

NATIONAL BOARD OF EXAMINATIONS



Guidelines

of

Competency Based Training Programme

in

Anatomy

FORMAT FOR GUIDELINES OF COMPETENCY BASED TRAINING PROGRAMME IN ANATOMY

Goals : The postgraduate course in the subject of Anatomy should enable a medical graduate to be-

1. A competent Anatomist
2. A good medical teacher in Anatomy practicing the required skills of teaching.

i) Objectives

At the end of the course a postgraduate student in Anatomy should be able to

1. Demonstrate comprehensive knowledge and understanding of Gross and Systemic anatomy including Embryology, Histology and Genetics as well.
2. Comprehend and understand Anatomical basis of health and disease affecting various organ systems.
3. Select and use appropriate teaching techniques and resources.
4. Critically evaluate published Journal, Literature and to effectively use the library facilities including computer, CD Rom and satellite search
5. Carry out relevant research
6. Function as an effective member of a teaching team or research team.
7. Carry out professional obligations ethically and keeping in view the National Health Policy.

Syllabus

Papers : 4

Marks : 100 marks each

Duration : 3 hours

Paper-I

Embryology and Histology

- a) General Embryology including growth and development and Teratology.
- b) Systemic Embryology and Teratology
- c) Age changes
- d) Comparative Anatomy,
- e) Recent advances in Embryology
- f) General and systemic histology and Histogenesis,
- g) Histological Techniques,
- h) Basics of Histochemistry,
- j) Immunological apparatus.

Paper-II

Neuro Anatomy and Human Genetics

- a) Structural organisation of the various parts of Nervous system with particular reference to their functions.
- b) Nuclei and Pathways
- c) Lesions in different parts of central Nervous system, their localization and effects.
- d) Effects of Injuries to Nerves.
- e) Neuro-Anatomical Techniques.
- f) Human Genetics including recent advances.

Paper-III

Applied Anatomy

- a) Applied aspects of Human Anatomy including surgical approaches to various structures and organs.

b) Principles of Newer Imaging Techniques	III. Neuro-Anatomy & Embryology and Genetics	50
c) Determination of age, sex, stature and race from skeletal remains.	IV. Pedagogy :	20
d) Determination of age of a living individual.	V. Forensic Anatomy	25
e) Theoretical aspects of examination of Hair and Nail including differences between human and animal hairs.	Viva-Voce :	75
f) Application of Anatomical knowledge to fertility control.	a) Soft parts	20
g) Immunological basis of tissue typing and organ transplant.	b) Osteology	20
h) Sectional Anatomy	c) Radiological Anatomy including interpretation of CT Scan, Sonography and MRI (Newer imaging techniques)	10
i) Principles and Interpretation of CT Scan, sonography and MRI,	d) Surface Anatomy	10
j) Surface anatomy	e) Embryology	15
k) Principles of Physical Anthropology.	Total	75
l) Museum Techniques,		
m) Embalming Techniques including medico-legal aspects.		

Paper-IV

Thematic Depiction

Practical

Proposed Distribution of Marks in Practicals and Viva-Voce in Anatomy

Practicals :-	Maximum Marks
I. Dissection	50
II. Histology :-	80
a) Identification and discussion of 10 stained sections	
b) Preparation of Paraffin block	
c) Section cutting : Taking serial section from block provided	
d) Staining : along with discussion of Histological techniques	

Recommended Books and Journals :

Gross Anatomy

1. Williams Peter L. Gray's Anatomy - 38th Edition Churchill Living Stone.
2. McMinn R.M.H. Last's Anatomy - 8th Edn. ELBS, 1990.
3. Basmajain V. John and Slonecker E. Charles, "Grants Methods of Anatomy" 11th Edn. Williams and Wilking 1989.
4. Hollinshed. W. Henry, "Anatomy for surgeon's" - 4th Edn. Harper and Raw Publishers, 1985.
5. Duplessis and Gagdecker Lee Mcgregor's, "Synopsis of Surgical Anatomy" - 12th Edn., K.M. Varghese Company, 1986.
6. Snell. S. Richard, 'Clinical Anatomy for Medical Students' - 3rd & 5th Edn., Little Brown and Company, 1985.
7. Grant Boileao. J. C., 'An Atlas of Anatomy' - 5th Edn. Little Brown and Company, 1984.

Graggs Hall E.C.B. 'Anatomy as a basis for Clinical Medicine' - 2nd Edition - Williams and Williams, 1990 (\$32. 73).

9. Mc Minn M.H. Robert, 'Mc Minn's Functional and Clinical Anatomy' - 1st Edn., Mosbu Publications, 1995.
10. McMinn R.M.H. 'Last's Anatomy Regional & Applied' - 9th Edn. 1994 Churchill Living Stone.
11. A. K. Datta, 'Text Book of Anatomy' Vol.I, II & III - 4th Edn. 1997, Current Books International
12. Legross Clerk, 'Tissues of the Body' - 6th Edn., 1980 Oxford University Press.
13. Keith & Moore, 'Clinically oriented Anatomy' - 3rd Edn. 1992, Williams & Wilkings.
14. Swamy. I.B. Human Anatomy, Vol. I-II And III.

Histology :

1. Cormack. H. David, 'Ham's Text Book of Histology' - 9th Edn. J.B. Lippincott Company, 1987.
2. Copenhagen M. Wilfred Et al, 'Bailey's Text Book of Histology', 17th Edn, william and Wilkins, 1978.
3. Difiore. S.H. Mariano, 'Atlas of Human Histology' - 5th Edn. Lea - Febiger Publishers, 1985.
4. Jungueira. C. Luis Etal, 'Basic Histology' - 2nd Edn. Large Medical Publication, 1971.
5. Drury R.A.B., Wallington. E.A. Carlcon's, 'Histological Technique' 5th Edn. Oxford University, Preces, 1980.
6. Cullings, 'Histological Technique' - 3rd Edn. 1994 Butterworths.
7. John. D. Bancroft, 'Manual of Histological Technique'-1st Edn, 1984 Churchil Living

stone.

8. Michael H. Ross, 'Histology - A Text & Atlas' - 3rd Edn. 1985 williams & wilking.
9. Bloom and Falet, Text Book of His logy.

Embryology

1. Hamilton W.J. and Mossman H.W. 'Human Embryology' - 4th Edn. Williams and Wilkins Company, 1972.
2. Sadler T.W. 'Langman's Medical Embryology' - 5th & 7th Edn. Williams and Wilkins company, 1995.
3. A. K. Datta, 'Essentials of Human Anatomy, Human Embryology, - 2nd Edn. Current Books International 1991.
4. Moore Persaud, 'The Developing Human' - 6th Edn. 1998, W.B. Souders Company.
5. Larsen 'Human Embryology' - 2nd Edn. 1997 Churchil Livingstone.
6. Arey - 'Developmental Anatomy.
7. John Lankman, Embryology for Medical Students.

Neuro Anatomy

1. Everett. N.B. 'Functional Neuroanatomy' - 6th Edn. Lee and Febigger, 1971.
2. Chusid. G.Joseph, 'Correlative Neuroanatomy and Functional Neurology' - 16th Edn. Lange Medical Publication, 1976.
3. A.K. Datta (Neuroanatomy), 'Essentials of Human Anatomy' - 1st Edn, Current Books International 1997.
4. Snell. S. Richard, 'Clinical Neuroanatomy For Medical Students,' 4th Edn. Lippincottl - Raven, 1982.
5. Parent Andre, 'Carpenter's Neuroanatomy' - 9th Edn., Williams and Wilkins, 1996.

6. Indirbir Singh, 'Neuroanatomy' - 5th Edn. 1997, Jaypee Brothers Medical Publications.

Human Genetics / Medical Genetics

1. Robert F. Mueller, 'Emery's Elements of Medical Genetics' - 9th Edn. 1995, Churchill Livingstone.
2. Nora & Frazer, 'Medical Genetics Principles' - 1974 Lee & Gebiger, Philadelphia.
3. Friedman, 'NMS Genetics' - 2nd Edn; 1996.
4. Alfred. G. Kudson Jr. 'Genetics & Disease' - MC Graw Hill Book Company, N.Y.
5. Thomas D. Gelehrtar, 'Principles of Medical Genetics' - 2nd Edn. 1990, Williams & Wilkins.
6. Charma, 'Curt Stern Principles of Human Genetics' - 2nd Edn. 1960.

Comparative Anatomy

1. 'Banks Histology and Comparative Organology' - A Text Book and Atlas - Edn. 1974.
2. Wolstenhome, 'Taste & Smell in vertebrates' - Edn. 1970.
3. Embryogenesis in Mammals CIBA foundation - Edition 1976.
4. George. C. Kent, Comparative Anatomy of the Vertebrates - 3rd Edn. 1983 McGraw Hill Book Company.
5. Romer, 'Vertebrate Body' 5th Edn. 1978 V.B. Saunders Company.

Physical Anthropology

1. Harrison, 'Human Biology, An Introduction to Human, Evolution and Growth' - 2nd Edn. 1970.

2. Poiria, 'Fossil Man, 1973.

Embalming Techniques

1. Jayavelu. T. Embalming Techniques, Churchill Livingstone.
2. Ansari. M.C. Embalming.

Museum Techniques :

1. Tompsett R. H. 'Anatomical Techniques.
2. Edwards. JJ, 'Medical Museum Techniques, Oxford University Press.

Forensic Anatomy

References :

1. The Human Skeleton in Forensic Medicine, By Wilton Marion-Krogman.
2. The Essentials of Forensic Medicine, By Polson.
3. Forensic Medicine - 3 Volumes, By Tedeschi-Eckert-Tedeschi.
4. Gradwohis (Gradwohl's) Legal Medicine, By Gradwohl's

Journals :

1. American Journal of Forensic Pathology
2. Forensic Science International
3. Journal of Forensic Science.

Journals :

1. Journal of Anatomical Society of India
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.

Additional Reading

1. Compendium of recommendations of various committees on Health Development (1943-1975). DGHS, 1985 Central Bureau of Health Intelligence, Directorate General of Health Services, Min. of Health and Family Welfare, Govt. of India, Nirman Bhawan, New Delhi. P.-335.
2. National Health Policy, Min. of Health & Family Welfare, Nirman Bhawan, New Delhi, 1983.
3. Santosh Kumar, The elements of Research, writing and editing, 1994, Dept. of Urology, JIPMER, Pondicherry.
4. Srinivasa D. K. et al, Medical Education Principales and Practice, 1995. National Teacher Training Centre, JIPMER, Pondicherry.
5. Indian Council of Medical Research, "Policy Statement of Ethical considerations involved in Research on Human Subjects", 1982, I.C.M.R., New Delhi.
6. Code of Medical Ethics framed under section 33 of the Indian Medical Council Act, 1956. Medical Council of India Kotla Road, New Delhi.
7. Francis C.M. Medical Ethics, JP. Publications, Bangalor, 1993.
8. Indian National Science Academy, Guidelines for cure and use of animals in Scientific Research, New Delhi, 1994.
9. Internal National Committee of Medical Journal Editors, Uniform requirements for manuscripts submitted to biomedical Journals, N. Engl J. Med. 1991 : 424-8
10. Kirkwood B.R. Essentials of Medical Statistics, 1st Edn. Oxford, Blackwell Scientific Publications 1988.
11. Mahajan B.K. Methods in Bio-statistics for medical students, 5th Edn. New Delhi, Jaypee Brothers, Medical Publishers, 1989.
12. Raveendran. B. Giranjali, A Practical approach to PG dissertation, New Delhi, JP. Publications, 1998.

