



YENEPOYA UNIVERSITY

Deralakatte, Mangaluru -575018

REGULATIONS AND CURRICULUM GOVERNING

POSTGRADUATE PROGRAM

M.Sc. IN MEDICAL ANATOMY

(CURRICULUM - EFFECTIVE FROM 2010-11)

ATTESTED

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Ref: No. YU/REG/ACA/3-ACM/2009

31.10.2009

NOTIFICATION

Sub: Starting of M.Sc. in pre & para clinical departments

Ref: Resolution of the Academic Council at its 3rd meeting held on 31.10.2009
vide agenda - 3

The Academic Council at its 3rd meeting and subsequently the Board of Management at its 9th meeting held on 31.10.2009 have resolved to approve the proposal to start following M.Sc. in pre & para clinical departments:-

1. M.Sc Medical Anatomy
2. M.Sc Medical Physiology
3. M.Sc Medical Biochemistry
4. M.Sc Medical Pharmacology
5. M.Sc Medical Microbiology

This notification is issued for implementation with effect from the academic year 2010-2011.

To:
The Principal - YMC

Copy to:

1. Controller of Examinations
2. File copy


I/c REGISTRAR
Registrar
YENEPOYA
(Deemed to be University)

I. Objectives of the Course:

Candidates on completion of this course are expected to fulfill the following objectives (outcomes):

A. Knowledge (cognitive abilities)

The candidate is expected to gain a full range of cognitive abilities (familiarize, understand, retain, analyze, criticize, etc) in the following subjects.

B. Skills:

Candidates are expected to be able to demonstrate with professional competence of the following mental and manual skills.

1. Mastering a wide range of anatomical skills. – Human cadaveric dissection
2. Design a research protocol
3. Statistical analysis of the results
4. Applications of an understanding basic and clinical sciences as a basis for clinical thinking, problem solving, decision making, clinical reasoning and judgment.
5. Identification of the different structure of the human body.
6. Histology techniques
7. Histological identification of different tissues.
8. Communication skills.
9. Handling, sorting and retrieving informations.
10. Proper use of information sources such as scientific journals, computers, internet and web sites.

C. Competence:

Able to carry out teaching work for UG'S (Medical & allied) & carry out research work. After completion of degree able to prepare and present scientific papers and pursue research.

D. Commencement of Class:

Commencement of the Classes will be on August 1st week.

E. Duration:

Total Duration of the course shall be 3 years.

Attendance:

Minimum of not less than 75% attendance in theory & practicals in each subjects in each academic year is essential for appearing in the examination.

COURSE DESCRIPTION:

An introduction to the body's major and minor systems for people who want to learn more about the human body and how it functions or who want to cover the basics of anatomy and physiology before attending a professional complementary the Gross Anatomy, as presented here, provides a variety of inputs or methods to assist of laboratory instructor, and text and atlases.

Through each of these methods assists in its own specific fashion, the most important is the laboratory dissection. Anatomy deals with structure and no description or illustration can surpass individual observation of the dimensional structure. The capacity to be observant is essential to clinical diagnosis and studying anatomy is a good way to develop it.

Students of anatomy are faced with a subject of great antiquity, a subject that is architectural, structural, dimensional, and descriptive, rather than philosophical. For this reason, students need no special ability other than that of observation. Time and experience improve the capacity to see. Anatomy is logical. Through the uninitiated.

Studying anatomy should be aimed at discovering the logic and architectural necessities that eliminate the need for note memorization. Because anatomy is structural, it is visual sciences. The dissection and repeated observation of the cadaver become the major mechanism of learning and the mental picture of the anatomy, the goal and reward.

It is objective of the anatomy sessions to expose the students to the various details underlying the ensuring curriculum. Following this comprehensive exposure, the student, with minimal review, should be able to recapture their knowledge and understanding as they need it.

M.Sc Medical students who is entering various healthcare research fields will find this self-paced Anatomy course to be extremely beneficial. Course Goals include the following: 1.) Be able to identify the major body systems and understand what each body system does, 2.) Be able to relate how each body system works, 3.) Be able to identify and explain major cells, tissues, and organs, and 4.) Be able to identify and explain functions of muscles and bones.

Class lessons will cover the following topics: Introduction to Anatomy and Physiology, Chemistry Basics, Cells (Foundation of Life), Tissue (Different Types and Functions), The Integumentary System, The Skeletal System, The Muscular System, The Nervous System, The Sensory System, The Endocrine System, The Cardiovascular System, The Lymphatic System, The Respiratory System, The Digestive System, The Urinary System, and The Reproductive System.

Internal Assessment:

1. Regular periodic assessment shall be conducted throughout the course.
2. 3 sessional examination conducted in each year of the course
3. Average of the best 02 examinations will be considered for calculating the internal assessment

SCHEME OF EXAMINATION – FOR FIRST YEAR M.Sc (PRELIMINARY)

Distribution of Subjects & marks for internal Assessment and University Examination for 1st year.

Subject	Internal Assessment	University Exam	Total
<u>Including:</u> Gross Anatomy, Histology, Embryology & osteology	20 – Theory	80 – Theory	100 marks

Along with Anatomy paper, preliminary students will appear for Physiology & Biochemistry papers also.

Carry over: Nil

Candidates will not be admitted to the 2nd year unless he/she clears the 1st year final University Examination in all the 3 papers.(Anatomy, Physiology and Biochemistry)

Syllabus for preliminary (1st year)

M. Sc. Preliminary Anatomy Syllabus

1. Gross Anatomy(Theory and Demonstration)
2. Histology(Microscope Anatomy Theory)
3. Embryology Theory
4. Genetics Theory

1. **Gross Anatomy (Theory and Demonstration)**

General Anatomy
Introduction to Anatomy
Cell structure
Basic tissues
Intracellular substances
Blood
Cartilage – Types
Bones
Joints – Types subtype and movement
Nerve tissues

Thorax

Introduction to Thorax
Pleura
Lungs
Pericardium
Heart
Blood supply of heart
Mediastinum and Subdivisions
Applied Anatomy

Abdomen and Pelvis

Anterior abdominal wall including inguinal canal
Male Genital organs including descent of testis
Abdominal cavity and peritoneum
Stomach and spleen
Superior and inferior mesenteric vessels. Small & large intestines.

Duodenum, Pancreas and Portal vein
Liver & Gallbladder
Kidney, Urethra Suprarenal
Diaphragm and posterior abdominal wall
Perineum, Anal and Urogenital canal, superficial & deep perineal pouches.
Ischioanal fossa, Pudendal nerve and vessels.
Urinary bladder, Prostate, Male Urethra
Uterus, Fallopian tube and Vagina.
Rectum and Anal Canal
Muscles of Pelvis, Pelvic diaphragm, Nerves & vessels of pelvis
Joints of pelvis and their movement.

Head & Neck

Scalp, Temple and Face (superficial)
Deep cervical fascia, Posterior triangle
Anterior triangle, its sub division & contents
Cranial cavity Dural folds, Pituitary gland
Deep dissection of Neck – Thyroid gland, Thymus, Subclavian-
vessels, Carotid artery, Thoracic duct
Deep dissection of Neck – 9,10,11,12 Cranial nerves, sympathetic trunk,
Lymph nodes of Head & Neck
Prevertebral region
Deep dissection of face, lacrimal apparatus. vessels & nerves of face
Orbit 2,3,4,6 cranial nerves.
Temporal and infra Temporal fossa and temporomandibular joint
Submandibular region (gland & muscles)
Mouth, pharynx, Tonsil, Soft palate
Nasal cavity – Lateral wall, septum, Para nasal air sinuses, Pterygopalatine
ganglion.
Larynx
Tongue
Organ of hearing – external & middle ear, auditory tube, 8th cranial nerve
Eyeball
Joints of neck

Histology

Epithelium – Simple and Compound

Glands – All types
Connective tissues – fibers and cells
Cartilage – hyaline, Elastic and White fibrous – histogenesis
Of Cartilages, growth of Cartilage, osteogenesis, ossification types
Muscle – structure of smooth cardiac and skeletal muscle
Nervous tissue- Nerves, sensory & automatic ganglia .Mixed nerve, optic Nerve
Circulatory system – structure of large and medium sized vessels – structure of arterioles.
Capillaries, Sinusoids, Venules, Vein , Anastomosis and arteries, Reticuloendothelial system, Lymph vessels
Lymph nodes, Spleen Thymus Tonsil
Digestive system – Teeth, Tongue, Salivary glands
Pharynx, General plan of organization of G.I.T. Esophagus, Stomach, Small intestine, Large intestine Pancreas Liver Gall bladders.
Urinary system – kidneys, Ureter, urinary bladder, Urethra.
Reproduction system – testis ,stages of spermatogenesis, Epididymis ,Vas deferens, Seminal vesicles , Penis, prostate
Nervous system
Eyeball ,Retina ,Cornea ,Sclero-corneal junction, structure of eyelids
Lacrimal gland
Respiratory system – Nasalcavity Larynx, trachea, Bronchi ,Lungs
Endocrine system -Structure of pituitary gland, Thyroid& Parathyroid, Suprarenal gland
Integument – Structure of thin skin and thick skin

Embryology

Introduction
Germ cells – Male and female gametes
Spermatogenesis, Oogenesis
Menstrual Cycle
Formation of germ layers
Development of embryonic disc
Placenta– implantation, chorionic villi ,Placental membrane, Placental circulation. Normal and abnormal Sites of implantation, Anomalies of placenta
Formation of tissues of the body, Epithelium,
Mesenchymal Connective tissue, Cartilage, Bone- formation, ossification
growth of long bones & Anomalies of bone

Skin and its appendages – Skin, Hair, sebaceous glands, Sweat glands,
Anomalies of skin and its appendages, Mammary glands

Development of lung, heart

Development of all the viscera in abdominal cavity and pelvic cavity.

The Pharyngeal arches - Derivatives of skeletal elements, Nerves and
muscles of arches, fate of ectodermic clefts, Development of Thymus,
Thyroid gland and anomalies. Development of tongue

Genetics

Nucleic acids gene, Genetic code and Protein synthesis, Cistron, Muton and
Racon.

Chromosomes Types . Nondisjunction

Mutation Types ,causes & effect

Genetic disorders & Genetics of Hemoglobin

M.Sc MEDICAL ANATOMY

(SECOND & THIRD YEAR)

Goal: The postgraduate, course M.Sc. (Medical Anatomy) should enable a medical graduate to become a competent specialist, acquire knowledge and skills in educational technology for teaching medical, dental and health sciences and conduct research in bio-medical sciences.

II. Objectives:

At the end of the course, a Postgraduate in M.Sc Medical Anatomy shall be able to

1. Demonstrate comprehensive knowledge and understanding of gross and microscopic structure of human body and skills to demonstrate special dissection and histological and histochemical techniques.
2. Comprehend normal disposition, interrelationships. functional and applied anatomy of the various structures of the body.
3. Describe development of human body to provide an anatomical basis for understanding the structure and correlate with functions both in health and in disease presentations.
4. Demonstrate knowledge of basic and systemic embryology including genetic inheritance and sequential developments of organs and systems.
5. Recognize critical stages of development and the effects of common teratogens, genetic mutations and environmental hazards.
6. Explain development basis of major variations and abnormalities.
7. Aware of contemporary advances and developments in anatomy and related bio-medical field.

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8. Demonstrate competence in basic concepts of research and acquire a spirit of enquiry in research.
 9. Critically evaluate published research literature.
 10. Recognize continuing educational needs and develop skills as a self-directed learner.
 11. Select and use appropriate learning resources and teaching techniques as applicable for teaching and evaluation of medical and allied health science students.
 12. Carryout professional obligations ethically and in keeping with objectives of National Health Policy.
 13. Function as an effective member in health care, research and training.
 14. Exhibit interpersonal behavior in accordance with social norms and expectations.
 15. Acquire knowledge relating to latest non-invasive techniques like X-rays, CT Scan, MRI. Ultrasound and their interpretation in health and disease conditions
 16. Describe the methodology, techniques of embalming, preservation of cadavers and museum techniques, and perform the procedures.
 17. Describe and interpret Anatomy Act as in existence.

Curriculum for M.Sc Medical Anatomy

The course M.Sc Anatomy degree is a 3 years course. In the first year (Subsidiary) candidate chooses to study Gross Anatomy (Thorax Abdomen, pelvis, Head & Neck,) Histology, General Embryology along with Physiology & Biochemistry

In the 2 & 3rd year to study Gross Anatomy – (Upper limb, Lower limb & Thorax Abdomen, pelvis, Head & Neck,) Histology – (General& Systemic histology), neuroanatomy, Genetics, Specimen preparation, slide preparation embalming, special staining, Embryology (General & Systemic Embryology)

The candidate is eligible for M.Sc degree in medical Anatomy after.

1. Completing the two – year’s course.(after one year preliminary)
2. Succeeding in both subsidiary and main examinations.

Internal Assessment:

1. Regular periodic assessment shall be conducted throughout the course.
2. 3 sessional examination will be conducted in each year of the course
3. Average of the best 02 examinations will be considered for calculating the internal assessment

THEORY

1. Gross Anatomy:(16 Hours)

A) General Anatomy:

1. Introduction to Anatomy
2. Cell Structure
3. Basic tissues
4. Intracellular substances
5. Blood
6. Cartilage – types
7. Bones
8. Joints – types subtypes and movement
9. Nerve tissues.

B) Upper Limb:

Introduction

1. Bones of the upper limb with special comments
2. Superficial structures of the upper limb

Cephalic vein

Basilic vein

Axillary

Lymph nodes

Dermatomes of upper limb bud

3. The breast of mammary gland
4. pectoral region
5. The axilla
6. Superficial muscles of the back
7. Scapular and deltoid regions
8. The Arm & cubital fossa
9. Forearm
10. Hand
11. Comprehensive survey of median Ulnar and radial nerves
12. Joints of the upper limb

C) Lower Limb:

Introduction

1. Front of the thigh
 2. Gluteal region
 3. Back of the thigh
 4. Popliteal fossa
 5. Posterior crural region
 6. The sole of the foot
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7. Anterior crural region
 8. Lateral crural region
 9. Dorsum c crural region
 10. Dorsum of the foot
 11. Joints of the lower limb
 12. Arches of the foot
 13. Surface anatomy

D) Thorax:

Introduction and thoracic wall

1. Pleura
2. Lungs
3. Pericardium
4. Heart
5. Blood supply of heart
6. Mediastinum & Subdivision
7. Applied Anatomy

E) Abdomen & pelvis :

1. Anterior Abdominal wall, including inguinal canal
 2. Male genital organs including descent of testes
 3. Abdominal cavity & peritoneum
 4. Stomach & spleen
 5. Superior and Inferior mesenteric vessels, small and large intestine.
 6. Duodenum, Pancreas and Portal vein
 7. Liver & Gallbladder
 8. Kidney, Ureter, Suprarenal
 9. Diaphragm and posterior abdominal wall
 10. Perineum, Anal and Urogenital and pouches, Ischioanal fossa, Pudendal nerve and vessels.
 11. Urinary bladder, Prostate, Male Urethra
 12. Uterus, Fallopian tube Vagina
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13. Rectum and Anal canal
 14. Muscles of pelvis, Pelvic diaphragm, Nerves & vessels of pelvis
 15. Joints of pelvis and their movement

F) Head & Neck:

1. Scalp, Temple and Face (Superficial)
 2. Deep cervical fascia, Posterior triangle
 3. Dissection of back, Suboccipital triangle
 4. Anterior triangle, its subdivision and contents
 5. Cranial cavity, Dural nerves, Pituitary gland
 6. Deep dissection of Neck – Thyroid, Thymus, Subclavian vessels
Carotid artery, Thoracic duct
 7. Deep dissection of Neck – 9,10,11,12 Cranial nerves, Sympathetic trunk, Lymph nodes of Head & Neck
 8. Prevertebral region
 9. Deep dissection of face lacrimal apparatus vessels & nerves of face
 10. Orbit 2,3,4,6 cranial nerve
 11. Parotid region & Facial nerve
 12. Temporal and infra Temporal fossa and temporomandibular joint
 13. Submandibular region (gland & muscles)
 14. Mouth, pharynx, Tonsil, Soft palate
 15. Nasal cavity – lateral wall septum, Paranasal air sinuses,
Pterygopalatine ganglion
 16. Larynx
 17. Tongue
 18. Organ of hearing external middle ear, auditory tube 8th cranial nerve
 19. Eyeball
 20. Joints of neck
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G) Neuroanatomy:

1. Organization & function of Nervous system
2. Peripheral Nerves & Ganglia
3. Receptors & Effects
4. Dermatomes and Muscular Activity
5. Central Nervous System: An Overview
6. Spinal Cord
7. Brainstem
8. Nuclei, Functional Components and Distribution of Cranial Nerves
9. Cerebellum and Fourth Ventricle
10. Diencephalon and Third Ventricle
11. Cerebellum
12. Basal Nuclei (Basal Ganglia)
13. White Matter of the Cerebellum Fluid
14. Somatic Motor and Sensory Pathways
15. Special Senses and their Neural Pathways
16. Reticular Formation and Limbic System
17. Autonomic Nervous System

Histology:

1. Epithelium - Simple and Compound
 2. Glands – All types
 3. Connective tissues – fibres and cells
 4. Cartilage – Hyaline, Elastic and White fibrous – histogenesis of Cartilage growth of Cartilage, osteogenesis, ossification – types.
 5. Muscle – structure of smooth cardiac and skeletal muscle
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6. Nervous tissue – Nervous, Sensory & Automatic ganglia – Mixed nerve, optic Nerve
 7. Circulatory system – Structure of large and medium sized vessels – structure of arterioles.
 8. Capillaries, Sinusoids, Venules, Vein, Anastomosis, End arteries, Reticuloendothelial system, Lymph vessels, Lymph nodes, Spleen, Thymus Tonsil.
 9. Digestive system – Teeth, Tongue, Salivary glands, Pharynx, General plan of organization of G.I.T , Esophagus, Stomach, Small intestine, Large intestine Pancreas Liver Gall Bladders
 10. Urinary system – system , kidneys, Ureter, Urinary bladder, Urethra
 11. Reproduction system Male Testis, Stages of spermatogenesis, Epididymis Vas deferens , Seminal vesicles, Penis, Prostate.
 12. Nervous system
 13. Eyeball, Retina Cornea, Sclero – corneal junction, structure of eyelids, Lacrimal gland
 14. Respiratory system – Nasal cavity, Larynx, Trachea, Bronchi, Lungs
 15. Endocrine system Structure of pituitary gland, Thyroid, Parathyroid, Suprarenal gland
 16. Integument – Structure of thin and thick skin

Embryology:

Introduction

1. Germ cells – Male and female gametes, Spermatogenesis, Oogenesis.
 2. Menstrual cycle
 3. Formation of germ layers
 4. Development of embryonic disc
 5. Placenta – Implantation, Decidua, Chorionic, Villi Placental membrane, Placental circulation, Normal and abnormal sites of Implantation, Anomalies of placenta
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6. Formation of tissues of the body – Epithelium, Mesenchyma, Connective tissue, cartilage, Bone – formation, ossification, growth of bone, Anomalies of bone.
 7. Skin and its appendages – Skin, Hair, sebaceous glands, sweat glands, Anomalies of skin and its appendages, Mammary glands.
 8. The Pharyngeal arches – Formation, Derivatives of skeletal elements, Nerves and muscles of arches, Fate of ectodermal clefts, Development of Thymus, Parathyroids, Thyroid gland and anomalies.
 9. Development of face, nose, Palate, Anomalies
 10. Development of Alimentary system
 11. Development of Respiratory system
 12. Development of Cardiovascular
 13. Development of Urogenital System
 14. Development of Eye, ear and Anomalies
 15. Development of Nervous system
 16. Development of skeletal system

Osteology:

Bone – Introduction, Types of bone

1. Bones of the Upper limb & lower limb, Scapula, clavicle, Humerus, Radius, Ulna, Carpal & Metacarpal, phalanges
2. Femur, Tibia, Fibula, Tarsal Bones, Metatarsal, phalanges
3. Bones of Thorax - Sternum, Ribs, Thoracic Vertebrae
4. Abdomen-Lumbar Vertebrae, hip bones, sacrum
5. Bones of head and neck – Skull, Maxilla, Palatine, Zygomatic, Temporal, Sphenoid, Occipital, Parietal, Frontal, Hyoid bone and cervical Vertebrae

Genetics -

Chromosomes, Types, Nondisjunction

Nucleic acids gene, Replication & Transcription
Genetic code and Protein synthesis, Cistron, Muton and Recon
Mutation Types, causes & effects
Genetics disorders & Genetics of Hemoglobin

PRACTICAL

1. **Dissection:** Upper limb, Lower limb, Thorax, Abdomen & Pelvis and Head & Neck, Brain

2. **Histology** – Techniques, Staining, Special Staining, Preparation of the slides

1. Genetics Demonstration
2. Embalming Techniques

II. IX. Recommended Books and Journals - Latest editions.

Gross Anatomy

1. Susan Standring. Gray's, Anatomy- 39th Edition, Elsevier 2005.
2. McMinn R.M.H. Last's, Anatomy - 8th Edition, ELBS, 1990.
3. Basmajain V. John and Slonecker E. Charles, Grants Method of Anatomy, 11th Edition., Williams and Wilkins 1939.
4. Hollinshed.W. Henry, Anatomy for Surgeon's - 4th Edition, Harper and Raw Publishers. 1985.
5. Duplessis and Gadecker LecMcgiegor's, Synopsis of Surgical Anatomy - K.M.Varghese Company, 1986.
6. Snell.S.Richard, Clinical Anatomy for Medical Students - 5th Edition, Little Brown and Company, 1985.

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7. Grant Boileau. J.C., An Atlas of Anatomy - 5th Edition, Williams and Wilkins - 1984.
 8. Griggs Hall E.C.B, Anatomy as a basis for Clinical Medicine - 2nd Edition. Williams and Williams, 1990.
 9. Mc Minn M.H.Robert, Mc Minn's Functional and Clinical Anatomy- 5th Edition. Mosby Publications, 1995.
 10. A.K.Datta, TextBook of Anatomy Vol. I, II & III – 4th Edition, 1997 Current Books International.
 11. Le Gross Clark, Tissues of the Body – 6th Edition, 1980 Oxford University Press.
 12. Keith & Moore, Clinically Oriented Anatomy – 3rd Edition, 1992 Williams & Wilkins.

III. Histology

1. Connack.H.David, Ham's Text Book of Histology - 9th Edition, J.B.Lippincott Company, 1987.
2. Copenhaver M. Wilfred et al. Bailey's text book of Histology, 17th Edition, William and Wilkins, 1978.
3. Difiore. S.H. Mariano, Atlas of Human Histology – 5th Edition, Lea Febiger Publishers. 1985.
4. Jantiucira.C.Luis et al, Basic Histology - 2nd Edition, Large Medical Publication, 1971
5. Dmry R.A.B., Wullington E.A. Carlion's. Histological Technique - 5th Edition, Oxford University, Preces, 1980.
6. Culliings, Histological Technique - 3rd Edition, 1994 Butterwoiths.
7. John D Bancroft, Manual of Histological Technique - 1st Edition, 1984 Churchil Livingstrone.
8. Michael H Ross, Histology - A Text & Atlas - 3rd Edition. 1985 Williams & Wilkins.
9. Bloom and Fawcett, Text Book of Histology. W.B.Saunder's Company.

IV. Embryology

1. Hamilton W.J. and Mossman H.W., Human Embryology - 4th Edition, Williams and Wilkins Company, 1972.
 2. Sadler T.W., Langman's Medical Embryology - 7th Edition, Williams and Wilkins Company 1995.
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3. A.K.Datta. Essentials of Human Anatomy, Human Embryology - 21st Edition, Current Books International, 1991.
 4. Moore Persaud, The Developing Human - 7th Edition, Elsevier 2003.
 5. Larsen, Human Embryology - 2nd Edition, 1997, Churchill Livingstone
 6. Langman, Medical embryology T W Sadur - 9th edition 2004, Lippincott, Williams & Wilkins.

V. Neuro Anatomy

1. Everett N.B., Functional Neuroanatomy, 6th Edition, Lee and Febigger, 1971.
2. Chusid. G.Joseph, Correlative Neuroanatomy and Functional Neurology – 16th Edition
3. Lange Medical Publication, 1976.
4. A.K.Datta, Neuroanatomy, - 1st Edition, Current Books International, 1997
5. Snell.S.Richard, Clinical Neuroanatomy for Medical Students, - 4th Edition, Lippincott -Raven, 1982.
6. Parent Andre, Carpenter's Neuroanatomy - 9th Edition, Williams and Wilkins, 1996.
7. Inderbir Singh, Neuroanatomy - 5th Edition. 1997 Jaypee Brothers Medical Publications

VI. Human Genetics / Medical Genetics

1. Robert F Mueller, Emery's Elements of Medical Genetics - 9th Edition, 1995 Churchill Livingstone.
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2. Nora & Frazer, Medical Genetics Principles - 1974 Lee & Gebiger. Philadelphia.
 3. Friedman, NMS Genetics - 2nd Edition, 1996.
 4. Alfred G Kudson Jr.. Genetics & Disease - Me Graw Hill Book Company N.Y.,
 5. Thomas D. Gelehrtar, Principles of Medical Genetics - 2nd Edition, 1990 Williams & Wilkins
 6. J.M.Conner M A Ferguson Smith - Essentials of Medical Genetics - Blackwell Scientific publications.

Physical Anthropology

1. Harrison, Human Biology an introduction to Human Evolution and Growth - 2nd Edition, 1970.
2. Poirie. Fossil Man, 1973.

Embalming Techniques

1. Jayavelu T., Embalming Techniques, Churchill Livingston.
2. Ansari M.C., Embalming.
3. Embalming - Ajmani 1st edition 1998, J.P.Publishers.

Museum Techniques

1. Tompsett RH, Anatomical Techniques.
2. Edwards JJ, Medical Museum Techniques. Oxford University Press

Journals

1. Journal of Anatomical Society of India.
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2. Journal of Anatomy.
 3. Acta Anatomica.
 4. American Journal of Anatomy.
 5. American Journal of Physical Anthropology.
 6. Journal of Morphology. Embryology
 7. Anatomical Record
 8. American Journal of Medical Genetics.
 9. Annual Review of Genetics.

Evaluation :(Assessment) Appraisal and Approaches

1. Appraisal during the course
2. Assessment of standard
3. Self assessment
4. On – the – job assessment
5. End of phase assessment
6. Evaluation of validity, reliability, and practicality of assessment
7. Types of assessment
 - a) Experimental
 - b) Written: short and long essay, commentary, MCQ and extended matching
 - c) Oral
 - d) Log book or work book.
8. Seminar presentations
9. Presentation of a research protocol to solve a scientific problem.

SCHEME OF EXAMINATION

Distribution of Subjects & marks for internal Assessment

Subject	Internal Assessment	University Exam
Anatomy <u>Including:</u> Gross Anatomy, Histology, Embryology Neuroanatomy and Genetics	100 - Theory	Not conducted

Distribution of Subjects & marks for internal Assessment and University Examination for 3rd year.

Subject	Internal Assessment	University Exam
Gross Anatomy	100 – Theory	100 - Theory
Histology + Embryology, Genetics	100 – Theory	100 - Theory
Neuroanatomy	100 – Theory	100 – Theory

UNIVERSITY EXAMINATION

Theory written	Theory I.A	Practical	Practical I.A	Viva voce	Total
Paper 1 - 100	25	100	25	50	500
Paper II – 100					
Paper III - 100					

Distribution & type of question and marks.

Type of Question	Number of Question	Marks for each Question
Long Essay	2 x 20	40
Short essay	6 x 10	60
TOTAL	100	

Declaration of marks in the final year exam

1. A candidate having appeared in all subjects in the same examination and passed that examination in the first attempt and secures 75% of marks or more of grand total marks prescribed will be declared to have passed the examination with distinction.
2. With the 65% or more but less than 75% is first class.
3. With the 50% or more but less than 65% is second class.
4. A candidate passing a University Examination in more than on attempt shall be placed in pass class irrespective of the percentage of marks secured by him/her in the Examination.

Final university examination (Practicals & viva)

Internal examiners – 02

External examiners - 02