SYLLABUS OF MD (HUMAN ANATOMY)

A. GOAL: To prepare the postgraduate student to become an exemplary teacher and a research scientist par excellence. To achieve this goal, the postgraduate student in Anatomy should be given an overall exposure to the subject, teaching methodologies and a sound grounding in research technologies.

B. LEARNING OBJECTIVES: To achieve this goal, the following objectives must be fulfilled.

I) Cognitive domain: At the end of three years of postgraduate training the student should be able to

1. Describe the gross anatomy of the human body and correlate the knowledge of structure and function.
2. Describe the microanatomy including cytology of various structures of the human body and compare the knowledge of microstructure with function and interpret it accordingly.
3. Interpret the anatomical basis of symptoms and signs of clinical conditions, diagnostic procedures and treatment modalities.
4. Describe the developmental aspects of human body and interpret the developmental basis of various congenital anomalies.
5. Describe the neuroanatomy in its entirety and interpret the neuroanatomical basis of various clinical conditions.
6. Explain various aspects of genetics and describe genetic basis of disorders and principles of genetics counseling.
7. Explain and interpret radiological anatomy and sectional anatomy of the human body as studied by various imaging techniques.
8. Comprehend surface and living anatomy of the human body.
9. Relate forensic anatomy to the study with medicolegal aspects of bone in particular.
10. Explain the general principles of Anatomy Act and Transplant of Human Organ Act.
11. Explain the process of embalming.
12. Comprehend ethical aspects of biomedical research.
13. Comprehend the basis of disposal of biomedical waste.

14. Comprehend horizontal integration of various subdivisions of anatomy with relevant physiology and biochemistry.

II) Psychomotor domain: At the end of the training, the student should be able to

1. Dissect and demonstrate various parts of adult human body
2. Demonstrate surface landmarks and living anatomy pertaining to muscle power, testing of nerves and palpating vessels.
3. Dissect and demonstrate various parts of a fetus.
4. Prepare tissue blocks ,perform H&E staining and is able to explain the principles of the following special stains -silver nitrate, periodic acid Schiff, osmic acid, Masson trichome, Verhoeff and Orcein stains.
5. Prepare and deliver lectures on various topics of human anatomy using audiovisual aids.
6. Operate computers so as to prepare documents, tables, charts and projection slides.
7. Identify research topics; carry out research and prepare a dissertation on a topic.
8. Present paper / poster in conferences.
9. Set undergraduate theory question paper, evaluate students and able to compute results including internal assessment marks.

III) Affective domain: At the end training the students should be able to

1. Co-operate with and react and respond in a cordial manner in his /her interaction with peers, superiors and subordinates.
2. Project a cheerful persona to the students.
3. Inspire the students to reach greater heights.
4. Arouse an element of curiosity and wonder in the minds of students.
5. Maintain a log book (Appendix - I).
6. Develop a healthy personality and a liking and respect for the subject.

C. COURSE DESCRIPTION

I) Eligibility: As per the guidelines of Medical Council of India and D.Y.Patil university, Kolhapur.

II) Duration: 3 years

III) Desirable qualities: The student should have an aptitude for teaching and reasonable command over spoken and written English language.

IV) Details of Training: The P.G. student would be a resident in the department for 3 years. The time-plan and the proposed division of curriculum will be on the following lines.

1. FIRST YEAR OF RESIDENCY

- ***Orientation programme***- Institutional and departmental orientation including duties and responsibilities of a postgraduate student.
- ***Time Management*** - should be conducted within 3-6 month.
- ***Stress Management***- should be conducted within 3-6 months.
- **Gross anatomy**: Dissection of one whole human body and study of gross anatomy and acquisition of embalming skills.
- **Microanatomy**: Basic techniques in tissue processing, preparation of blocks, microtome sections and H & E and principles of the following special stains - silver nitrate, periodic acid Schiff, osmic acid, Masson's trichome, Verhoeff and Orcein stains.
- To attend all undergraduate lectures held in the department of Anatomy and all the lectures organized by the university by various PG teachers at different colleges.
- To present the topic for dissertation and the research design in front of a dissertation committee comprising of all senior and PG teachers in the department within first six months of registration. Thereafter periodic assessment of the progress of the dissertation (every 6 monthly) will be done by the concerned PG teacher and if required, by the dissertation committee.
- Get trained to use computer for teaching and use the internet
- Scan Anatomy journals and periodicals.
- **OPTIONAL yet DESIRABLE**: To attend all the orations/ seminars/ workshops held for the subject in the city colleges, attend general orations held in the institution and attend regional /national conferences.
- **TEACHING**
  - 70 hours of small group teaching with at least l/3 of these under supervision by a senior teacher.
  - **Microteaching sessions** are mandatory before small group teaching for each and every session.
  - Should be exposed to evaluation techniques
  - Exposure to Medical Education Technology Workshops
  - Presentation in Journal club.
  - Presentation in Seminars and symposia.
  - Should complete microanatomy and embryology journals.

- **RESEARCH**
  - Basic techniques like review of literature for a given topic and collection of data.
  - Exposure to computer for various applications.

2. SECOND YEAR OF RESIDENCY

a) SPECIAL POSTING

Interaction with other pre, para and clinical specialties so as to prime the mind of the P.G. students in Anatomy to the growing needs of application of anatomical knowledge to other branches of medicine. This will be achieved through **horizontal and vertical integration**.

Posting

i. Horizontal Integration

(Selected topics should be taken as PG lectures by the concerned departments.)
Physiology and Biochemistry

ii. Vertical integration (Lectures to be arranged by the various departments for PG students)

Radiology, Surgery, Orthopaedics, Medicine, Obs &Gyn, Genetic Laboratory Pathology, Microbiology& Forensic.

(Posting in pathology - to gain knowledge about Frozen-sections, use of cryostat. special immunohistochemical techniques and immunological techniques and morbid and medicolegal anatomy from postmortem.)

During vacation

b) RESEARCH

Starting the work on thesis by the beginning of second year of residency with the aim to complete the data collection & analysis by the end of second year.

c) TEACHING

i. From middle of second year, the P.G. students in Anatomy should be capable of giving lectures for the entire batch of students.
ii. Start teaching Embryology and Genetics in small groups after microteaching Sessions.
iii. Should be conversant with the use of various audiovisual aids

d) PRESENTATION IN JOURNAL CLUB

e) Presentation in Seminars / Symposia at the departmental and institutional level

f) FETAL DISSECTION: Should have dissected at least one fetus

3. THIRD YEAR OF RESIDENCY

a) RESEARCH

i. Completion of Dissertation

ii. Presentation of paper in conference (optional but desirable)

iii. Writing articles for publication

b) TEACHING

i. Full fledged lectures, lecture-demonstration, small group teaching

ii. Seminars / Symposia

iii. Journal Club

c) DISSECTION - Exercise in window-dissection of various regions.

V) SYLLABUS-

1. Postgraduate curriculum shall include the entire undergraduate curriculum as spelt out below (Appendix III) with modifications as under:
   Levels 1 & 2 of U.G. curriculum will become Level 1 of P.G curriculum.
   Levels 3 of U.G curriculum will become Level 2 of P.G. Curriculum
   Levels.3 of P.G. Curriculum will include current trend and recent advances in the
2. **Additional topics to be covered**
   - History of anatomy
   - Embalming techniques
   - Microanatomy
     - Principles and types of Electron microscopy: TEM, SEM
     - Identification of various cell organelles and their EM appearance

A. Embryology: Stem Cell.

B. Genetics: a) Exposure to various DNA technologies, including cell culture, Karyotyping, Polymerase Chain Reaction (PCR) and Fluorescent-in-Situ- Hybridization (FISH)

C. Neuroanatomy: Limbic system and Reticular Systems – Details

D. Clinical Anatomy: Application of anatomical knowledge to explain the anatomical basis of various clinical symptoms and signs, diagnostic procedures and treatment modalities

E. imaging Modalities
   i. Radiology
   ii. Ultrasonography (USG): - Principles of USG, Orientation of anatomical organs, in various USG plates. Structures as seen in 2-D echocardiography axes used and orientation of heart in various axes in 2-D echocardiography.
   iii. PET scan: Principles.

F. Forensic Anatomy: Estimation of age and sex
   i. With reference to bones including ossification
   ii. With reference to radiology pictures

G. Cross-sectional Anatomy and its correlation to C.T. scan images and MRI images
H. Comparative Vertebrate Anatomy: Basic outline
I. Anthropology: Basic principles and anthropometry

d) EVALUATION

Evaluation of students for PG Degree M.D. (Human Anatomy) will consist of; internal assessment examination which will be conducted at the end of Ist year and IInd year. Preliminary examination will be conducted before the University Examination. Both examinations will have the same evaluation pattern for theory as well as practical.

UNIVERSITY EXAMINATIONS

University examination shall be taken at the end of 36 months and shall have.

a) Four theory papers of 400 marks - 03 hrs duration

Paper I, II, III, & IV will have the following pattern -

06 SAQs of 10 marks each – 60 marks

02 LAQs of 20 marks each – 40 marks

Total - 100 marks

	Sections	**Marks**
Paper I	General Anatomy, General Histology General Embryology. Gross Anatomy of upper extremity and thorax including corresponding microanatomy, embryology and clinical anatomy. **With principles of organ transplant.**	100
Paper II	Gross anatomy of Inferior extremity, Abdomen Pelvis and perineum including corresponding microanatomy, embryology and **surgical anatomy**.	100
Paper III	Head, Neck and Face and Neuroanatomy including corresponding microanatomy and embryology and clinical anatomy **with principles of reconstructive surgery.**	100
Paper IV	Genetics, Radiology, Embalming Museum techniques, Anthropometry and **Recent advances in Anatomy and preservation of viscera**	100
	TOTAL THEORY = 400	**400**

Minimum passing marks in each head 40% and aggregate: 50% in all papers

Practical & Viva - **400 marks**

i) First Day-

Morning session

Long case – Dissection and discussion- 100 marks

Afternoon session

Short case –

Histology slides – } 100 marks

Embryology slides –

Neuroanatomy slides –

Genetics chart –

Histology techniques

- Staining H & E } 50 marks
- Use of Microtome

} 150 marks

ii) Second day –

Morning session

Viva / Orals

Grand viva on soft parts, Neuroanatomy and osteology

- Radiology including CT scan, MRI, USG
- Embryology Models
- Surface Anatomy
- Thesis

} 100 marks

ii) Microteaching – Teaching on a given subject 50 marks

The candidate should submit log book, journal of Histology and Embryology of the time of university examination.

Minimum passing marks: 50% separate in Practical and viva voce

e) LIST OF RECOMMENDED BOOKS

I. Textbooks:

1. Cunningham's Manual of Practical Anatomy - Latest editions of volumes I, II, III
2. Regional & Applied Anatomy - R. J. Last
3. Clinical Anatomy for Medical Students - Richard Snell
4. Synopsis of Surgical Anatomy - McGregor
5. Functional Histology - Wheater, Burkit,
6. Langman's Medical Embryology
7. Embryology by Keith Moore
8. Clinical Neuroanatomy – Snell
9. The Human Nervous System - Murray Barr, John Kieman
10. Genetics by Emery
11. Human Genetics - S.D. Gangane
12. Essential of Human Genetics by Bhatnagar, Kothari and Mehta
13. Cross-sectional anatomy by Bo, Meehan and Kruger
14. Principles of General anatomy by A. K. Dutta
15. Comparative anatomy A.S. Romer.

II. Reference Books:

1. Gray's Anatomy
2. Clinical Anatomy _ NMS Series
3. Anatomy for Surgeons - Henry Hollinshead
4. Surgical Anatomy - Harold Ellis
5. Bailey's Textbook of Microscopic Anatomy
6. Embryology - Boyd & Mossman
7. Clinically oriented anatomy _ Keith Moore
8. Atlas of Human Histology – Di fiore
9. Tissues of the Human Body by Le Gros Clerk
10. Genetics by Thompson and Thompson
11. History of Anatomy - Charles Singer
12. History of Anatomy Indian Medicine - Kutumbiah
13. Dorlands Medical Dictionary

III. Journals:

1. Journal of Clinical Anatomy
2. Surgical & Radiological Anatomy
3. Journal of Anatomy
4. Development Dynamics
5. Anatomical Record
6. Journal of Anatomical Society of India