MEDICITI COLLEGE OF PHYSIOTHEREAPY

(*Affiliated with Kaloji Narayana Rao University of Health Sciences*)

Bachelor of Physiotherapy

1st year

COURSE STRUCTUR

	Theory Marks		Practical Marks			
PAPER	University Exam	Internal assessment	University Practical /Clinical	University Orals	Internal assessment	Total
I Year						
English	80	20	--		--	100
Sociology Sec.A & Psychology Sec.B	40+40	10+10	---		---	100
Anatomy	80	20	40	40 (10 marks of the orals is for record book work)	20	200
Physiology	80	20	40	40 (10 marks of the orals is for record book work)	20	200
Biochemistry	80	20	--	--	--	100

First-Year University Examination: Question Paper Pattern

S. No.	Subject/Section	Maximum Marks	Essay Questions	Short-Note Questions	Very Short-Note Questions
1	**Sociology – Section A**	40	1 essay question with one internal choice **1 × 10 = 10**	4 questions **4 × 5 = 20**	5 questions **5 × 2 = 10**
	Psychology – Section B	40	1 essay question with one internal choice **1 × 10 = 10**	4 questions **4 × 5 = 20**	5 questions **5 × 2 = 10**
	Total: Sociology and Psychology	**80**	**20**	**40**	**20**
2	**Anatomy**	80	2 essay questions with one internal choice **2 × 10 = 20**	8 questions **8 × 5 = 40**	10 questions **10 × 2 = 20**
3	**Physiology**	80	2 essay questions with one internal choice **2 × 10 = 20**	8 questions **8 × 5 = 40**	10 questions **10 × 2 = 20**
4	**Biochemistry**	80	2 essay questions with one internal choice **2 × 10 = 20**	8 questions **8 × 5 = 40**	10 questions **10 × 2 = 20**
5	**English**	80	2 essay question with internal choice **2 × 12 = 24**	6 questions (**6 × 4 = 24),** Letter writing **(1×6 =6),** Short paragraph **(1×6 =6),** Grammar **(20 marks)**	

SYLLABUS

Paper 1: ENGLISH

1. Prose

Prescribed Textbook: *Contemporary English: An Anthology of Prose*, Board of Editors, D.U.P.

The following lessons are prescribed:

1. *From Heaven Lake* – Vikram Seth
2. *Indian Cinema: Tradition and Change* – Chidananda Das Gupta
3. *Stench of Kerosene* – Amrita Pritam
4. *The Relationship of Languages* – Jawaharlal Nehru
5. *My Financial Career* – Stephen Leacock
6. *To Students* – M.K. Gandhi
7. *Next Sunday* – R.K. Narayan
8. *After Twenty Years* – O. Henry
9. *New York on 17 Dollars a Day* – Khushwant Singh

2. Poetry

Prescribed Textbook: *Magic of the Muse: An Anthology of Poems*, edited by Prof. L.S.R. Krishna Sastry, Maruthi Publishing House, Hyderabad.

The following poems are prescribed:

1. *Under the Greenwood Tree* – William Shakespeare
2. *The Happy Man* – Alexander Pope
3. *Simon Lee (The Old Huntsman)* – William Wordsworth
4. *The Cloud* – Percy Bysshe Shelley
5. *Ulysses* – Alfred Lord Tennyson
6. *From Lover's Gift* – Rabindranath Tagore
7. *Unharvested* – Robert Frost
8. *The Earthen Goblet* – Harindranath Chattopadhyaya
9. *Telephone Conversation* – Wole Soyinka

3. Grammar

The following textbooks are recommended for reference and study:

1. *Essentials of English Grammar and Composition* by N.K. Aggarwala, Goyal Brothers Prakashan Educational Publishers, 11/1903, Chuna Mandi, Paharganj, New Delhi – 110055.
2. *Learner's English Grammar and Composition* by N.D.V. Prasada Rao, Reviser of Wren & Martin's *High School English Grammar and Composition*, S. Chand & Company Ltd., Ram Nagar, New Delhi – 110055.

The grammar syllabus includes:

I. Vocabulary

- Spellings
- Antonyms
- Words and phrases

II. Letter Writing

- Personal letters to father, mother, brother, aunt, etc.
- Official letters and applications
- Academic matters, such as letters to the editor of a newspaper or submission of an article

III. General Essay

Suggested topics:

1. Physiotherapy
2. Social problems: corruption, dowry system, population, diseases and remedies
3. Scientists and their contributions

IV. Transformation of Sentences

- Voice
- Degrees
- Question tags
- Direct and indirect speech
- Words often confused

V. Applied Grammar

- Articles
- Prepositions
- Tenses
- Verbs
- Correct use of nouns

Pattern of Distribution of Theory Marks

Type of Question	**Number of Questions**	**Marks per Question**	**Total Marks**
Essay Questions	2	20	2 × 20 = 40
Short-Note Questions	5	8	5 × 8 = 40
Total			**80**

Paper 2: SOCIOLOGY & PSYCHOLOGY

Section A: SOCIOLOGY

Course Description

This course introduces the basic sociological concepts, principles and social processes. Social institutions in relation to the individual, family and community, and the various social factors affecting the family in rural and urban communities in India, will be studied.

Syllabus

A. Introduction

Definitions of Sociology; Sociology as a science of society; uses of the study of Sociology; application of the knowledge of Sociology in Physiotherapy.

B. Sociology and Health

Concepts of health and disease; social factors affecting health status; social consciousness and perception of illness; decision-making in treatment.

C. Socialization

Meaning and types of socialization; influence of social factors on personality; socialization in hospitals; socialization in the rehabilitation of patients.

D. Social Groups

Concepts and classification of social groups; influence of formal and informal groups on health and sickness; role of primary and secondary groups in hospital and rehabilitation settings.

E. Family

Meaning and characteristics of family; distinctive features and types of families; basic needs and functions; influence of family on human personality; changes in the functions of a family; effects of sickness on the family; family and psychosomatic diseases.

F. Community

Definition and elements of community; concepts of community; role of rural and urban communities in public health; role of community in determining beliefs, practices and home remedies in treatment.

G. Culture

Meaning, definition and characteristics; material and non-material culture; cultural diffusion; cultural lag; components of culture; impact of culture on human behaviour; culture-induced symptoms and diseases; subculture of medical workers.

H. Caste System

Definition and characteristics; features of the modern caste system and its trends.

I. Race

Biological human stratification; theories of races; classification of races; racism.

J. Social Change

Meaning and factors of social change; human adaptation and social change; social change and stress; social change and health programmes; role of social planning in the improvement of health and rehabilitation.

K. Social Control

Meaning of social control; role of norms, folkways, customs, morals, religion, law and other means of social control in regulating human behaviour.

L. Social Problems of Persons with Disabilities

Consequences of the following social problems in relation to sickness and disability, and remedies to prevent them:

- Population explosion
- Poverty and unemployment
- Beggary
- Juvenile delinquency
- Prostitution
- Alcoholism
- Problems of employed women

M. Geriatric Care: A Sociological Approach

Post-retirement difficulties faced by the geriatric population; mitigation of problems; services provided by governmental agencies and non-governmental organisations such as Age Care India, HelpAge India and homes for senior citizens.

N. Types of Disabilities under the Persons with Disabilities Act, 1995

Special reference to:

- Autism spectrum disorders
- Cerebral palsy

- Four levels of mental retardation
- Multiple disabilities

O. Social Security

Retirement as a social and economic event; social security for civil servants; insurance schemes for the general public; social security for industrial workers under the ESI Act; Workmen's Compensation Act; social legislation relating to persons with disabilities.

P. Social Adjustment and Social Gerontology

Social adjustment; gerontology; ageing; social aspects of ageing; sexual adjustment; economic aspects of ageing; ageing process; health and medical care.

Q. Social Worker

Role of a medical social worker.

R. Social Legislation

Merits and demerits of social legislation.

S. Evaluation

Evaluation of the sociological factors relevant to health, disability and rehabilitation.

Section B: GENERAL PSYCHOLOGY

Course Description

This course will enable the student to understand all the psychological factors that influence health and illness, how people stay healthy, why they become ill and how they respond when they become ill. By learning how the mind and body work together to produce physical and mental health, students can deal effectively with patients during admission, treatment, rehabilitation, recovery and discharge.

Note: Health Psychology has been excluded because it is marked "Not for University Examination" in the syllabus.

Syllabus

A. Introduction to Psychology

1. Definition and nature of Psychology; basic information relating to its methods and branches.

2. **Methods of Psychology:** Introspection, observation, interview, case study and experimental method.
3. **Branches of Psychology:** General, social, abnormal, child, applied, educational, industrial, counselling, clinical, parapsychology and gerontology.

B. Heredity and Environment

Twins; relative importance of heredity and environment; their role in physical characteristics, intelligence and personality; nature-nurture controversy.

C. Growth and Development of Behaviour

- Infancy
- Childhood
- Adolescence
- Adulthood
- Middle age
- Old age

D. Motivation

Definition; drive; incentive; reinforcement; types of motivation; physiological and psychological needs; need theory; Maslow's hierarchy of needs.

E. Emotion

Definition; differentiation of emotions from feelings; physiological changes associated with emotions; role of the reticular activating system, hypothalamus, cerebral cortex, sympathetic nervous system and adrenal glands; James-Lange and Cannon-Bard theories of emotion.

F. Intelligence

Definition and nature of intelligence; mental age; Intelligence Quotient; assessment of intelligence; intelligence tests; Wechsler scales; WISC and WAIS; Bhatia Performance Test; Raven's Progressive Matrices.

G. Personality

1. Definition and components of personality: physical characteristics, character, abilities, temperament, interests and attitudes.
2. Role of heredity, nervous system, physical characteristics, abilities, family and culture in personality development.
3. Approaches to personality:
    - Type approach – Sheldon
    - Trait approach – Cattell and Allport
    - Psychoanalytic approach – Freud
    - Psychosocial approach – Erik Erikson
    - Neo-Freudian approach – Adler and Jung

4. Personality assessment through interviews, rating scales, questionnaires and inventories such as MMPI, CPI, BAI and 16 PF.
5. Projective tests: Rorschach Inkblot Test, Thematic Apperception Test, Children's Apperception Test and Rotter Incomplete Sentences Blank.

H. Learning

1. Definition and nature of learning.
2. Types of learning: classical conditioning, operant conditioning, trial and error, insightful learning and observational learning.
3. Effective ways of learning:
    - Massed versus spaced learning
    - Whole versus part learning
    - Reading versus recitation
    - Rote versus meaningful learning
    - Incidental versus intentional learning
    - Knowledge of results
    - SQ3R method
4. Reinforcement: meaning and types of schedules.
5. Memory: short-term memory, long-term memory and forgetting.

I. Thinking

Definition, types and process of thinking; creative thinking.

J. Frustration

Definition, sources and measurement of frustration; types of conflicts; adaptive and defensive methods of resolving conflicts.

K. Sensation, Attention and Perception

1. Senses: vision, hearing, olfactory, gustatory, cutaneous, movement, equilibrium and visceral senses.
2. Attention and factors determining attention: nature of the stimulus, intensity, colour, change, extensity, repetition, movement, size, curiosity and primary motives.
3. Perception and principles of perception: figure and ground, constancy, similarity, proximity, closure, continuity, values and interests, past experience, context, needs, moods, religion, sex, age and socioeconomic status.
4. Illusions and hallucinations: definitions and types, including visual, auditory and cutaneous.

L. Attitudes

Definition; factors involved in attitude change; measurement of attitudes.

M. Defence Mechanisms

Regression, compensation, projection, identification, repression, rationalization, sublimation, daydreaming, withdrawal and denial.

Pattern of Distribution of Theory Marks: Sociology and Psychology

Section	Subject	Question Type	Number and Marks	Total
A	Sociology	One essay question with one internal choice	1 × 10	10
		Four short-note questions	4 × 5	20
		Five very short-note questions	5 × 2	10
Sociology Total				**40**
B	Psychology	One essay question with one internal choice	1 × 10	10
		Four short-note questions	4 × 5	20
		Five very short-note questions	5 × 2	10
Psychology Total				**40**
Total Marks				**80**

Paper 3: ANATOMY

Course Description

The course is designed to provide students with a working knowledge of those structures of the human body that form an essential foundation for understanding their clinical studies. Studies are concerned with the topographical and functional anatomy of the limbs, thorax and brain. Particular attention is paid to the muscles, bones and joints of the regions. The abdomen, pelvis, perineum, head and neck are to be studied with particular reference to topics of importance to physiotherapists.

Syllabus

I. General Anatomy

A. Introduction to Anatomy

Definition; anatomical position; anatomical planes; common anatomical terms; various methods of studying anatomy, including gross, systemic and radiological anatomy; subdivisions of anatomy, including muscular, skeletal and cardiovascular anatomy.

B. Introduction to Osteology

Definition of bone; classification of bones; parts of a long bone; blood supply of a long bone; laws of ossification; epiphysis and its types; clinical applications.

C. Introduction to Myology

Definition; types and classification of muscles based on shape, location and function; swing, shunt and spin muscles; innervation of a muscle; motor unit; neuromuscular junction.

D. Introduction to Arthrology

Definition and classification of joints with examples; lever systems of the body; description of a synovial joint; synovial fluid; bursae; menisci; clinical applications.

E. Introduction to Neuroanatomy

Classification of the nervous system; parts of a neuron and their functions; types of neurons; afferent and efferent nerves; components of a reflex arc; spinal segments; formation of a plexus; motor, sensory and mixed peripheral nerves; effects of injury.

F. Introduction to the Cardiovascular System

Arteries and their classification; end arteries; collateral circulation; veins; sinusoids; arteriovenous anastomoses; components of the lymphatic system, including lymph capillaries and lymph nodes; circulation of lymph.

II. Histology

A. General Histology

1. Microscope: parts and types, with their uses in understanding different levels of structural detail.
2. Cell components and their functions, including ultrastructural details.
3. Classification and functions of basic tissues: epithelial, connective, muscular and nervous tissues.
4. Epithelial tissue, including glandular epithelium: definition, classification, examples and functions.
5. Connective tissue: components and classification with examples; deep fascia, tendons, ligaments and aponeuroses. Cartilage: types, structure, location and functions. Bone: primary and secondary bone, lamellar and compact bone, growth and development, influencing factors, types of ossification and clinical importance.
6. Muscular tissue: classification and detailed structure of cardiac and skeletal muscles, including sarcomeres and intercalated discs.
7. Nervous tissue: unipolar, bipolar and multipolar neurons; longitudinal section of a peripheral nerve; axon, myelin sheath and nodes of Ranvier; transverse section and coverings of a peripheral nerve—epineurium, perineurium and endoneurium.
8. Circulatory system: transverse sections of large arteries, medium-sized arteries and large veins.
9. Lymphoid tissue: lymph node, tonsil, thymus and spleen.
10. Skin and its appendages; flexion creases and Langer's lines.

B. Systemic Histology

1. Respiratory system: trachea and lung.
2. Nervous system:
    - Spinal cord at cervical, thoracic and lumbar levels
    - Cerebrum
    - Cerebellum

III. Genetics

1. Introduction to human genetics: mitosis, meiosis and Mendel's laws.
2. Cytogenetics: karyotype, karyotyping and Barr body.
3. Modes of inheritance: autosomal dominant and recessive inheritance, Y-linked inheritance, X-linked dominant and recessive inheritance, and pedigree charting.
4. Medical genetics: structural chromosomal aberrations, including deletion, duplication and translocation; numerical abnormalities, including Down, Turner and Klinefelter syndromes.
5. Clinical genetics: prenatal diagnosis and genetic counselling.
6. Recent advances: gene therapy and stem-cell therapy.

IV. Embryology

1. Ovum, spermatozoa, fertilization, and formation and derivatives of the germ layers.
2. Development of the skin, fascia, blood vessels and lymphatics.
3. Development of pharyngeal arches and their derivatives.
4. Development of the heart and major vessels, including the aorta, superior vena cava, inferior vena cava, axillary, femoral and carotid vessels.
5. Development of the respiratory system.
6. Development of bones, axial and appendicular skeleton, and muscles.
7. Development of the nervous system: neural tube, brain vesicles, spinal cord, formation of grey and white matter, tracts, myelination and neural-tube defects.

V. Regional Anatomy

1. Upper Limb

Osteology

Clavicle, scapula, humerus, radius, ulna and articulated hand.

Soft Parts

Breast, pectoral region, axilla, front and back of the arm, cubital fossa, front and back of the forearm, palm, dorsum of the hand, muscles, nerves, blood vessels and lymphatic drainage of the upper extremity.

Joints

Shoulder girdle, shoulder joint, elbow joints, radioulnar joints, wrist joint and joints of the hand.

Applied Anatomy

Erb's and Klumpke's paralysis, wrist drop, carpal tunnel syndrome, claw hand and winging of the scapula.

Additional Study

Surface anatomy and X-rays.

2. Lower Limb

Osteology

Hip bone, femur, tibia, fibula, patella and articulated foot.

Soft Parts

Gluteal region; front and back of the thigh; femoral triangle; femoral canal and inguinal canal; medial side of the thigh; adductor canal; popliteal fossa; anterior and posterior compartments of the leg; sole and dorsum of the foot; lymphatic and venous drainage; blood supply; arches of the foot.

Joints

Hip joint, knee joint, ankle joint and joints of the foot.

Applied Anatomy

Femoral sheath, femoral canal, sciatic nerve and its branches, obturator nerve, foot drop, varicose veins and various joints.

Additional Study

Surface anatomy and X-rays.

3. Thorax

Osteology

Thoracic vertebrae, sternum, ribs and joints.

Soft Parts

Intercostal and accessory muscles of respiration: origin, insertion, nerve supply and action. Diaphragm: origin, insertion, nerve supply, action and openings. Intercostal spaces, nerves and vessels; movements of respiration.

Cardiovascular System

Mediastinum and its divisions and contents; pericardium; thoracic wall; position, shape and parts of the heart; conducting system; blood supply and nerve supply of the heart.

Respiratory System

Outline of the respiratory passages; pleura and lungs—their positions, parts, relations, blood supply and nerve supply; bronchopulmonary segments.

Other Structures

Azygos vein, oesophagus, trachea and thoracic duct.

Additional Study

Surface anatomy and X-rays.

4. Abdomen and Pelvis

Osteology

Lumbar vertebrae, male and female pelvis, sacrum and joints.

Soft Parts

Anterior abdominal wall, rectus sheath, external genitalia and inguinal canal.

Organs

Stomach, small intestine, large intestine, liver, pancreas, spleen, urinary system, suprarenal glands, male and female reproductive systems, and supports of the uterus.

Perineum

Male and female perineum; superficial and deep perineal pouches; ischiorectal fossa; pelvic diaphragm.

Applied Anatomy

Reproductive system and perineum in parturition and family planning.

5. Back

Osteology

Vertebral column, curvatures, intervertebral discs and movements.

Soft Parts

Muscles of the back and thoracolumbar fascia.

Nervous System

Spinal cord, meninges, tracts and blood supply.

Applied Anatomy

Posture and gait; line of gravity; centre of gravity; abnormal curvatures; prolapse of the intervertebral disc; lumbar puncture.

Additional Study

Surface anatomy and X-rays.

6. Head, Face and Neck

Osteology

Articulated skull and mandible, cervical vertebrae, foetal skull and joints.

Soft Parts

Scalp, face, fascia of the neck, triangles of the neck, muscles of the neck, cranial cavity, dural venous sinuses, meninges, cranial nerves, extraocular muscles of the eyeball and muscles of mastication.

Glands and Other Structures

- Thyroid, parotid and submandibular glands
- Oral cavity, tongue, teeth and tonsils
- Nasal cavity and paranasal sinuses
- Ear, larynx, pharynx, palate, trachea and oesophagus
- Surface anatomy and X-rays

7. Brain

1. Meninges, surfaces and parts of the cerebrum, cerebellum and brainstem.
2. Medulla: gross and sectional anatomy, with special attention to motor and sensory tracts and cardiac and respiratory centres.
3. Pons: gross and sectional anatomy.
4. Midbrain: gross and sectional anatomy.
5. Cerebellum: lobes, fissures and cerebellar peduncles.
6. Cerebrum: sulci, gyri and functional areas.
7. Thalamus, hypothalamus, basal ganglia, limbic system and reticular formation.
8. Tracts: pyramidal and extrapyramidal tracts, optic pathway, auditory pathway and gustatory pathway.
9. Blood supply, ventricular system of the brain and cerebrospinal fluid.
10. Cranial nerves: location of nuclei, course, termination and effects of injuries at different levels.
11. Applied anatomy: hemiplegia, internal capsule, medial and lateral medullary syndromes, etc.

8. Endocrine Glands

Position, shape, size, function, blood supply and nerve supply of the hypothalamus, pituitary gland, thyroid glands, parathyroid glands, adrenal glands, pancreatic islets, ovaries, testes, pineal gland and thymus.

Pattern of Distribution of Theory Marks

Area	Marks
General Anatomy, General Embryology, Histology and Genetics	5
Upper Limb	15
Lower Limb	15
Thorax	10
Head and Neck	10
Abdomen and Pelvis	5
Brain and Endocrine Glands	15
Back	5
Total	**80**

Distribution of Practical Marks

Component	Distribution	Marks
Spotters	15 spotters × 2 marks	30
Discussion	Limbs: identification of structures as questioned by the examiner; 2 × 5 marks	10
Total Practical Marks		**40**

Distribution of Anatomy Spotters

Region	Number of Spotters
Upper Limb	2
Lower Limb	2
Abdomen	2
Thorax	2
Head and Neck	2
Brain	2
Osteology	3
Total	**15**

Viva Voce and Record

Component	Marks
Viva – Soft Parts	10
Viva – Radiology	10
Viva – Osteology	10
Record	10
Total	**40**

Record Requirements:

- General Anatomy, Histology and Genetics: 10 diagrams
- Regional Anatomy: 20 diagrams

Paper 4: PHYSIOLOGY

Course Description

This course, which runs concurrently with the Anatomy course, helps students understand the basis of normal human physiology, with special emphasis on the functioning of the cardiovascular, respiratory, musculoskeletal and nervous systems.

Syllabus

Abbreviations: E – Essay; S – Short-note question; VS – Very short-note question.

A. Cell – VS

Outline of the basic concepts of cell structure; functions of cellular components; transport across membranes.

B. Skin – S/VS

Structure; functions; blood flow; temperature regulation.

C. Blood – E/S/VS

1. Components of blood and their functions: RBCs, WBCs and platelets.
2. Blood groups.
3. Significance of RBC and WBC counts, ESR and related tests.
4. Clotting mechanisms.
5. Blood volume and its regulation.

D. Nerve-Muscle Physiology – E/S/VS

1. Gross and microscopic structure of muscle tissue; arrangement of myofibrils; myoneural junction.
2. Chemical processes involved in muscle contraction.
3. Physiology of muscle contraction; simple muscle twitch; quantal summation; wave summation; treppe; tetany; effects of temperature changes; all-or-none law; fatigue; isotonic, isometric and isokinetic contractions.

E. Circulation – E/S/VS

Structure and properties of cardiac muscle; cardiac cycle.

1. ECG, heart sounds and cardiac output.
2. Factors regulating the action of the heart.
3. Blood pressure—maintenance and regulation.
4. Cerebral, renal and pulmonary circulation.
5. Effects of exercise and postural changes.
6. Lymph and factors affecting lymph flow.

F. Respiration – E/S/VS

1. Defence mechanisms in the respiratory tract; mucociliary transport; mechanics of respiration.
2. Transport of blood gases; acid-base balance.
3. Lung-function tests, including lung volumes; artificial ventilation.
4. Nervous and chemical regulation of respiration.
5. Hypoxia—types and causes.
6. Effects of exercise on respiration.

G. Exercise Physiology – E/S/VS

1. Exercise metabolism; oxygen debt; respiratory quotient.
2. Development of endurance; factors affecting endurance and muscle strength; factors affecting general and cardiorespiratory endurance; aerobic and anaerobic work; efficiency of muscular activity; aerobic versus anaerobic activity in relation to speed, work, load, fatigue, diet and obesity.
3. Age and exercise; age-related changes in muscle function, cardiovascular system, pulmonary function, physical work capacity and nervous system.
4. Environment and exercise; adaptation to heat and cold; exercise in heat and cold; human limitations in heat; acclimatization to heat; exercise at high altitudes.

H. Digestion – S/VS

1. Digestion in the mouth, stomach and intestine.
2. Gastric juice, bile, pancreatic juice and intestinal juice.
3. Mechanisms controlling secretions and motility.
4. Diet and nutrition.

I. Excretion – S/VS

1. Structure of the nephron.
2. Formation of urine.
3. Micturition.

J. Endocrines – S/VS

Outline of the various hormones and their actions, with special emphasis on thyroid and parathyroid hormones.

K. Reproduction – S/VS

1. Male reproductive system.
2. Female reproductive system.
3. Outline of pregnancy, functions of the placenta, parturition, lactation and contraceptive measures.
4. Physiology of the foetus and factors affecting foetal growth.

L. Nervous System – E/S/VS

1. Introduction to the nervous system.
2. Neural tissue:
    - Neuron
    - Neuroglia
3. Classification of nerve fibres.
4. Properties of nerve fibres.
5. Degeneration and regeneration of nerve fibres.
6. Receptors.
7. Synapse.
8. Neurotransmitters.
9. Reflex activity.
10. Spinal cord.
11. Ascending and descending pathways in the spinal cord.
12. Physiology of pain.
13. Brainstem.
14. Thalamus.
15. Internal capsule.
16. Hypothalamus.
17. Basal ganglia.
18. Cerebral cortex.
19. Limbic system.
20. Reticular formation.
21. Proprioceptors.
22. Muscle tone, posture and equilibrium.
23. Vestibular apparatus.
24. Cerebrospinal fluid.
25. Autonomic nervous system.

M. Special Senses – VS

Vision, audition, olfaction, gustation and vestibular apparatus.

Practical Demonstrations

A. Haematology

1. Demonstration of packed-cell volume.

2. Estimation of haemoglobin by Sahli's method.
3. Determination of total RBC count.
4. Determination of total WBC count.
5. Determination of differential leucocyte count.
6. Determination of blood groups.
7. Determination of bleeding time and clotting time.
8. Determination of ESR.

B. Human Experiments

1. Recording of systemic arterial blood pressure and the effect of exercise on BP.
2. Demonstration of vital-capacity measurement and peak expiratory flow rate.
3. Clinical examination of the cardiovascular system, including arterial pulse.
4. Clinical examination of the sensory nervous system.
5. Clinical examination of the motor nervous system and reflexes.
6. Examination of light reflexes and hearing.
7. Clinical examination of cranial nerves.
8. Clinical examination of colour vision and visual acuity.

Pattern of Distribution of Theory Marks

Type of Question	Number of Questions	Marks per Question	Total Marks
Essay Questions with Internal Choice	2	10	2 × 10 = 20
Short-Note Questions	8	5	8 × 5 = 40
Very Short-Note Questions	10	2	10 × 2 = 20
Total			**80**

Distribution of Practical Marks

Component	Marks
Major Practical	15
Minor Practical	5
Spotters	20
Viva Voce	30
Record	10
Total University Practical Examination	**80**
Practical Internal Assessment	20
Grand Total	**100**

Major Practical – 15 Marks

1. RBC count.
2. WBC count.
3. Recording of arterial blood pressure and the effect of exercise.
4. Clinical examination of the sensory nervous system.
5. Clinical examination of the motor nervous system.

Minor Practical – 5 Marks

1. Clinical examination of reflexes—either two superficial or two deep reflexes.
2. Hearing tests.
3. Pupillary reflexes.

Spotters – 20 Marks

Ten spotters × 2 marks each

1. Focusing on one WBC and identification.
2. Identification of photographs of endocrine disturbances.
3. PCV.
4. ESR.
5. Ishihara charts.
6. Snellen's chart.
7. Neubauer's counting chamber.
8. Knee hammer.
9. Peak expiratory flow meter.
10. Theory charts.

Paper 5: BIOCHEMISTRY

Abbreviations: E – Essay; S – Short-note question; VS – Very short-note question.

Students need not know the details of structures, formulae, individual chemical reactions and their mechanisms.

1. Nutrition – E/S/VS

1. Importance of nutrition.
2. Calorimetry: energy values, calorimeters, respiratory quotient and its significance, and specific dynamic action of food.
3. Basal metabolic rate: definition, normal values, factors affecting BMR, food and energy expenditure for various activities.
4. Nutritional aspects of carbohydrates, fats and fibres.
5. Nutritional aspects of proteins: essential and non-essential amino acids, chemical score, digestibility coefficient, biological value, net protein utilization, nutritional classification of proteins into complete and incomplete proteins, nitrogen balance and its significance.
6. Composition of food, balanced diet, dietary recommendations and nutritional supplementation.
7. Protein-energy malnutrition, kwashiorkor and marasmus.

2. Carbohydrates – E/S/VS

1. Definition, chemistry and classification; common carbohydrates, their sources and composition.
2. Digestion and absorption of carbohydrates.
3. Glycolysis: aerobic and anaerobic glycolysis, energetics, regulation, Cori cycle and gluconeogenesis.
4. Citric-acid cycle and its energetics.
5. Glycogenesis, glycogenolysis and their regulation; role of liver and muscle glycogen.
6. Hormonal regulation of blood-sugar levels.
7. Metabolic disorders of glycogen, lactose intolerance and diabetes mellitus.

3. Lipids – E/S/VS

1. Definition and classification of lipids; classification of fatty acids; examples and functions of common lipids; essential fatty acids and their importance.
2. Classification, sources and functions of lipoproteins.
3. Digestion and absorption of lipids.
4. Beta-oxidation, energetics and regulation.
5. Fatty-acid biosynthesis, energetics and regulation.
6. Fat metabolism in adipose tissue; lipoprotein lipase and hormone-sensitive lipase.
7. Ketone-body formation and utilization.
8. Cholesterol and its importance; common hyperlipoproteinaemias.

4. Proteins – E/S/VS

1. Definition of proteins and amino acids; classification of amino acids and proteins; essential amino acids; functions of amino acids and proteins.
2. Enzymes: definition, coenzymes, factors affecting enzyme activity, regulation of enzyme activity, enzyme inhibition, isoenzymes and clinical significance.
3. Digestion and absorption of proteins.
4. Transamination, deamination and the urea cycle.
5. Specialized products produced from phenylalanine, tyrosine, tryptophan, arginine, glycine and methionine.

5. Genetics – S/VS

Nucleic acids; functions of DNA and RNA; differences between DNA and RNA; genetic code.

6. Vitamins – E/S/VS

1. Definition and classification according to solubility.
2. Individual vitamins: sources, coenzyme forms, functions, recommended dietary allowance, digestion, absorption, transport, deficiency and toxicity.

7. Trace Minerals – S/VS

1. Individual minerals: calcium, phosphate, iron, magnesium, fluoride, selenium, molybdenum, copper and zinc—their sources, recommended dietary allowance, digestion, absorption, transport, excretion, functions and disorders.
2. Phosphate, calcium and iron in detail.

8. Muscle Contraction – S/VS

Contractile elements in muscle and the process of muscle contraction.

9. Connective Tissue – S/VS

Biochemistry of connective tissue, collagen, glycoproteins and proteoglycans.

10. Cell Biology – S/VS

Cell-membrane structure; mechanism of transport across the cell membrane; intracellular organelles and their functions; brief study of the cytoskeleton.

11. Hormone Action – S/VS

Classification of hormones and mechanisms of hormone action:

1. Receptors, signal transduction and second messengers, including calcium, cAMP and inositol phosphates, and their roles in cellular function.
2. Neurotransmitters.

12. Acid-Base Balance, Water and Electrolytes – S/VS

1. Body water, osmolarity, extracellular and intracellular sodium and potassium, regulation of water and electrolyte balance, buffers, pH and blood-buffer systems.
2. Role of the lungs and kidneys in acid-base balance.

13. Clinical Biochemistry – S/VS

1. Relevance of blood levels of glucose, urea, calcium, phosphates, pH, bicarbonate, enzymes, lipids and lipoproteins.
2. Urinary levels of sugar, creatinine and proteins.
3. Competitive inhibitors and clinically important enzymes.
4. Liver-function tests.
5. Renal-function tests.

Pattern of Distribution of Theory Marks

Type of Question	Number of Questions	Marks per Question	Total Marks
Essay Questions with Internal Choice	2	10	2 × 10 = 20
Short-Note Questions	8	5	8 × 5 = 40
Very Short-Note Questions	10	2	10 × 2 = 20
Total			**80**