BHARATH INSTITUTE OF HIGHER EDUCATION AND RESEARCH

Program
MD ANATOMY

(Revised with effect from 2019-2020 onwards)

I) SYLLABUS:

1. HUMAN GENETICS

Elements of human genetics, cytogenetics, molecular genetics and tissue culture.

2. ANATOMICAL TECHNIQUES

Knowledge of embalming procedures, museum techniques, histological techniques, advanced neuro-anatomical staining and immuno-histochemical techniques.

3.GROSS ANATOMY (REGIONAL)

UPPER & LOWER EXTREMITIES

Nerves, muscles, vessels, bones and joints to be studied with a wholesome concept and with special reference to surface projections, applied anatomy. Their radiological and developmental significance also need to be studied.

ABDOMEN AND PELVIS

Regions of abdomen, abdominal wall with special reference to inguinal canal, rectus sheath, peritoneum and fascia. The abdominal viscera and their disposition, surface projections, blood supply, nerve supply, lymphatic drainage and applied aspects.

THORAX

Thoracic cage, anatomical and clinical land marks, mediastinum and its subdivisions, pleura, lungs,pericardium and heart.

BRAIN

Coverings, subdivisions, external and internal features including nuclei and their connections and blood supply.

SPINAL CORD

Coverings, blood supply, external features and internal structure including arrangement of various ascending and descending tracts.

HEAD AND NECK

Knowledge of blood vessels, nerves, muscles, glands and viscera.

Neuro anatomy, embryological anatomy, microscopic anatomy ,osteology and surgical anatomy pertaining to various regions of the body are to be thoroughly studied.

4. **GENERAL AND SPECIAL EMBRYOLOGY INCLUDING TERATOLOGY**

5. **GENERAL AND SPECIAL HISTOLOGY**

6. **RADIOLOGICAL ANATOMY**

Identification of normal anatomical features in commonly used Skiagrams (Plain and contrast), CT Scan, Ultra Sound, MRI and Endoscopy.

7. **SURFACE ANATOMY**

Surface marking of those structures, organs and viscera of the body which are commonly affected in various disease processes.

8. **SECTIONAL ANATOMY**

Knowledge of gross / sagittal / coronal sections of thorax,abdomen, pelvis and limbs, head and neck and brain. To understand interrelations of organs and interpret CTs and MRIs.

9. **COMPUTER APPLICATION**

Computer in medicine and introduction to use of computer is essential.

10. **RESEARCH METHODOLOGY**

Research methodology and biostatistics

II) **PRACTICAL TRAINING – Includes dissection of all 6 regions ofthe human body including-Head & Neck, Brain and Spinal cord. Upperlimb, Lower limbs, Thorax and abdomen noting variations if any and their significance.**

Pedagogical training through lectures and demonstrations for the undergraduate students in the fields of ostelogy, radiology, surface anatomy, histology, embryology, clinical anatomy.

Participation and presentation in the departmental seminars and journal club. Training in preparation of tissue mounts using Heamatoxylin and Eosin and specialized staining techniques, working knowledge of other types of microscopes.

Training in cytogenetic and karyotyping.

Training in embalming of human adult and foetal cadavers.

Encouraged to make scientific presentations at regional, national and international scientific fora.

Encouraged to publish original scientific data in peer reviewed national and international indexed journals.

Encouraged to attend the workshops to update skills and knowledge.

III) THESIS\DISSERTATION

Every student will prepare a thesis\ dissertation as per the rules laid down by the university.

1. **Last date for the submission of thesis plan will be within 3 months of joining PG course.**

2. **Guide: The academic qualification and teaching experience required for recognition as guide for dissertation work is as per Medical Council of India, Minimum Qualification for Teachers in Medical Institutions: Regulations 1998. i.e. recognized post graduate teacher in anatomy having 8 years teaching experience after obtaining postgraduate degree.**

3. **Co-Guide – May be included provided the work requires substantial contribution from a sister department. The co-guide shall be a recognized post graduate teacher.**

4. **The last date for submission of thesis: six months prior to the date of university exams.**

5. **Thesis examiners – Same set of examiners appointed by university as per MCI norms.**

LOG BOOK

Every candidate shall maintain a log book and record his /her participation in the training programme conducted by the department. All the presentations and procedures carried out by the candidate should be detailed in this and certified by the teacher concerned. The log book shall be scrutinized and certified by the Head of the Department and the Head of the Instituition and presented in the university examination.

Details of the log book is given in APPENDIX -1

V) COURSE OBJECTIVES

Paper - I General Anatomy, Gross Anatomy, Radiological Anatomy, Surface Anatomy and Cross sectional Anatomy. (U15MDAT01)

CO1. Should know the fundamentals of general anatomy and apply it to all subdivisions of anatomy.
CO2. Should have mastered the nerves muscles vessels, joints and viscera of the entire human body.
CO3. Should have a basic understanding of the radiological principles in visualizing the structures of the body and correlate it with cross sectional

anatomy.
CO4. Should be able to mark and project clinically important structures on the surface of the body.
CO5. Communicate effectively using correct discipline specific terminology.

GROSS ANATOMY (REGIONAL)

UPPER & LOWER EXTREMITIES

Nerves, muscles, vessels, bones and joints to be studied with a wholesome concept and with special reference to surface projections, applied anatomy. Their radiological and developmental significance also need to be studied.

ABDOMEN AND PELVIS

Regions of abdomen, abdominal wall with special reference to inguinal canal, rectus sheath, peritoneum and fascia. The abdominal viscera and their disposition, surface projections, blood supply, nerve supply, lymphatic drainage and applied aspects.
Mesentery – anatomy and clinical application
Surface anatomy of all the viscera and its clinical importance

THORAX

Thoracic cage, anatomical and clinical land marks, mediastinum and its subdivisions, pleura, lungs,pericardium and heart.

BRAIN

Coverings, subdivisions, external and internal features including nuclei and their connections and blood supply.

SPINAL CORD

Coverings, blood supply, external features and internal structure including arrangement of various ascending and descending tracts.
Anatomy of spinal nerves and its distribution

HEAD AND NECK

Knowledge of blood vessels, nerves, muscles, glands and viscera.

Neuro anatomy, embryological anatomy, microscopic anatomy ,osteology and surgical anatomy pertaining to various regions of the body are to be thoroughly studied.

Paper - II Genetics, Embryology, Histology & Anatomical techniques. (U15MDAT02)

CO 1. Should have a basic understanding of human genetics, cytogenetics, molecular genetics and tissue culture.

CO 2. Should have substantial knowledge of the development of embryo, and systems and should be able to correlate it to congenital anomalies.

CO 3. Should have developed in depth knowledge of cellular structures and specific features of organs and other structures of the body.

CO 4. Knowledge of embalming procedures

CO 5. Should have attained knowledge to mount specimens for the museum and basic model making skills.

CO 6. Should know how to procure,process and stain a tissue

HUMAN GENETICS

Elements of human genetics, cytogenetics, molecular genetics and tissue culture.
Anatomical variants and genetics

ANATOMICAL TECHNIQUES

Knowledge of embalming procedures, museum techniques.
Ethical aspects in the embalming of bodies
Forensic importance of embalming of bodies

(U19MDAT03) Paper - III Neuro Anatomy including embryology and histology

CO 1. Should have an understanding of the external and internal features of all parts of the brain and spinal cord and their interconnections.
CO 2. Should have basic understanding of the developmental sequence of the nervous system and awareness of common congenital conditions.
CO 3. Should have working knowledge of histological techniques of neuro anatomy.
CO 4. Develop vocabulary of appropriate terminology.

General and Special Embryology including teratology.

(U19MDAT04) Paper - IV Clinical Anatomy, Recent Advances in Anatomy, History of Anatomy

CO 1. Should be able to define the anatomical basis of signs and symptoms of disease.
CO 2. Should be able to demonstrate an understanding of clinical presentations and strategies for health maintenance.

CO 3. Use the clinical anatomical knowledge and correlate it with invasive procedure.
CO 4. Demonstrate information literacy skills to access,evaluate, and stay abreast with current trends in management.
CO 5. Trace the historical development of anatomy as a medical subject

Training in cytogenetic and karyotyping.

Knowledge of gross / sagittal / coronal sections of thorax, abdomen, pelvis and limbs, head and neck and brain. To understand interrelations of organs and interpret CTs and MRIs.

Identification of normal anatomical features in commonly used Skiagrams (Plain and contrast), CT Scan, Ultra Sound, MRI and Endoscopy.

Knowledge of histological techniques, advanced neuro-anatomical staining and immuno-histochemical techniques.

(U19MDAT05) SOFT SKILLS (Elective)

CO 1. Should know how to carry out documentation
CO 2. Should have developed organizational skills to conduct symposia and group discussions.
CO 3. Identify socio-economic environmental and overall health of the student community and acquire capacity of not letting personal beliefs and limitations come in the way of duty.

The candidate can chose to attend soft skills teaching sessions. There will be no written assessment. The candidate will be evaluated throughout the program by the peers.

VI) SCHEME OF EXAMINATION

100 Marks for each Paper (4 Papers) = 400 Marks (Total)

THEORY

Paper-I	**Gross Anatomy: Including Radiological anatomy**
Paper-II	**Embryology including Teratology, Histology and Genetics**
Paper-III	**Neuroanatomy**
Paper-IV	**Clinical anatomy and Recent advances in anatomy.**

PRACTICALS

(DAY-1) PRACTICAL – 1 (3 hours) Total = 100 marks

Dissection and discussion of a given region within - 3 hours.

(DAY-II) PRACTICAL-2 (3 hours) Total = 100 marks

Identification and discussion of histology, embryology and neuroanatomy slides = 50 marks Preparation of a stained tissue mount from the given block of tissue = 50 marks

ORAL (VIVA VOCE) – gross anatomy, related ostelogy, embryology, radiology and neuro anatomy.

Microteaching = 20 marks

Grand Viva including Surface Anatomy = 80 marks

Note: Minimum of 40 marks must be obtained in each paper. However, the passing minimum aggregate marks of all theory papers will be 200 out of 400 marks.

MODEL QUESTION PAPER

Time: 3 hours **Maximum: 100 marks**

Q1	Essay	25 marks
Q2	Essay	25 marks
Q3	Brief essays-5 (10 X 5)	50 marks
	Total =	**100 marks**

VII) BOOKS RECOMMENDED

1) **Gray's Anatomy – 39th edition**

Examination	Max. Marks	Min. Marks	No. of Papers	Paper Max.
Theory	**400**	**200**	**4**	**100**
Practical	**200**	**100**	**-**	**-**
Oral	**100**	**-**	**-**	**-**

2) **Grant's Dissector,14e, 39th edition – Dr.Patrick W. Tank**
3) **Di Fiore's Atlas of Histology – Victor P. Eroschenko-Lippincott Williams & Wilkins.**

4) **Clinical Anatomy by regions –Richard S. Snell- 8th edition**
5) **Clinically Oriented Anatomy-Keith L Moore – 5th edition**
6) **Cunningham's Manual of Practical Anatomy – 3 Volumes- 15th edition**
7) **The Developing Human-Clinically Oriented Embryology –Keith L Moore**
8) **Lang Man's Medical Embryology –Thomas W. Sadler – 8th edition**
9) **Human embryology – Inderbir Singh, G P Pal - 8th edition**
10) **Hamilton, Boyd and Mossman's Human Embryology – 2nd edition**
11) **Neuro Anatomy – Truex and Carpenter**
12) **Clinical Neuro Antomy-Richard S. Snell**
13) **Histological Techniques –John D. Bancroft, 5th edition**
14) **Histology: A Text and Atlas – 3rd edition – Michael H Ross, Edward J Reith.**
15) **Hams Histology-David Cormack**
16) **Cell and Molecular Biology-EDP De Robertis, EMF De Robertis Jr.**
17) **Emery's Elements of Medical Genetics-Robert F Mueller and De Young**
18) **Frazer's Osteology and Anthropometry.**

JOURNALS

1. **Journal of Anatomy London**
2. **Journal of Anatomical Society of India**
3. **Anatomical record.**
4. **Developmental dynamics**