

Study & Evaluation Scheme

of

Doctor of Medicine MD (Anatomy) 2011-12



TEERTHANKER MAHAVEER MEDICAL COLLEGE & RESEARCH CENTRE

TEERTHANKER MAHAVEER UNIVERSITY

Delhi Road, Moradabad, Uttar Pradesh-244001

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P.G. Curriculum MD Anatomy

1. Objectives
2. Syllabus
3. Teaching program
4. Thesis
5. Evaluation

ANATOMY

OBJECTIVE:

The objective of the postgraduate training leading to the M.D. degree in Anatomy shall be to produce competent specialist and medical teacher in Anatomy.

At the end of the training the person shall be able to:

- * Master basic skills and acquire competence required to teach postgraduate and undergraduate students in Anatomy during their training.
- * Demonstrate competence in basic concepts of research and data collection and be able to critically analyse the relevant literature.
- * Supervise, write and present scientific communications.
- * Maintain proper records of the data related to research
- * Develop skills as self-directed learner, reorganize continuing medical education and select and use appropriate learning resources.
- * Develop skills in using educational methods and techniques as applicable to the teaching of medical students and paramedical workers.
- * Demonstrate adequate managerial skills to function as an effective leader of the team engaged in teaching and research.
- * Discharge ethical responsibilities and participate in National Health Education Programme.

COMPONENTS OF THE CURRICULUM

THEORETICAL KNOWLEDGE:

1. Gross Anatomy of whole body with special emphasis on:
 - Applied anatomy
 - Developmental anatomy
 - Teratology
 - Microscopic anatomy
 - Fine structure of cells, tissues and organs
 - Radiological and sectional anatomy
 - Surface anatomy
2. Genetics
3. Neuroanatomy
4. History of anatomy
5. Comparative anatomy

PRACTICAL TRAINING:

I. GROSS ANATOMY

1. Dissection of whole body
2. Special dissections
3. Preparation of specimens for museum
4. Embalming technique and preservation of bodies.

II. HISTOLOGY & HISTOCHEMISTRY

1. Preparations of tissues and blocks for section cutting by various methods e.g. paraffin.
2. Staining by various methods.
 - a) Preparation and use of various fixatives e.g. formalin, bouin's, OSO₄, etc.
 - b) Tissue processing:
 - Hard tissue - Decalcification & bone sections
Including ground sections.
 - Soft tissue - preparation of various grades of alcohol and

Processing for paraffin.

3. Use of vacuum bath embedding
4. Use of microtomes e.g. rotory
5. Honing & stropping of microtome knives, including sharpening by machine.
6. Preparation of various stains.
7. Staining by various techniques:
 - A Hemotoxylin and Eosin van geison, masson, Mallory, verhoeffs etc.
 - B
 - i) Nervous tissue (Luxol fast blue, Pal Weifert)
 - ii) Silver impregnation methods (AgCl₃, Holmes, Bodian etc.)
8. Use of camera lucida and morphometric grid.
9. Microscopic structure of all tissues and organs of the body.
10. Principles, handling and calibrations of various types of microscopes.
11. Principles of microphotograph.

III EMBRYOLOGY AND TERATOLOGY.

1. Teratology-
Induction of malformations by various teratogens to understand their modus
opendii
Study of factors potentiating teratogenicity and preventive teratology

IV. NEUROANATOMY:

1. Special dissections of brain
2. Study of neuroanatomy slides
3. Clinical examination of neurological cascs
4. Staining as mentiones under histology
5. Methods of investigations.

V. SURFACE MARKING AND RADIOLOGY

Covering all regions of the body including CT Scan, MRI and Ultrasound.

VI. ANTHROPOLOGY:

Identification and use anthropological instruments.

VII. FORENSIC MEDICINE:

Identification of human bones and their remains and determination of sex, age and height etc. from these for medico legal application of Anatomy.

VIII. COGNATE COURSES:

1. History of Anatomy and short life sketches of notable anatomist with their contributions.
2. Outline of comparative anatomy and morphology.
3. Basic human evolution
4. Medical Genetics, Mendel's law, mutation, inborn errors of metabolism and effect of radiation on living system.

The candidates shall attend and participate actively in various postgraduate programmes, seminars, journal clubs as decided by the department teachers council.

I. GROSS ANATOMY:

1. Phases and norms of growth.
2. Age changes in different tissues and organ systems.
3. Anatomy of the child.
4. Anatomy of the old.
5. Anatomy of Newborn.
6. Vertebral column and intervertebral disc.
7. Vestigial structures in man.
8. Sphincters of the body.
9. Paranasal air sinuses.
10. Evolution, development and applied importance of occipito -atlanto axial complex.
11. Morphology of Pectoral girdle.
12. Morphology of pelvic diaphragm and urogenital diaphragm.
13. Mechanism of swallowing.
14. Mechanism of the larynx.
15. Anatomy and applied importance of fascial spaces of the hand.
16. Innervations of Urinary bladder and mechanism of micturition in normal and injured CNS conditions.
17. Nerve supply male genital organs.
18. Nerve supply of female genital organs.
19. Diaphragmatic hernias and other rare hernias.
20. Anatomy and development of the Palate, Lips and Face.
21. Musculature and structure of heart.
22. Segments of the liver and their blood supply.
23. Development, anatomy and structure of the internal ear.
24. Segments of Lungs.

II. EMBRYOLOGY & TERATOLOGY:

1. Scope of Anatomy and some important biological principles e.g., growth mechanisms, differentiation, regeneration & degeneration, symbiosis, parabiosis, metamorphosis, parthenogenesis, teratogenesis, neurobiotaxis, etc.
2. Determination of sex, sex differences, Intersex
3. Recapitulation theory with examples.
4. Evolution of erect posture.
5. Morphology and development of placenta.
6. Evolution and development of excretory system.
7. Evolution and development of genital system in the male.
8. Evolution and development of genital system in the female.
9. Evolution and development of nervous system.
10. Evolution and development of cardiovascular system

11. Evolution and development of respiratory system.
12. Development, anatomy and congenital of oesophagus.
13. Development and structure of tech.
14. Morphology of the membranes of the foetus.
15. Organizers and their role in development.
16. Causes of congenital abnormalities.
17. Apoptosis and programmed cell death.
18. Morphology of Diaphragm.

III. NEUROANATOMY:

1. Neurone doctrine.
2. Blood supply of the brain and spinal cord.
3. Evolution, development, anatomy and connections of the cerebellum.
4. Reticular formation of the brain.
5. Hypothalamus (anatomy and connections) – recent concepts.
6. Thalamus (anatomy and connections) – recent concepts.
7. Visual pathway and its blood supply.
8. Comparative anatomy of the tracts in the spinal cord.
9. Anatomy, connections and recent concept of the Rhinencephalon.
10. Central connections of the cranial nerves.
11. Structure of the cerebral cortex.
12. Development and anatomy of the commissural fibres of the brain.
13. Anatomy, development and structure of the optic nerve.
14. Mode of termination of nerve fibres.

IV. HISTOLOGY:

1. Pigment cells and biology of melanin.
2. Receptors.
3. Histology of liver.
4. Histology of spleen.
5. Histology of pituitary.
6. Histology of suprarenal.
7. E/M of Synapse.
8. E/M of muscle.
9. E/M of Motor end plate.
10. Structure of neuromuscular spindle.
11. Neuroglial tissue.
12. E/M of Collagen fibre.
13. Ossification of bones and factors involves in it.

V. APPLIED ANATOMY:

1. Paralysis of oculomotor and facial nerves.
2. Medial and lateral medullary syndromes.
3. Tumour of cerebellopontine angle.
4. Brown sequard syndrome.
5. Syringomyelia.
6. Erb's paralysis.
7. Various nerve injuries.
8. Cavernous sinus thrombosis.
9. Cancer of lip, breast, oesophagus, uterus.
10. Tracheostomy.
11. Thyroidectomy.
12. Indirect inguinal and other hernias.
13. Prolapsed intervertebral disc.
14. Psoas abscess.
15. Segmental abscess of lung.
16. Middle lobe syndrome.
17. Coarctation of aorta.
18. Obstruction of superior and inferior vena cava.
19. Cholecystectomy
20. Prolapsed of uterus.
21. Cervical rib.
22. Tendon sheaths and thenar space infections.
23. Injury to the knee joint.

The candidate shall undergo intensive training in teaching to undergraduate students, nursing students and other paramedical workers.

Throughout the training period the candidate will attend the prescribed course of lectures, seminars, journals clubs and practical's in addition he/she will have active participation in all undergraduate teaching programmes. He/she will also participate in the interdepartmental seminars and symposia and attend lectures by eminent invited teachers etc.

A record of all theoretical practical and experimental work done by the candidate and its assessment will be kept and shall be available for examiners at the time of the final practical and viva voce examination. There will be periodical examinations during the course of training. A theory examination in the cognate course will be held about six months before the final theory and practical examination, which will be conducted by the internal examiners only. During last six months the candidate will have weekly assessment tutorials.

The final M.D. examination will consist of Theory, Oral and Practical.

M.D. THESIS (Part-I)

The candidate will be registered under the supervision of a faculty member of the department on the recommendation of the Department Research Committee (DRC). He/she may co-opt the co-supervisor/s from other departments of the faculty/university as permitted by the DRC. He/She shall carryout thesis (research) work with the help of the laboratory staff of the department. Acceptance of the thesis by the examiners is a mandatory requirement to appear in the Part-II of the M.D. Examination.

EVALUATION

MD ANATOMY THEORY PAPERS

PAPER I MORPHOLOGY AND GROSS ANATOMY

- (a)** Histology of Anatomy
- (b)** Radiological Anatomy including sectional Anatomy as applicable to C.T, M.R.I, Ultra Sonography etc.
- (c)** Morphology of different parts of body.
- (d)** Gross Anatomy of whole human body i.e Upper limb, Lower limb, Throax, Abdomen & Pelvis and Head & Neck.
- (e)** Preservation of human body and its parts.

PAPER II GENETICS, DEVELOPMENT AND MICROSCOPIC ANATOMY

- (a)** General Principles of Cytogenetics, Cytogenetics as applicable to Medicine.
- (b)** General Embryology, Systemic Embryology, Methods of experimental embryology, clinically oriented embryology and teratology.
- (c)** Histology of tissues and organs of the body including fine structure.

PAPER III RECENT ADVANCES AND NEUROANATOMY

- (a)** Recent advances in medical sciences related to Anatomy of human body.
- (b)** Neuroanatomy including brain, spinal cord and autonomic nervous system.

PAPER IV APPLIED HUMAN ANATOMY

- (a)** Clinical and applied aspect of Anatomy
- (b)** Surgical anatomy.

M.D (Anatomy)

Marks Distribution

THEORY **400**
Marks

The four theory papers shall be of 100 Marks each with details below:

	<u>Q.No.1</u>	<u>Q.No.2, A & B</u>	<u>Q.No.3, Notes (4)</u>	<u>Total</u>
Paper I	30	15 + 15	10 x 4 = 40	100
Paper II	30	15 + 15	10 x 4 = 40	100
Paper III	30	15 + 15	10 x 4 = 40	100
Paper IV	30	15 + 15	10 x 4 = 40	100

PRACTICAL & VIVA-VOCE **400**
Marks

(A) Practical Examination

1. Dissection Marks	150
2. Histology spotting Marks	50
3. Histological techniques including histochemistry Marks	30
4. Surface Marking Marks	30
5. TEM & SEM Marks	20
6. Teaching ability Marks	20

Total

300 Marks

(B) Viva - voce Examination

1. Grand Viva Marks	100
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On dissected Parts of the body,
C.N.S. and Embryological,
Teratological & genetics models etc:

Recommended Books:-

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| 1. Gray's Anatomy | - | 4 th Ed. |
| 2. Essentials of Human Anatomy Vol. (I – IV)
Dr. A.K. Datta | - | Latest editions by
Dr. A.K. Datta |
| 3. Principles of General Anat. | - | Dr. S.D. Gangane |
| 4. Human Genetics
3 rd edition | - | |
| 5. Clinical Neuro Anatomy
edition | | -Richard S. Snell 7 th |
| 6. The Developing Human
edition | | -Keith L. Moore 8 th |
| 7. Functional Histology
edition | - | Wheater's 5 th |
| 8. Langman's Medical Embryology
edition | - | Sadler T.W. 11 th |

Reference books:-

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|---|---|--------------------------------|
| 1. Human section Anatomy
edition | - | Ellis Harold 3 rd |
| 2. Atlas | - | Netter's |
| 3. Atlas of Histology | - | Difiore |
| 4. Neuro Anatomy | - | Carpenter M.B. |
| 5. Embalming | - | M.L. Ajmani |
| 6. Clinically oriented Anatomy
edition | - | Keith L. Moore 5 th |

Journals:-

1. Journals of Anatomy
2. Anatomy & Embryology
3. American Journal of Anatomy
4. European Journal of Morphology