Pravara Institute of Medical Sciences

(Deemed University)

Loni Bk - 413 736, Tal. Rahata, Dist. Ahmednagar (MS)

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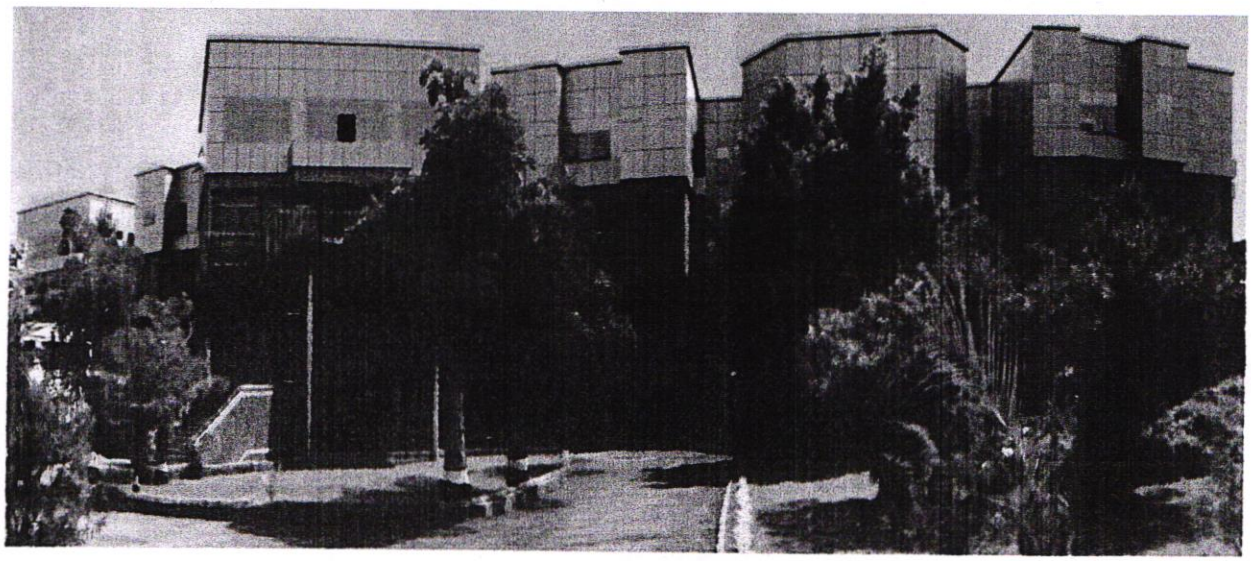
Syllabus

M.Sc Medical Anatomy

Approved Vide Academic Council Resolution
No. 22 / AC / 2010 dated 26th Mar. 2010.



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Syllabus in Human Anatomy for Postgraduate Teaching-Training leading to M.Sc (Human Anatomy) degree

A. Goal:

Goal of this postgraduate degree course is education of the postgraduate student to become a good teacher and a research scientist. To reach this goal, the postgraduate student in Anatomy should be given a comprehensive exposure to the Anatomy subject, teaching methodologies and research technologies.

B. Learning objectives: To reach 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) Explain the gross anatomy of the human body and associate the knowledge of structure with the function by horizontal integration/correlation of anatomy with relevant physiology and biochemistry.
2) Explain the development of human body and understand the basis of various congenital anomalies.
3) Explain the microanatomy including cytology of various structures of the human body and compare the knowledge of microstructure with function and interpret it accordingly.
4) Understand the anatomical basis of symptoms and signs of clinical conditions, diagnostic procedures and treatment modalities.
5) Explain various aspects of genetics and describe genetic basis of disorders and principles of genetics counseling.
6) Explain and interpret radiological anatomy and sectional anatomy of the human body as studied by various imaging techniques.
7) Explain the neuroanatomy and interpret the neuroanatomical basis of various clinical conditions.
8) Relate anatomy of bones and its development to medicolegal aspects and forensic medicine.
9) Comprehend surface projections of various internal structures/organs and living anatomy of the human body.
10) Explain the process of embalming.
11) Explain the general principles of Bombay Anatomy Act and Transplant of Human Organ Act.
12) Understand the basis of disposal of biomedical waste.
13) Understand ethical aspects of biomedical research.

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

1) Dissect and demonstrate various parts of human body.
2) Make tissue blocks, perform H&E staining and explain the principles of the following special stains - Periodic acid Schiff, Silver nitrate, Osmic acid, Masson's trichome,

Orcein and Verhoeff stains.

3) Demonstrate surface landmarks and living anatomy pertaining to muscle power, testing of nerves and palpating vessels.
4) Prepare and deliver lectures on various topics of human anatomy using audiovisual aids.
5) Set undergraduate theory question paper, evaluate students and tabulate and calculate results including internal assessment marks.
6) Identify research topics; carry out research and prepare a dissertation on a topic, present paper and posters in conferences.
7) Operate computers so as to prepare documents, tables, charts and projection slides.

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

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

C. COURSE DESCRIPTION

I. **Eligibility:** B.Sc. Zoology/B.Sc. Physiology, MBBS.

II. **Method of Selection:** Competitive written examination with MCQs.

III. **Duration :** 3 & ½ years (Academic Session begins in July every year)

Iç. **Desirable qualities:** Student should have an aptitude for teaching and reasonable command over spoken and written English language.

ç. **Details of Training:** The syllabus and its time plan shall be as follows.

1. FIRST YEAR OF THE COURSE

a. *Orientation programme* - Institutional and departmental orientation including duties and responsibilities of a postgraduate student.

b. *Gross anatomy.* Dissection of one whole human body and study of gross anatomy and acquisition of embalming skills.

c. To attend all undergraduate lectures and practical classes those that are held in the department of Anatomy and all the post graduate lectures organized by the department/ university.

d. Drawing and completing Microanatomy and Developmental anatomy journals.

e. *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.

f. 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 year of registration. Thereafter periodic assessment of the progress of the dissertation

(every 6 monthly) will be done by the concerned PG teacher.

g. Read Anatomy journals and periodicals of the related subjects.

h. Get trained to use computer for teaching and use the internet.

i. ***Voluntary however desirable***: To attend all the orations /seminars/workshops those are held for the subject in the college, attend general orations held in the institution and attend regional /national conferences.

j. Teaching

i) **Exposure to Microteaching sessions** and Group teaching before the end of first year.
ii) Should be exposed to evaluation techniques.
iii) Exposure to Medical Education Technology Workshops
iv) Presentations in departmental Journal club, Seminars and Symposia.

k. Research

i) Basic techniques like review of literature for a given topic and collection of data.

ii) Exposure to computer for various applications.

2. SECOND YEAR OF THE COURSE

a. Interaction with postgraduate students and teachers of other preclinical, paraclinical and clinical specialties so as to prepare 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 :** Certain topics with profound structure function correlation be taken as PG lectures Physiology(For e.g. Cardiovascular system) and Biochemistry(Biochemical genetics)

ii) **Vertical integration : C**linical/Applied anatomy lectures delivered by faculty from clinical departments to be attended by all the postgraduate students in Anatomy. Posting in Pathology during first summer vacation - to gain knowledge about Frozen-sections, use of cryostat, Special immunohistochemical techniques, immunological techniques, morbid and medicolegal anatomy from postmortem in FMT.

b. Teaching

i. Seventy hours of small group teaching in the dissection hall/histology practical hall with at least 1/3rd of these under supervision by a senior teacher.

ii. Should become conversant with the use of various audiovisual aids.

iii. Presentation in Journal Club, Seminars and Symposia at the departmental and institutional level.

c. ***Practical training*** : Apart from the regular dissection and microanatomy practical teaching learning exercises, exercise in window-dissection of various regions.

d. ***Research :*** Start the work on dissertation within 18 months of registration with an aim to complete the data collection & analysis by the end of three years.

3. THIRD YEAR OF THE COURSE

a. Teaching

i. Start teaching Embryology and Genetics in small groups after microteaching sessions.

ii. Should be able to regularly conduct small group teaching in the dissection hall/histology practical hall for UG students.

iii. Should be able to regularly conduct lecture-cum-demonstration classes for UG students.

iv. By the end of 3rd year, the P.G. students in Anatomy should be capable of giving lectures for the entire batch of students.

v. Presentation in Journal Club, Seminars and Symposia.

b. Practical Training: Apart from the regular dissection and microanatomy practical teaching learning exercises he should dissect at least one fetus during third year.

c. Research: Completion of the data collection for dissertation before the end of third year.

4. LAST SIX MONTHS

a. *Teaching*

i. Should regularly conduct small group teaching in the dissection hall for UG students.

ii. Should regularly conduct lecture-cum-demonstration classes for UG students.

iii. Should be able to conduct theory lecture for entire batch.

iv. Presentation in Journal Club, Seminars and Symposia.

b. *Practical Training*: - Exercise in window-dissection of various regions.

c. *Research*

i. Completion of Dissertation

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

iii. Writing articles for publication

V. SYLLABUS

1. Curriculum for postgraduate teaching-training course for M.Sc. degree in the subject of Anatomy shall include the entire syllabus for undergraduate Ist year MBBS Anatomy curriculum and the entire syllabus for postgraduate degree MD Anatomy approved by PIMS(DU). The syllabus for postgraduate education in the subject of Anatomy includes current trend and recent advances in the syllabus mentioned above and historical aspects.

Number of classes for the first academic year is as follows

S.No.	Lecture /Practical	Topic	No of Hours
1.	Dissection and Microanatomy Practical Classes	Upper Limb	40
		Lower Limb	40
		Thorax	20
		Abdomen & Pelvis	70
		Head and Neck	70
		Neuroanatomy	40
		Histology	60
		Total	340

2.	Demonstration Classes	Osteology	70
		Radiology	
		Living Anatomy	
		Embryology	
		Tutorials	
3.	Theory Classes	General Anatomy	10
		Upper Limb	20
		Lower Limb	20
		Thorax	10
		Abdomen & Pelvis	35
		Head and Neck	35
		Neuroanatomy	20
		Histology	30
		Embryology	30
		Genetics	5
		Total	215
Grand Total			625

2. List of Additional topics to be covered during three and half year curriculum over and above the approved undergraduate syllabus is as follows:-

   a. History of anatomy

   b. Embalming techniques

   c. Microanatomy

      i) Principles and types of Electron microscopy.

      ii) Identification of various cell organelles and their EM appearance

   d. Embryology: Stem Cell.

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

   f. Neuroanatomy: Details of Limbic system and Reticular Systems.

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

   h. 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.

   i. Forensic Anatomy: Estimation of age and sex

      i) With reference to bones including ossification.

      ii) With reference to radiology pictures.

   j. Cross-sectional Anatomy and its correlation to C.T. scan images and MRI images.

   k. Basic outline of Comparative Vertebrate Anatomy.

   l. Anthropology: Basic principles and anthropometry.

D. EVALUATION :

Formative evaluation to be carried out with the help of Internal assessment based on

1. Teaching: (Evaluated based on a proforma given in Appendix II)
2. Dissection (Evaluated during routine Dissection hall assignments).
3. Completion of Microanatomy and Developmental anatomy Journals.
4. Completion of Log Book
5. Examinations : Students shall be evaluated as follows

a. Theory:

- First Year : They have to appear for all the part completion and theory Internal assessment examination (Terminal + Preliminary) that are conducted for undergraduate students of Ist MBBS.
- Second Year end two papers

  Paper I – Embryology and Genetics

  Paper II –Neuroanatomy and applied anatomy.

  30% of the paper will be constituted by multiple choice questions of Single best response.
- During 7th Term (2 months before University examination)

  Preliminary examination as per the university examination pattern

b. Practical and viva

- First Year end

  They have to appear for all the part completion and practical Internal assessment examination (Terminal + Preliminary) that are conducted for undergraduate students of Ist MBBS.
- Second Year end

  After the theory examination for second year end, a practical examination shall be held under following heads
  - Prepare a tissue block, stain and discuss + 10 microanatomy spots.
  - Window dissection
  - Viva on Osteology and soft parts.
  - Viva on embryology models
  - Viva on brain
- During 7th Term (2 months before university examination)

  Preliminary examination as per the university examination pattern

c. Head of Passing : A) Theory B) Practical + Viva

d. Standard of Passing: A candidate shall obtain minimum 50% in each of the head of the passing.

University Examination

Eligibility for appearing for university examination :

1. Candidate has to submit dissertation completed in all respects to the university within the stipulated time.
2. Candidate has to submit logbook completed in all respects to the university within the stipulated time.
3. Candidate has to secure minimum 35% marks separately in theory and practical (including viva) examinations conducted by the department.
4. It is mandatory to send six-monthly progress report (as per proforma) of the student to Principal RMC, signed by head of the department of Anatomy.

Theory Examination : Four papers, each of 100 marks, distribution of the course syllabus of these papers shall be as follows

Duration of each paper : 3 hours (Each paper shall have 3 long questions (20 marks each) and 1 short note questions with 4 notes (10 marks) covering all topics included in the syllabus.)

Distribution of syllabus :

Paper I : Upper half of the body: Head (without neuroanatomy), neck, upper limb, thorax, related systemic embryology, systemic microanatomy and general anatomy.

Paper II : Lower half of the body: Diaphragm (Thoracoabdominal), abdomen, lower limb, related systemic embryology, systemic microanatomy and general microanatomy.

Paper III : General Embryology, Genetics, Neuroanatomy and Physical Anthropology

Paper IV : History of Anatomy, Applied anatomy & Recent advances in Anatomy

Instructions regarding weightage given to each system shall be communicated to paper setters and examiners.

Practical Examination : Student shall be evaluated for 200 marks with help of following exercises.

- Prepare a tissue block, stain and discuss + 10 microanatomy spots.
- Window dissection
- Viva on Osteology and soft parts.
- Viva on embryology models
- Viva on brain

Distribution of Marks (Practical) shall be as follows

• Window Dissection + Viva	:	60
• Preparation of tissue block and staining + Viva	:	30
• Microanatomy spots(10)	:	20
• Microanatomy slide discussion(2 slides)	:	10
• Micro teaching	:	20
• Grand Viva	:	60

Viva Examination: Duration –1 hr per student
(Combined viva by all examiners)

1. General Viva	:	30 minutes
2. Viva on dissertation	:	20 minutes
3. Micro teaching	:	15 minutes

Head of Passing : A) Theory B) Practical + Viva

Standard of Passing : A candidate shall obtain minimum 50% in each of the head of the passing.

E. LIST OF RECOMMENDED BOOKS

I. Textbooks:

1. Cunningham's Manual of Practical Anatomy- Latest Editions of Vol 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, Burkitt.
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. Cross-sectional anatomy by Bo, Meehan and Kruger
13. Principles of General anatomy by A. K. Dutta.
14. 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

Appendix I (LOG BOOK)

S.No.	Date	Time	Topic/Activity	Teacher	Remarks & Signature of PG Teacher

*Topic – Topic of lecture/Demonstration attended
Topic of Lecture/Demonstration taught

*Activity - - Dissection – Part
- Microanatomy- Practical
- Special posting if any - Department

Monthly submission of the logbook to the concerned PG teacher for signature.

Appendix II

(Microteaching Assessment Proforma)

Direction to the observers - Please tick the statement, which most closely corresponds to your observation.

Name of the teacher/observer : _____

Topic : _____

Date : _____

S.No.	Skill	Teacher action	Yes	Partially	No
1.	Set Induction	Aroused interest at the beginning			
		Specified objectives of presentation			
2.	Planning	Organized material in a logical sequence			
		Used relevant content matter.			
3.	Presentation	Fluency in language			
		Used non verbal cues, eye contact etc.			
4.	Interaction	Allowed questions from students			
		Asked Questions			
		Rewarded pupil effort			
		Clarified doubts			
5.	Use of Audiovisual aids	Used proper A V aids			
		Used the aid effectively			
6.	Summarization	Reviewed important points in the end			
		Checked that all the students understood the Points			
		Lesson on the whole was effective			
7.	Any suggestions for the speaker to improve the Teaching - learning exercise				