quantitative urine estimation of sugar, urea, creatinine, proteins and chloride.
- ELISA demonstration.
- Chromatography demonstration.
- Colorimetry/spectrophotometry and interpretation of standard curves.
- Internal quality-control exercise and laboratory documentation.

CRP.350 — Community Rehabilitation Practice

Name of the Course	Community Rehabilitation Practice
Course Code	CRP.350
Semester	Semester-IV
Credit Hours	2
Course Type	Elective
Teaching Scheme	2+0+0; ['Applied case discussion and simple community rehabilitation planning.', 'Basic screening and ICF-based documentation exercise.'] contact hours

Teaching Objective

Provide foundational knowledge and practical understanding of community rehabilitation, functioning, participation and equitable care across the life course.

Learning Outcomes

- Define rehabilitation and explain its place within health systems.
- Apply basic ICF concepts to simple cases.
- Describe principles of community-based and home-based rehabilitation.
- Recognize needs of vulnerable populations and social determinants.
- Develop a simple community rehabilitation plan and referral pathway.

Theory / Course Content

Unit No.	Content	Lectures / Hours
1	Rehabilitation and health systems: concept and definition of rehabilitation, rehabilitation as an essential health service, overview of rehabilitation and World Rehabilitation Alliance.	5
2	Functioning, disability and ICF framework: function versus disease-based models, components of ICF, activity, participation and contextual factors; basic case application.	5
3	Community-based rehabilitation: principles of CBR, early identification of disability, home-based rehabilitation, community participation and empowerment.	5
4	Life-course and vulnerable populations: women's health and caregiving burden, ageing and fall prevention, chronic diseases and disability, social determinants of health.	5

5	Primary care and interprofessional practice: referral pathways, team-based rehabilitation, ethical/professional roles and communication in community settings.	5
6	Applied community planning: simple rehabilitation plan, screening tools for functional limitations, ICF documentation and case discussion.	5
	Total Theory Hours	30

Semester-V

APB-ANT.401 — Gross Anatomy—Brain & Embryology—Brain, CNS & Neuroanatomy

Name of the Course	Gross Anatomy—Brain & Embryology—Brain, CNS & Neuroanatomy
Course Code	APB-ANT.402
Semester	Semester-VI
Credit Hours	5
Course Type	Core
Teaching Scheme	3+1+2; 45 theory + 15 tutorial + 30 practical

Teaching Objective

Provide an integrated understanding of brain and CNS anatomy, neurodevelopment and the anatomical basis of neurological function and disease.

Learning Outcomes

- Identify major structures of brain, spinal cord and meninges.
- Explain major ascending, descending and cranial-nerve pathways.
- Describe ventricular system and CSF circulation.
- Explain neural-tube and brain development with common developmental abnormalities.
- Relate neuroanatomy to basic clinical and radiological findings.

Theory / Course Content

Unit No.	Content	Lectures / Hours
1	Neuroanatomical foundations: skull, meninges, ventricles, cerebrospinal fluid and organization of central and peripheral nervous systems.	7
2	Brainstem and cerebellum: external and internal organization, cranial-nerve relationships, pathways and functional correlations.	7
3	Cerebral hemispheres and diencephalon: cortex, white matter, basal nuclei, thalamus, hypothalamus and major functional areas.	7
4	Spinal cord and ascending/descending pathways: segmental organization, sensory and motor tracts and autonomic components.	7
5	Neuroembryology: neural tube, neural crest, brain vesicles, spinal cord development, neural tube defects and developmental anomalies.	7
6	Special senses and applied neuroanatomy: visual/auditory pathways, blood supply, autonomic pathways, basic radiological anatomy and clinical correlations.	8
7.	Histology of Brain & spinal Cord	2
	Total Theory Hours	45

Practical / Tutorial / Applied Component

- Dissection/identification of brain, spinal cord and related structures.
- Brain models and neuroanatomy spotters.
- Identification of nervous-system histology slides.
- Embryology models of neural-tube and brain development.
- Basic neuro-radiological identification and viva.

APB-BIC.401 — Immunology

Name of the Course	Immunology
Course Code	APB-BIC.401
Semester	Semester-V
Credit Hours	6
Course Type	Core
Teaching Scheme	3+1+2; 45 theory + 15 tutorial + 30 practical

Teaching Objective

Introduce fundamental immunological mechanisms and their application to disease, prevention, laboratory diagnosis and health care.

Learning Outcomes

- Describe innate and adaptive immune responses.
- Explain antibody structure, classes and functions.
- Describe antigen presentation, T-cell responses and cytokine-mediated regulation.
- Explain complement, hypersensitivity, autoimmunity and immunodeficiency.
- Describe basic immunological laboratory methods and vaccine principles.

Theory / Course Content

Unit No.	Content	Lectures / Hours
1	Foundations of immunity: innate and adaptive immunity, barriers, immune cells, lymphoid organs and organization of the immune system.	7
2	Antigens and antibodies: antigen recognition, immunoglobulin classes, antibody structure and functions, antigen-antibody interactions.	8
3	Cell-mediated immunity: T-cell subsets, antigen presentation, major histocompatibility complex, cytokines and immune regulation.	8
4	Complement and hypersensitivity: complement pathways, biological effects, hypersensitivity types and clinical examples.	7
5	Autoimmunity, immunodeficiency and transplantation: mechanisms, selected disorders and principles of compatibility/rejection.	7
6	Immunology in laboratory and disease: immunoassays, ELISA principles, vaccines, tumor immunity and interpretation of basic immune investigations.	8
Total Theory Hours		45

Practical / Tutorial / Applied Component

- ELISA/immunoassay demonstration and interpretation.
- Antigen-antibody reaction demonstrations where facilities permit.
- Case-based interpretation of hypersensitivity, autoimmunity and immunodeficiency.
- Tutorials on vaccination and immune responses.

APB-PHY.401 — Endocrine & Reproductive Physiology

Name of the Course	Endocrine & Reproductive Physiology
Course Code	APB-PHY.401
Semester	Semester-V
Credit Hours	6
Course Type	Core
Teaching Scheme	3+1+2; 45 theory + 15 tutorial + 30 practical

Teaching Objective

Explain endocrine and reproductive physiology, integrating hormonal regulation with growth, metabolism, reproduction, pregnancy and lactation.

Learning Outcomes

- Describe hormone synthesis, receptors and feedback regulation.
- Explain functions of pituitary, thyroid, adrenal and pancreatic hormones.
- Describe male and female reproductive physiology.
- Explain ovarian and menstrual cycles and their hormonal control.
- Describe physiological changes during pregnancy, parturition and lactation.

Theory / Course Content

Unit No.	Content	Lectures / Hours
1	Endocrine organization: hormones, receptors, second messengers, feedback mechanisms and hypothalamic-pituitary control.	7
2	Pituitary and thyroid: growth hormone, prolactin, thyroid hormones, regulation and physiological effects.	7
3	Adrenal and pancreatic endocrine function: cortisol, aldosterone, adrenal androgens, catecholamines, insulin and glucagon.	8
4	Male reproductive physiology: testes, spermatogenesis, testosterone, endocrine regulation and reproductive functions.	7
5	Female reproductive physiology: ovarian cycle, oogenesis, estrogen/progesterone, ovulation and menstrual cycle.	8
6	Pregnancy, lactation and integrated reproductive function: fertilization, implantation, placental hormones, pregnancy adaptations, parturition and lactation.	8
	Total Theory Hours	45

Practical / Tutorial / Applied Component

- Endocrine case discussions and hormone-feedback diagrams.
- Interpretation of basic endocrine/reproductive laboratory scenarios.
- Demonstration of physiological pregnancy and reproductive concepts through models/graphs.
- Tutorial on menstrual-cycle and endocrine profiles.

AHCP.401 — Disaster Management & Environmental Science

Name of the Course	Disaster Management & Environmental Science
Course Code	AHCP.401
Semester	Semester-V
Credit Hours	2
Course Type	Elective
Teaching Scheme	2+0+0; 30 contact hours

Teaching Objective

Introduce disaster preparedness and environmental-health principles relevant to health professionals and institutional emergency planning.

Learning Outcomes

- Identify major disaster hazards and phases of disaster management.
- Describe basic triage, preparedness and emergency-response principles.
- Recognize environmental hazards affecting health.
- Explain the role of health institutions in disaster preparedness and recovery.
- Contribute to simple disaster and environmental-health plans.

Theory / Course Content

Unit No.	Content	Lectures / Hours
1	Disaster concepts and risk: hazards, vulnerability, capacity, risk assessment, disaster cycle and preparedness.	5
2	Natural and human-made disasters: earthquakes, floods, fires, industrial accidents, chemical events and mass-casualty situations.	5
3	Emergency response systems: triage, command structures, communication, evacuation, shelter and continuity of essential health services.	5
4	Environmental health: air, water and soil pollution, waste, occupational/environmental hazards and health effects.	5
5	Climate and health: heat stress, vector-borne disease, changing environmental exposures and community resilience.	5
6	Disaster preparedness planning: institutional plans, emergency kits, drills, risk communication and recovery.	5
	Total Theory Hours	30

Semester-VI

APB-ANT.402 — Gross Anatomy & Embryology—Head & Neck

Name of the Course	Gross Anatomy & Embryology—Head & Neck
Course Code	APB-ANT.401
Semester	Semester-V
Credit Hours	6
Course Type	Core
Teaching Scheme	3+1+2; 45 theory + 15 tutorial + 30 practical

Teaching Objective

Provide comprehensive gross, surface, radiological and developmental anatomy of the head and neck, including special senses and selected microscopic correlations.

Learning Outcomes

- Identify major head-and-neck structures and their relationships.
- Explain cranial-nerve pathways and vascular supply at an introductory level.
- Describe development of face, branchial arches and special senses.
- Recognize normal histological features of endocrine and salivary glands and nervous tissue.
- Correlate anatomy with common clinical and radiological findings.

Theory / Course Content

Unit No.	Content	Lectures / Hours
1	Scalp, face and superficial neck: layers, facial expression muscles, vessels, nerves, scalp, facial spaces and applied anatomy.	7
2	Deep neck and cervical regions: triangles, fascia, carotid sheath, cervical sympathetic chain, pharynx, larynx and thyroid region.	8
3	Cranial nerves and major head/neck vessels: course, distribution and selected clinical correlations.	8
4	Oral cavity, pharynx and related structures: tongue, palate, salivary glands, pharyngeal spaces and swallowing anatomy.	7
5	Special senses and related embryology: eye, ear and sensory structures; development of face and branchial arches.	7
6	Embryology and histology: nervous-system and special-sense development, ductless glands, endocrine and salivary gland microscopic anatomy.	8
	Total Theory Hours	45

Practical / Tutorial / Applied Component

- Dissection of head and neck regions and brain-related structures.
- Identification of bones, muscles, vessels and cranial nerves.
- Embryology models of face, branchial arches and special senses.
- Histology slides of endocrine glands, salivary glands, nervous system and special senses.
- Surface/radiological anatomy and viva.

APB-PHY.402 — Nervous System & Special Senses

Name of the Course	Nervous System & Special Senses
Course Code	APB-PHY.402
Semester	Semester-VI
Credit Hours	5
Course Type	Core
Teaching Scheme	3+1+2; 45 theory + 15 tutorial + 30 practical

Teaching Objective

Explain neural control, sensory processing and special-sense physiology, integrating basic mechanisms with clinical examination concepts.

Learning Outcomes

- Describe neuronal organization and synaptic transmission.
- Explain motor control, reflexes and sensory pathways.
- Describe visual and auditory transduction and pathways.
- Explain vestibular function and equilibrium.
- Relate physiological mechanisms to basic neurological and special-sense examination.

Theory / Course Content

Unit No.	Content	Lectures / Hours
1	Organization of nervous system: neurons and glia, sensory and motor organization, synaptic transmission and neurotransmitters.	7
2	Spinal and supraspinal motor control: reflexes, muscle tone, posture, motor pathways, basal ganglia and cerebellar functions.	8
3	Sensory physiology: somatic sensation, pain, temperature, touch, proprioception and central processing.	7
4	Vision: optics, accommodation, photoreceptors, visual pathways, visual acuity, colour vision and visual field concepts.	8
5	Hearing and equilibrium: auditory mechanisms, sound localization, vestibular receptors and balance.	7
6	Higher functions and integrated nervous-system physiology: sleep, learning, memory, language, autonomic functions and selected clinical correlations.	8
	Total Theory Hours	45

Practical / Tutorial / Applied Component

- Clinical testing of reflexes and cranial nerves.
- Testing of proprioception and general sensations.
- Vision: blind spot, near point, acuity, perimetry, colour and stereoscopic vision.
- Hearing: basic hearing tests and sound localization.
- Case-based tutorials on neurological examination.

APB-BIC.402 — Nutrition

Name of the Course	Nutrition
Course Code	APB-BIC.402
Semester	Semester-VI
Credit Hours	5
Course Type	Core
Teaching Scheme	3+0+2; 45 theory + 30 practical

Teaching Objective

Provide an integrated understanding of human nutrition, nutrient metabolism, deficiency states and the relationship between diet and health.

Learning Outcomes

- Explain energy and nutrient requirements.
- Describe digestion, absorption and metabolic relevance of major nutrients.
- Recognize vitamin and mineral deficiency states.
- Explain nutritional aspects of obesity and metabolic disease.
- Apply basic principles of nutritional assessment and health education.

Theory / Course Content

Unit No.	Content	Lectures / Hours
1	Principles of nutrition: nutrients, energy balance, basal metabolic needs, dietary sources and assessment of nutritional status.	7
2	Carbohydrate nutrition: dietary carbohydrates, digestion, absorption, glycemic concepts and regulation of blood glucose.	7
3	Protein and amino-acid nutrition: protein quality, requirements, nitrogen balance, essential amino acids and deficiency states.	7
4	Lipid nutrition: dietary fats, essential fatty acids, cholesterol, lipoproteins and relationship with obesity and cardiovascular risk.	7
5	Vitamins and minerals: functions, sources, deficiency and excess of major vitamins and key minerals; nutrition across life stages.	9
6	Clinical and community nutrition: malnutrition, obesity, metabolic disease, therapeutic dietary principles and nutrition education.	8
	Total Theory Hours	45

Practical / Tutorial / Applied Component

- Basic dietary assessment and calculation exercises.
- Interpretation of BMI and simple nutritional indicators.
- Case-based identification of nutrient deficiencies.
- Demonstration of selected biochemical tests relevant to nutritional status.

RMB.401 — Research Methodology & Biostatistics

Name of the Course	Research Methodology & Biostatistics
Course Code	RMB.401
Semester	Semester-VI
Credit Hours	4
Course Type	Elective
Teaching Scheme	3+1+0; 45 theory + 15 tutorial

Teaching Objective

Develop foundational competence in research design, ethical conduct, data management and basic biostatistical analysis for health-science research.

Learning Outcomes

- Formulate research questions, aims, objectives and hypotheses.
- Identify variables and select appropriate sampling approaches.
- Differentiate major observational and experimental study designs.
- Apply basic descriptive statistics and present data appropriately.
- Select and interpret basic tests of significance including chi-square, t-test and z-test.
- Recognize essential ethical and documentation requirements in research.

Theory / Course Content

Unit No.	Content	Lectures / Hours
1	Research foundations: meaning and purpose of research, problem statement, research questions, aims, objectives and hypotheses.	7
2	Variables and sampling: types of variables; random, purposive, stratified, quota, multistage, convenience and other sampling approaches.	8
3	Research designs and data collection: descriptive, analytical, case-control, cohort and experimental/RCT designs; methods of data collection and their advantages/disadvantages.	9
4	Research ethics and documentation: research ethics, informed consent, confidentiality, documentation and reference-management software.	6
5	Statistics and data presentation: scales of measurement, classification, continuous/discrete data, tables/graphs, mean, median, mode, range, deviation and variance.	7
6	Hypothesis testing: contingency tables, chi-square test, student t-test and z-test; interpretation and reporting of statistical findings.	8
	Total Theory Hours	45

Practical / Tutorial / Applied Component

- Research-protocol drafting exercise.
- Variable coding and basic data-entry exercise.
- Construction of frequency tables, graphs and summary statistics.
- Contingency-table and chi-square exercises.
- Basic t-test and z-test problems.
- Reference-management and research-documentation exercise.

Duration

The internship shall be of **six months (24 weeks)** and shall be undertaken after successful completion of the prescribed academic requirements of the B.Sc. APB programme.

Recommended duration:

24 weeks / approximately 6 months

3. Recommended Internship Structure

Rotation	Duration
Anatomy & Histology	6 weeks
Physiology & Clinical Physiology	6 weeks
Biochemistry Laboratory	10 weeks
Hematology & Basic Clinical Laboratory	2 weeks

Objectives of the Internship

The internship is intended to enable students to:

1. Apply theoretical knowledge acquired during the six semesters in real laboratory and health-care settings.
2. Develop competence in routine laboratory procedures.
3. Understand laboratory workflow from sample collection to reporting.
4. Develop professional communication and teamwork skills.
5. Understand principles of laboratory safety, infection prevention and biomedical waste management.
6. Develop skills in identification and interpretation of basic anatomical, physiological and biochemical findings.
7. Understand quality-control procedures.
8. Maintain laboratory records and documentation.
9. Develop basic research and data-management skills.
10. Understand professional ethics, confidentiality and patient-related responsibilities.

Detailed Internship Rotation

ROTATION I — ANATOMY & HISTOLOGY

Duration: 4 Weeks

A. Gross Anatomy

Students should receive supervised exposure to:

- Identification of bones and anatomical landmarks
- Identification of muscles, vessels and nerves
- Surface anatomy
- Osteology
- Regional anatomy
- Anatomical models and specimens

- Radiological anatomy
- CT/MRI/X-ray orientation
- Anatomical correlations with common clinical conditions

The existing curriculum specifically includes dissection/spotting, identification of muscles, vessels, nerves and joints, surface marking, histological slides and basic radiological identification.

B. Histology

- Students should learn:
 - Preparation/handling of histological slides
 - Light-microscopic examination
 - Identification of epithelial tissues
 - Connective tissue
 - Muscle tissue
 - Nervous tissue
 - Cardiovascular tissue
 - Respiratory tissue
 - Gastrointestinal tissue
 - Liver and pancreas
 - Kidney
 - Reproductive tissues
 - Brain and spinal cord

Expected competency

- At the end of the rotation, the student should be able to **identify common anatomical structures and basic histological tissues and relate them to clinical/radiological findings at an introductory level.**

5. ROTATION II — PHYSIOLOGY

Duration: 4 Weeks

A. General and Clinical Physiology

- Students should receive supervised training in:
 - Pulse examination
 - Blood-pressure measurement
 - Respiratory rate
 - Temperature
 - Cardiovascular examination principles
 - ECG recording and basic interpretation
 - Respiratory physiology
 - Spirometry demonstration and interpretation
 - Exercise physiology
 - Neuromuscular physiology
 - Reflexes
 - Basic sensory testing
- The curriculum specifically includes ECG, pulse and blood-pressure interpretation and demonstrations of heart sounds, arterial pulse, JVP and BP where facilities permit.

B. Hematology

Students should be trained in:

- Hemoglobin estimation
- RBC count
- WBC count
- Differential leukocyte count
- Platelet count
- PCV
- ESR
- Reticulocyte count
- RBC indices
- Blood grouping
- Basic coagulation investigations
- Peripheral blood-smear examination
- These competencies directly correspond to the hematology practical component already included in the APB curriculum.

6. ROTATION III — BIOCHEMISTRY LABORATORY

Duration: 8 Weeks

This should constitute the **major laboratory component** of the internship.

A. Sample Collection & Processing

Students should understand:

- Patient/sample identification
- Request-form verification
- Appropriate sample selection
- Venous blood collection demonstration
- Serum/plasma separation
- Urine collection
- Labelling and barcoding
- Sample transport
- Sample acceptance/rejection criteria
- Pre-analytical errors
- Students should perform invasive procedures only under appropriate supervision and institutional authorization.

B. Routine Biochemistry

- Students should receive hands-on/supervised exposure to:
 - Blood glucose
 - Urea
 - Creatinine
 - Uric acid
 - Total protein
 - Albumin
 - Bilirubin
 - Cholesterol
 - Triglycerides
 - HDL/LDL-related investigations

- Calcium
- Phosphate
- Liver-function-related parameters
- Renal-function-related parameters
- The existing curriculum specifically includes quantitative estimation of glucose, urea, creatinine, phosphate, calcium, uric acid, cholesterol, bilirubin and proteins.

C. Analytical Techniques

- Training should include:
 - Colorimetry
 - Spectrophotometry
 - Standard curves
 - Calibration
 - Pipetting
 - Dilution techniques
 - Centrifugation
 - Chromatography demonstration
 - Electrophoresis demonstration
 - ELISA demonstration
 - Basic immunoassay principles
- These techniques are explicitly represented in the Semester-IV Analytical Biochemistry curriculum.

D. Quality Control

- Students should understand:
 - Internal quality control
 - Calibration
 - Reference ranges
 - Precision and accuracy
 - Random and systematic errors
 - Reagent storage
 - Equipment maintenance
 - Documentation
 - External quality-assurance concepts

7. ROTATION IV — HEMATOLOGY & CLINICAL LABORATORY

Duration: 3 Weeks

Training may include:

- **Hematology**
 - CBC workflow
 - Peripheral smear
 - RBC morphology
 - WBC morphology
 - Platelet assessment
 - ESR
 - Hemoglobin
 - Hematocrit

- Basic coagulation testing

Clinical laboratory workflow

Students should understand:

Patient → Request → Sample collection → Identification → Processing → Analysis → Quality control → Validation → Reporting

- The student should **not independently authorize/sign clinical laboratory reports**.

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