List of Ph.D. Course work subjects that can be offered under Anatomy Group from 2026

Anatomy							
Group I		Group II		Group III		Group IV	
Subject Code	Name of the subject	Subject Code	Name of the subject	Subject Code	Name of the subject	Subject Code	Name of the subject
PHAN101	Gross Anatomy	**PHAN201**	Clinical Anatomy	**PHAN301**	Anthropometry	**PHAN401**	Osteology
PHAN102	-	**PHAN202**	Radiological Anatomy				
PHAN103	Biostatistics	**PHAN203**	Neuro-Science				

PHAN101 GROSS ANATOMY

SUPERIOR EXTREMITY

Mammary gland, Axilla, Brachial plexus, Cubital fossa, Shoulder joint, Elbow joint, Wrist Joint, Fascial spaces of hand, Radiocarpal joint.

INFERIOR EXTREMITY

Femoral triangle, Adductor canal, Gluteal region, popliteal fossa, Arches of foot, Hip joint, Knee joint, Ankle joint.

THORAX

Pleura and lung, Pericardium, Heart, Blood supply of heart, Mediastinum, Azygous system of vein.

ABDOMEN & PELVIS

Inguinal canal, Male external genitalia, Peritoneum, Stomach, Small and large intestine,Aorta and its branches, Extrahepatic biliary apparatus, caecum and appendix, Rectum and anal canal, spleen , liver, kidney, ureter, urinary bladder, urethra, Suprarenal gland, Diaphragm, Perineum, Ischiorectal fossa, Prostate, Uterus and vagina, Ovaries, Lumbar sympathetic trunk and ganglia.

HEAD , NECK AND FACE

Scalp, Triangles of neck, cranial cavity and dural venous sinuses, orbit, parotid region, infratemporal region, muscles of mastication and mandibular nerve, temporomandibular joint, facial nerve, submandibular gland, thyroid gland, tongue, pharynx and palate, palatine tonsil, paranasal sinuses, larynx, eyeball,cranial nerves, Cervical part of sympathetic trunk and ganglia.

NEUROANATOMY

Meninges and CSF, Blood vessels of brain, spinal cord, cerebrum , cerebellum, brain stem, ventricles of brain, basal nuclei, reticular formation, thalamus , hypothalamus, limbic system, autonomic nervous system.

REFERENCE BOOKS:

1. Gray's Anatomy – latest edition
2. Cunningham's Manual of Practical Anatomy – Latest editions of vol. I, II, III
3. A K Datta Essentials of Human Anatomy– latest editions part 1, 2 & 3

PHAN103: RESEARCH METHODOLOGY & BIOSTATISTICS

Chapter: 1

Introduction to Research Methodology

Study objectives

Review of literature

Developing the conceptual framework

Chapter: 2

Research problem

Ethical issues

Formulating the hypothesis

Selecting research design

Chapter: 3

Biostatistics

Binomial Distribution

Normal Distribution

Parametric Tests

Chapter: 4

Non-Parametric Tests

Parametric vs Non-Parametric Tests

Sample Size Determination

Sampling Techniques

Chapter: 5

Systematic Review and Meta-Analysis

Test of Significance – Chi-Square Test

Data analysis and interpretation of data

Dissemination of research findings

PHAN201 CLINICAL ANATOMY

1. **Upper limb**
   mammary gland, brachial plexus, fascial spaces of palm

2. **Lower limb**
   Sciatic nerve, gluteal region, Hamstrings, arches of foot

3. **Thorax**
   Blood supply of heart, mediastinum, Bronchopulmonary segments, Splanchnic nerves

4. **Abdomen & Pelvis**
   Lumbar sympathetic trunk & relevant clinical anatomy, Lumbosacral plexus, Uterus, Rectumanal canal, Urinary bladder & urethra

5. **Head & neck**
   Thyroid gland, dural venous sinuses, Salivary glands, Infratemporal fossa & contents, parasympathetic ganglia

6. **Brain**
   Blood supply, Functional areas of cerebral cortex, Spinal cord, CSF Circulation, Coverings of brain

7. Relevent Radiological investigations

8. Recent advances in anatomy

Reference Books:

1. Gray's Anatomy – latest edition
2. Regional & Applied Anatomy – R. J. Last
3. Clinical Anatomy for Medical Students – Richard Snell
4. Synopsis of Surgical Anatomy – MeGregor
5. Clinically oriented anatomy – Keith Moore
6. Clinical Neuroanatomy – Snell

PHAN202: RADIOLOGICAL ANATOMY

1. Introduction to Radiology: History and evolution of radiology, overview of imaging modalities (X-ray, CT, MRI, Ultrasound, Nuclear Medicine).
2. Principles of Image Formation: X-ray production and attenuation, CT image reconstruction, MRI principles of magnetic resonance, ultrasound mechanisms.
3. Radiological Terminology and Anatomical Planes: Anatomical planes (axial, coronal, sagittal), radiological terminology used in cross-sectional imaging.
4. Radiation Safety and Protection: Biological effects of radiation, ALARA principles, radiation shielding, contrast media types and uses.
5. X-ray Radiography: Radiographic anatomy of chest, abdomen, and skeleton, normal vs. pathological findings.
6. Computed Tomography (CT): Spiral and multi-slice CT technology, image acquisition protocols, CT windowing for bone, soft tissue, and lung.
7. Magnetic Resonance Imaging (MRI): T1, T2, and FLAIR sequences, high-resolution imaging for soft tissues, MRI for functional and anatomical analysis.
8. Ultrasound Imaging: Identification of major organs and vasculature, Doppler principles, applications in abdominal and pelvic imaging.
9. Specialized Imaging Techniques: PET-CT principles, digital subtraction angiography (DSA), applications of advanced imaging.
10. Musculoskeletal System: Radiological anatomy of long bones, joints, spine, common fractures, and age-related changes.
11. Cardiovascular System: Chest X-ray and CT anatomy, mediastinal anatomy, imaging of the heart and great vessels.
12. Respiratory System: Normal lung fields on X-ray and CT, bronchial tree, and pulmonary vasculature.
13. Abdomen and Pelvis: Radiological anatomy of liver, spleen, kidneys, pancreas, and pelvic organs, cross-sectional imaging of the abdomen and pelvis.
14. Head and Neck: Skull and brain imaging, paranasal sinuses, orbital anatomy, cranial nerve imaging.
15. Bony Anatomy of the Pelvic Region: Pelvic girdle landmarks, sacroiliac joints, sexual dimorphism, pelvimetry.
16. Soft Tissue Anatomy of the Pelvic Region: Pelvic floor muscles (levator ani, coccygeus), bladder, uterus, rectum imaging.

17. Vascular and Lymphatic Systems of the Pelvic Region: Pelvic arterial and venous anatomy, lymphatic drainage patterns.
18. Pathological Correlations in the Pelvic Region: Degenerative changes in bones, pelvic floor dysfunction imaging findings.
19. CT Imaging: Cross-sectional anatomy of thorax, abdomen, pelvis, multiplanar reconstructions, Hounsfield units.
20. MRI Applications: Functional MRI, soft tissue imaging in detailed anatomical studies, advanced sequences.
21. Advanced Post-Processing Techniques: Volume rendering, surface reconstruction, quantitative morphometric analysis.
22. Imaging Protocols for Morphometric Studies: Standardization of imaging parameters, techniques for thickness and angle measurements.
23. Case Studies and Practical Applications: Normal and pathological variants, examples from pelvic and musculoskeletal studies.
24. Emerging Trends in Radiology: Artificial intelligence in radiological diagnostics, integration of imaging in surgical planning.

PHAN203: NEURO-SCIENCE

1. **Introduction**

Neuroscience is the scientific study of the nervous system, encompassing its structure, function, development, genetics, biochemistry, physiology, pharmacology, and pathology. It is an interdisciplinary science that bridges the gap between biology, medicine, psychology, and even computer science and engineering through fields like neuroinformatics and artificial intelligence.

2. **Brain – Parts and Functions**

The human brain is the command center of the nervous system, responsible for processing sensory input, controlling bodily functions, generating thoughts, emotions, memory, and facilitating behavior. Weighing about 1.4 kg, it is composed of approximately 86 billion neurons, supported by glial cells. Structurally and functionally, the brain is divided into various regions**,** each with specialized roles.

3**. Midbrain – Anatomy, Histology & Physiology**

The midbrain**, or** mesencephalon, is the uppermost portion of the brainstem, located between the pons and the diencephalon (thalamus and hypothalamus). Although relatively small in size, it plays a crucial role in motor control**,** sensory processing**,** visual and auditory reflexes, and regulation of consciousness and alertness**.**

4. **Parkinson's Disease (PD) – History & Pathology**

Parkinson's disease (PD) is a progressive neurodegenerative disorder that primarily affects movement but can also involve cognitive and emotional disturbances in later stages. It is one of the most common disorders of the basal ganglia, second only to Alzheimer's disease in prevalence among neurodegenerative conditions.

5. MPTP – A Neurotoxin Linked to Parkinsonism

MPTP (1-methyl-4-phenyl-1,2,3,6-tetrahydropyridine) is a powerful neurotoxin that selectively destroys dopaminergic neurons in the brain, particularly in the substantia nigra pars compacta. Its discovery significantly advanced our understanding of Parkinson's disease (PD) pathogenesis and led to the development of animal models mimicking human PD.

6. Animal Models of MPTP in Parkinson's disease Research

MPTP (1-methyl-4-phenyl-1,2,3,6-tetrahydropyridine) is a neurotoxin widely used to induce Parkinsonian symptoms in animal models. Since its accidental discovery in the 1980s, MPTP has become one of the most valuable tools for modeling Parkinson's disease (PD) in vivo, enabling researchers to study dopaminergic neurodegeneration, test new therapies, and explore disease mechanisms. Mechanism in Animal Models MPTP crosses the blood-brain barrier and is metabolized by monoamine oxidase-B (MAO-B) in astrocytes into MPP^+ (1-methyl-4-phenylpyridinium). MPP^+ is selectively taken up by dopamine transporters (DAT) into dopaminergic neurons, where it accumulates in mitochondria and inhibits complex I of the electron transport chain. This leads to ATP depletion, oxidative stress, and neuronal death in the substantia nigra pars compacta—a hallmark of PD.

7. Mucuna pruriens – A Natural Source of L-DOPA

Mucuna pruriens, also known as velvet bean, is a tropical leguminous plant traditionally used in Ayurvedic medicine for various ailments. It has gained significant scientific interest for its high content of L-DOPA (levodopa), the precursor of dopamine—a neurotransmitter critically deficient in Parkinson's disease (PD).

8. Convolvulus pluricaulis – A Traditional Nootropic Herb

Convolvulus pluricaulis, commonly known as Shankhpushpi, is a revered medicinal herb in Ayurveda, recognized for its potent nootropic (cognitive-enhancing), anxiolytic, and neuroprotective properties. Traditionally used to enhance memory and mental health, it is now gaining scientific attention for its role in neurological and psychiatric disorders, including anxiety, depression, and neurodegenerative conditions.

PHAN301: ANTHROPOMETRY

Somatometry

Introduction, somatometric techniques, somatometric landmarks on body, hands & feet, ear, somatometric measurements on body, hands & feet, head & face, girth of body, somatoscopy – body posture, shapes of fingers & hands, hair form, the eye & eyefolds, nose, membranous lips, breadth of mouth, external ear, somatoscopic techniques.

Osteometry

views & measurements of Axial & appendicular skeleton, Estimation of stature from long bones.

Craniometry

Determination of sex & age, ageing, craniometric landmarks & measurements, craniographic techniques, cranioscopy- different shapes of skull

Lists of plates

Anthropometric rod, rod compass, head height needle, spreading caliper, pelvimeter, sliding caliper, palatometer.

Reference Books:

1. “Anthropometry” by Indera P Singh, M K Bhasin.
2. “Handbook of Anthropometry: Physical measures of human form in health & disease” edited by Victor R Preedy.

PHAN401: OSTEOLOGY

1. Skull & cranial bones
2. Vertebral column & Thoracic cage
3. Bones of upper limb
4. Bones of Lower limb
5. Bones of pelvis
6. Sex determination
7. Medicolegal importance of bones
8. Applied osteology

REFERENCE BOOKS:

1. Gray's Anatomy – latest edition
2. "The Human Skeleton" by Donald J Ortner
3. "Osteology" by Timothy D
4. "Anthropometry" by Indera P Singh, M K Bhasin.