Mangalore University

MSc Medical Physics

MPS 404: Human Anatomy and Physiology

Teaching hours: Each Unit – 12 h

Objective:

To acquaint the students about the structure and function of different kinds of cells, tissues, organs; and important systems such as circulatory, digestive, respiratory, endocrine, reproduction and nervous systems in human body from the point of view of radio diagnosis and radiation therapy.

Course Outcomes:

- Students will acquaint with basic knowledge of cells, tissues, different kinds of bones and muscular systems; and understand surface anatomy.
- They will learn all important aspects of circulatory and digestive system.
- They will understand respiratory and endocrine systems.
- They will learn about reproduction and nervous system.
- They will also learn anatomy and physiology applied to radio diagnosis and radiotherapy.
- They will be able to identify different organs/structures using X-rays, CT and other images.

Unit 1: Surface anatomy

Cells, structure and functions, germ cells, pre-natal development – The tissues – the systems skin, cartilage and bone – Bacteria –Inflammation – Injection – ulceration – neoplasma, bones – the skeleton – joints– The skeletal system – the skull – vertebral column, thorax Upper Extremity, Lower Extremity etc. – the muscular system -the thoracic cage – the media sternum, the diaphragm the abdominal cavity and abdominal regions –anatomy of the heart. Superior Extremities, Inferior Extremities, Ossification centers, Bone of Upper Limb, Radius and ulna, surface marker of Thorax, Abdomen, Head and Neck.

Unit 2: Circulatory system and Digestive system

Functions of mouth, tongue, teeth, esophagus, Salivary Glands, stomach, small intestine, Duodenum, large intestine, Jejunum, Ileum Pancreas, Liver, Biliary System.– digestion and

assimilation of carbohydrates – Fats and proteins – Gastric juice – Pancreatic juice – Function of liver and spleen. Blood and circulatory system, Blood and its composition, RBC and WBC– blood grouping – coagulation of blood, Plasma, artery, vein, capillaries and heart structure and functions – Physiological properties of heart muscle, cardiac dynamics – EEG – blood pressure and its regulation.

Unit 3: Respiratory & Endocrine system

Physical laws of respiration – Nose, Pharynx, Bronchi - Trachea – Lungs and its functions – oxygen transport –Physiology of Respiration – Lung Volume and capacity, control, gas exchange. Pituitary glands and its functions – functions of adrenal, thyroid, and pancreas etc - secretion – chemistry – physiological actions, effects on removal effect on removal effect on administration, hormonal assay detailed molecular mechanism of hormone action – Insulin.

Unit 4: Reproduction system & Nervous system

(a). Male: Reproductive System – Testis, Functions, ducts, Male infertility. (b) Female Reproductive System: Ovaries, Fallopian Tube, Vagina, Breast, reproductive Cycle, Menstruation, Maturation, Fertilization. Brain and spinal cord – its functions - central nervous system and Autonomic Nervous system functions – Physiology of special senses of hearing, taste vision.

Kidney and its functions – Formation and Excretion of Urine, Ureter, Urinary Bladder, Urethra, Micturation.Skin - Eye - Ear - Nose - Tongue.

Unit 5: Radiographic anatomy and diseases

Anatomy and physiology as applied to radio diagnosis and radiotherapy –X-ray anatomy – CT/MRI anatomy-surface anatomy applied to Radio-diagnosis (RD) and Radio therapy (RT) –introduction to the nature of diseases and trauma-inflammation and infection. Anatomy and Physiology as applied to radio diagnosis and radiotherapy –Radiographic anatomy (including cross sectional anatomy) – identify the different organs/structures on plain X-rays, CT scans and other available imaging modalities. Normal anatomy and deviation for abnormalities.

Reference Books:

1. C.H. Best and N.B. Taylor, A Test in Applied Physiology, Williams and Wilkins Company, Baltimore, 1986.
2. C.K. Warrick, Anatomy and Physiology for Radiographers, Oxford University Press, 1988.
3. J.R. Brobek, Physiological Basis of Medical Practice, Williams and Wilkins, London, 1995

4. Tortora, Gerard, –Principles of anatomy and physiology|, John Wiley & Sons Inc., New York, 2000.
5. Ross and Wilson, –Anatomy and Physiology|, Churchill Livingstone; 2005.

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