

**Amrita School of Medicine
Amrita Institute of Medical Sciences (AIMS)
Kochi-682041**

**CURRICULUM-Department of Pathology
M.D. (PATHOLOGY)**

GOAL :

The goal of postgraduate medical education shall be to produce competent specialist.

- (i) Who shall recognize the health needs of the community and carry out professional obligation ethically and in keeping with the objectives of the national health policy;
- (ii) Who shall have mastered most of the competencies, retaining to the specialty, that are required to be practiced at the secondary and tertiary levels of the healthcare delivery system.
- (iii) Who shall be aware of contemporary advances and developments in the discipline concerned.
- (iv) Who shall have acquired a spirit of scientific inquiry and oriented to the principles of research methodology epidemiology and
- (v) Who shall have acquired the basic skills in teaching of the medical and paramedical professionals.

OBJECTIVES :

At the end of the course a candidate must be able to

- (i) Understand and explain about the factors in causation of disease.
- (ii) Understand processes involved in the gross and microscopic changes of organs and tissues and explain these changes.
- (iii) Understand and explain the basis of evolution of clinical signs and symptoms.
- (iv) Should be able to perform procedures designated for laboratory detection of diseases.
- (v) Should be able to process and accurately interpret the representative materials obtained from the patients in order to arrive at a correct diagnosis.
- (vi) Should be able to recognize and report morphological changes in cells, tissues and organs.
- (vii) Should be able to plan, perform and report specific research projects.
- (viii) Should be able to perform clinical autopsy and present CPC (Clinico Pathological Correlation)

METHODS OF TRAINING

Duration of course – 3 years.

(i) On job training

- Histopathology including techniques and reporting
- Cytology including FNAC, fluid cytology , exfoliative cytology- techniques and reporting
- Haematology including blood banking and transfusion medicine- techniques and reporting
- Clinical pathology- techniques and reporting
- Museum techniques
- Autopsy techniques and interpretation
- Serology- techniques and reporting
- Handling of hazardous material
- Handling, maintenance and calibration of instruments used in laboratory
- Undergraduate teaching
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(ii) P.G. Teaching sessions

- Journal review
- Subject seminar
- Grossing discussions for autopsies and surgical material
- Slide seminars including histopathology ,haematology, and cytopathology
- Clinical case- group discussion
- Interdepartmental seminars

Postgraduate students should be encouraged to attend CME, Workshops, Conferences & present papers.

TEACHING /LEARNING CONTENT

A. THEORY

I BASIC SCIENCES

Anatomy/histology of all structures in human body/organs

- Physiology and biochemistry-Basic aspects of various metabolism and functioning of endocrines
- Genetics-Fundamental / applied aspects
- Biostatistics
- Biomedical ethics-ethical issues related to Medical practice and research

II PATHOLOGY

Historical aspects

- General pathology
- Systemic pathology
- Haematology
- Blood banking and Transfusion Medicine
- Cytopathology

- Clinical Pathology
- Medical autopsy: Techniques and interpretation
- Recent advances in all fields, related to Pathology
- Organization of laboratory including quality control

III CLINICAL BIOCHEMISTRY

Routine biochemical investigations and various organ function tests i.e. LFT, RFT etc.

B. PRACTICAL

Proficiency of technological methods should include the following:

1. Fields in which high degree of professional competence and theoretical knowledge is expected:-

- a) Gross pathology and histopathology
- b) Haematology
- c) Cytopathology
- d) Clinical pathology and Blood banking

2. Fields in which student is expected to achieve reasonable working knowledge and skills to be able to run laboratory services independently

- a) Clinical chemistry
- b) Clinical Microbiology

Routine Microbiological investigations including culture & sensitivity

3. Fields in which student is expected to achieve general acquaintance of techniques to understand and interpret data

- a) Immunopathology
- b) Histochemistry
- c) Immunohistochemistry
- d) Cytogenetics
- e) Molecular biology
- f) Medical statistics

POSTING SCHEDULE:

- 1) Histopathology – 12 months
- 2) Autopsy - 3 months
- 3) Clinical pathology & Haematology -9 months
- 4) Cytopathology – 6 months
- 5) Blood Bank – 1 month
- 6) Biochemistry : - 15 days
- 7) Microbiology:- 15 days
- 8) Museum :- 15 days
- 9) Revision in all sections :- 31/2 months

TOTAL 36 months(3years)

RECOMMENDED MINIMUM TEXT BOOKS AND JOURNALS

BOOKS:

- 1 Cotran, Kumar, Collins. Robin's Pathologic Basis of Disease, published by W.B. Saunders & Company.
- 2.Ivan Damjanov, James Linder. Anderson's Pathology, published by C.V. Mosby Company.
3. J. B. Walter, M.S. Israel. General Pathology, published by Churchill Livingstone.
4. Emeritus W.ST. Symmers Systemic Pathology, published by Churchill Livingstone.
5. Juan Rosai, Ackerman's Surgical Pathology, published by C.V. Mosby Company.
6. Leopold G Koss, Diagnostic cytology and its histopathologic basis published by J.B. Lippincott Company.
7. Marluce Bibbo, Comprehensive cytopathology, published by W.B Saunders Company
8. Winnifred Grey, Diagnostic cytopathology, published by Churchill Livingstone
9. Orell, Sterrett- Walters and Whittaker, Fine Needle Aspiration Cytology (Manual & Atlas), published by Churchill Livingstone
- 10.Greer J.P, Foerster J,Jukens J et. al Wintrobe's Clinical Haematology, published by Lippincott Williams and Wilkins
11. Firkin F , Chesterman C, Penington D, de Gruchy's Clinical Haematology in Medical Practice, published by Blackwell Sciences
12. Henry J.B Clinical Diagnostics and Management by Laboratory Methods. published by W.B. Saunders & Company.
13. Lewis S.M, Bain D.J, Bates I, Dacie & Lewis Practical Haematology published by Churchill Livingstone.
14. Hoffbrand A.V, Catovsky D, Tuddenham G.D, Postgraduate Haematology – published by Blackwell publishing
- 15 R.Anantnarayan , C.K.Paniker, Textbook of Microbiology , published by Orient Longman.
16. Harshmohan ,Textbook of pathology , published by Jaypee.
17. Parasitology (Protozoology & Helminthology.) in relation to clinical medicine –K.D.Chatterjee – published by Chatterjee Medical Publication.
18. Sudha R.Kini ,Colour Atlas of differential diagnosis in exfoliative and aspiration cytopathology , published by Lippincott, Williams & Wilkins.
19. Praful B. Godkar ,Clinical Biochemistry – Principles & practice , published by Bhalani Publishing House, Bombay.
20. Theory & practice of Histological Techniques edited by John . D.Bancroftpublished by Chruchill Livingstone.
21. Enzinger & Weiss, Soft Tissue Tumours, Published by B.I.Publications (India.) C.V.Mosby company.
22. Elder D.E, Lever's Histopathology of the skin – Published by J.B.Lippincott Company.
23. Novak & Woodruff Edited, Novak's Gyanaecologic and Obsteric Pathology, published by – Kiaku Shoin/Saunders.

24. Christopher D.M. Fletcher, Diagnostic Histopathology of Tumours Vol.1 & 2- published by Churchill Livingstone.
25. Recent advances in Histopathology, Haematology, Blood coagulation etc.
26. AFIP, Atlas of tumour pathology.
27. Interpretation of Breast Biopsies - Carter
28. Day D.W, Jass J.R, Price A.B, Morson and Dawson's Gastrointestinal Pathology, published by Blackwell publishing .
29. Ellison D, Love S, Chimelli L et. al, Neuropathology , published by Mosby
30. Epstein Prostate Biopsy Interpretation, published by Lippincott- Raven
31. Fogo A.B,Kashgarian M, Diagnostic Atlas of Renal Pathology, published by Elsevier
Saunders
32. Foster C.R, Pathology of the Urinary Bladder, published by Saunders
33. Fox H, Wells M ,Haines & Taylor - Obstetric and Gynaecological Pathology, published by Churchill Livingstone
34. Ioachim H.L,Lymphnode Pathology, published by Lippincott
35. Kilpatrick, Renner, Diagnostic Musculoskeletal Surgical Pathology, Clinicroadiologic & cytologic correlations,published by Saunders
36. Kurman R.J, Blaustein's pathology of the female genital tract, published by Springer
37. Leslie K.O ,Wick M.R, Practical pulmonary pathology; a Diagnostic approach, published by Churchill Livingstone
38. MacSween, Butt, Portman et al,Pathology of the liver- published by Churchill Livingstone
39. Mills S.E, Sternberg's diagnostic surgical pathology, published by Lippincott Williams and Wilkins
40. Montgomery E.A, Biopsy interpretation of the Gastrointestinal Tract Mucosa, published by Lippincott Williams and Wilkins
41. Odze R.D, Surgical pathology of the GI Tract, Liver, Biliary Tract and Pancreas, published by Saunders
42. Owen D, Pathology of the Gall Bladder , Biliary Tract, and Pancreas, published by Saunders
43. Pilch B.Z, Head and Neck surgical pathology, published by Lippincott Williams and Wilkins
44. Rosen P, Pathology of Breast, published by Lippincott Williams and Wilkins
45. Silverberg S.G, Atlas of Breast pathology, published by Saunders
46. Weedon ,Skin Pathology, published by Churchill Livingstone
47. Wickremasinghe, Blood and Bone marrow pathology, published by Churchill Livingstone
48. Atkinson B, Atlas of diagnostic pathology, published by Saunders
49. Cibas E.S, Cytology :Diagnostic principles and clinical correlates, published by Saunders
50. Geisinger, Modern cytopathology
51. Naib Z.M,Cytopathology, published by Little Brown and company
52. Meisels A, Morin C, Cytopathology of the uterine Cervix, published by ASCP Press

53. Miettinen M, Diagnostic soft tissue pathology, published by Churchill Livingstone
54. Chandler F.W, Pathologic diagnosis of fungal infection, published by ASCP Press
55. Collins R.D, Paediatric Haematopathology, published by Churchill Livingstone
56. Hoffman , Benz, Shattil ,Haematology :Basic principles and practice,published by Churchill Livingstone
57. Naeim F, Atlas of bone marrow and blood pathology, published by W. B Saunders
58. Tkachuk D.C, Atlas of clinical haematology, published by Saunders
59. WHO Classification of tumours, published by IARC Press.
60. Mollison P.L, Blood transfusion in clinical medicine, published by Oxford, ELBS & Blackwell Scientific Publication
61. Chitale A, Pathology of urinary & male genital system for urologists, general surgeons & Pathologists published by B.I. Publications
62. Saran R.K., Transfusion medicine technical manual, published by WHO

JOURNALS:

1. British Journal of Haematology, published by Blackwell Sciences.
2. CANCER, International journal of American Cancer Society, published by John Wiley & Sons Inc.
3. Journal of Clinical Pathology, published by B.M.J.
4. Haematology / Oncology Clinics of North America, published by W.B. Saunders & Company.
5. American Journal of Surgical Pathology, published by Lippincott & Raven
6. Indian Journal of Pathology & Microbiology, published by IAPM.
7. Indian Journal of Cancer, published by Indian Cancer Society.
8. Indian Journal of Cytology, published by IAC.
9. LANCET published by Elsevier
10. I.C.M.R. Bulletin, published by ICMR
11. Histopathology , journal of the British Division of the International Academy of Pathology-Published by Blackwell Science
12. Acta Cytologica, The Journal of Clinical Cytology and Cytopathology
13. Archives of Pathology and Laboratory Medicine-Published by American Medical Association
14. Human Pathology- Published by W.B. Saunders & Company.
15. American Journal of Clinical Pathology published by ASCP
16. Indian Journal of Cytology
17. WHO Bulletin published by WHO
18. Indian Journal of Urology
19. Modern Pathology
20. Indian journal of Leprosy published by Indian Leprosy Association
21. New England Journal of Medicine published by Massachusetts Medical Society

ADDITIONAL READINGS:

1. Compendium of recommendations of various committees on health and development (1943 to 1975) DGHS, 1985 Central Bureau of Health Intelligence, DGHS, Ministry of Health & Family Welfare, Govt. of India, Nirman Bhavan, New Delhi-335.
2. National Health Policy, Ministry of Health & Family Welfare, Govt. of India, Nirman Bhavan, New Delhi-335. 1983.
3. ICMR, Policy, Statement of ethical considerations involved in research on Human subjects, 1982 ICMR, New Delhi.
4. Code of Medical Ethics framed under Section- 33 of Indian Medical Council Act , 1956 . MCI, Kotla road, New Delhi.
5. Santosh Kumar, The elements of Research ,writing and editing 1994,Dept. of Urology,JIPMER,Pondicherry
6. Srinivas D.K et al , Medical Education Principles and Practices,1995.National Teacher Training Centres, JIPMER, Pondicherry
7. Francis C.M Medical Ethics, J.P.Publication, Bangalore 1993
8. Indian National Science Academy, Guidelines for care and use of animals in scientific research, New Delhi,1994
9. International Committee of Medical Journal Editors, Uniform Requirements for manuscripts submitted to biomedical journal. N. Engl J Med 1991;424-8
- 10.Kirkwood B.R. Essentials of Medical Statistics, 1st ed. Oxford Blackwell Scientific Publications 1988
- 11.Mahajan B.K.Methods in Biostatistics for medical students,5th ed New Delhi, Jaypee Brothers Medical Publishers,1989
- 12.Raveendran B. Gitanjali, A Practical Approach to PG dissertation, New Delhi.J.P Publications 1998.

Student's Record Book
M.D (Pathology)
DEPARTMENT OF PATHOLOGY

Name of the Student :Dr.

Name of the Institute & Address:

ABOUT THE LOG BOOK:

The log book has been prepared to maintain a record of academic and service activities of postgraduates and to provide an account of progress made by him/her. Maintenance of such log books will also allow a review of training programme and incorporation of improvements in the programme. Postgraduates are required to carry the log book and get the entries made regularly. Faculty is requested to countersign. Log books have to be submitted to the head of the department before submitting the final examination form.

PERSONAL BIO-DATA

Name of the Student :
 Date of joining :
 Probable date of appearing for Examination :
 Date of Birth :
 M.B.B.S from :
 Year of passing MBBS :
 Name of the State Medical Council :
 Registration No with date :
 Permanent Address :
 PIN : Phone No. : ()
 Local Guardian's Address :
 PIN Phone No. : ()

POSTING SCHEDULE :

SECTION	MONTH & YEAR
From...	To.....

REMARKS**SIGNATURE OF SECTION I/C**

Clinical Pathology	Autopsy
Cytopathology	Biochemistry
Haematology	Serology
Blood Banking	Museum
Histopathology	

Revision in all sections

ATTENDANCE AT P.G. TEACHING SESSIONS:

Month & Year	No. of Teaching Programmes Held	No. of Teaching Programmes attended

Remarks :

Signature of P.G. Teaching I/C

PARTICIPATION IN P.G. TEACHING ACTIVITY

Subject Seminars	Date	Topic
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presented		

Remarks:		Signature of faculty
Journal Articles presented	Date	Topic

Remarks:		Signature of faculty
Group discussion of clinical cases	Date	Topic

Remarks:		Signature of faculty
Slide Seminars presented/participated:	Date	Topic

Remarks: **Signature of faculty**

SCIENTIFIC CONTRIBUTIONS

CME/ Workshops attended :

No.	Name of CME/ Workshop Held	Dates

No.	Conferences attended	Dates

Name of Conference Paper presented - Yes/No

If yes, title of paper Publications:

- 1.
- 2.

Awards:

CERTIFICATE

This is to certify that Dr..... has completed the tenure for M.D. satisfactorily.

P.G.Teacher Programme Incharge

**P.G.Teaching
Professor & Head**

EVALUATION SYSTEM

A. DISSERTATION

a) Thesis / Dissertation is compulsory. Every candidate is required to carry out the work on a selected research project under the guidance of a recognized post graduate teacher. The results of such work shall be submitted in the form of a Dissertation.

b) The Dissertation is aimed at training the candidate in research methods and techniques. It includes identification of a problem , formulation of a hypothesis , search and review of relevant literature, getting acquaintance with recent advances, designing of research study , collection of data, critical analysis of results and drawing conclusions.

c) The title of the topic along with the plan of work not exceeding 500 words in prescribed proforma should be submitted to the University with the recommendation of guide through proper channel within a period of 3 months from the date of registration for the postgraduate course. There should not be an overlap of topic, cases, material or the related data among the candidates within the department during the period of actual Dissertation work. Prior approval by the local Ethical Committee is essential .
Unless communicated otherwise within a period of 2 months from the date of receipt of plan of work by University, it shall be assumed that topic of Dissertation is approved and no communication is necessary in this regard. The last date for submission will not be extended without prior permission from the University. In case of delay in submission of topic of Dissertation and plan of work, the period of training of the candidate will be proportionately extended for which the entire responsibility shall be upon the candidate .

d) The volume of the Dissertation should be reasonable and may vary depending on the topic. The bibliography should be as per Vancouver system.

e) Four copies of the Dissertation complete in all respect certified by the guide should be submitted to the University through proper channel 6 months before the final examinations to the registrar. (evaluation)

f) The identity of the candidate/ teacher/ Department /College / Place should not be disclosed in the Dissertation. Acknowledgement should not be included in the Dissertation.

g) Certificates issued by guide, countersigned by Head of the Department and the Dean certifying, therein that the work done by the candidate has been carried out under the supervision of the guide to his/her entire satisfaction, should be submitted separately to the University.

h) Dissertation approval is a prerequisite for appearing at the University exam. In case the Dissertation, is not accepted, the same shall be communicated to the candidate along with reasons for rejection at least 2 months prior to the commencement of theory exam.

i) The candidate may make necessary corrections and resubmit the Dissertation at least 1 month prior to the commencement of theory exam.

B. LOG BOOK (Work diary)

The postgraduate students should include all their activities in the log book. The annual assessment based on the work diary shall be done by the guide, teacher in charge of postgraduate teaching programme and HOD.

C. UNIVERSITY EXAMINATION

The university examination will comprise of theory and practical. To be eligible to be declared as successful in the PG Degree examination it is compulsory for the candidate to pass in theory and practical examination separately in the same attempt.

a) Theory examination:

There shall be four question papers, each of three hours duration. Each paper will be of 100 marks. Minimum passing percentage is 50%

Paper I- General Pathology

Paper II- Haematology, Clinical pathology, Cytology & Transfusion Medicine, .

Paper III- Systemic Pathology

Paper IV- Recent Advances in Pathology

Each paper will consist of

2 LAQs of 20 marks each - **40**

6 SAQs of 10 marks each – **60**

Total 100 marks

Marking Pattern for Theory Examination

Marks for individual Paper

question

Q1	LAQ1	20 marks
Q2	LAQ2	20 marks
Q3 –Q8- 6 SN		10 marks each

Minimum passing marks 200

Total Marks 400

The candidate should score minimum 200 out of total 400 marks in theory i.e 50%

b) Practical Examination Duration – 3 days

DAY 1 :

i) Clinical case will include **Total 75 marks**

- urine examination - **20**
- haemogram - **20**
- special haematology test-1 – **20**
- case discussion – **15**

ii) Reconstructed autopsy - **20 marks**

iii) Gross/ Morbid Anatomy - **30 marks**

iv) Haematology and Cytology 15 slides - **75 marks**

(8 & 7 slides respectively, five minutes duration for each slide.)

DAY 2 :

i) Histopathology slides- 25 slides- **125 marks**

(the candidate should be assessed so as to evaluate performance in identifying common as well as rare lesions).Five minutes duration for each slide.

ii) Histopathological Techniques **20 marks**

- 1) Block cutting
- 2) Staining- H & E & Pap
- 3) Special stain- 1

DAY 3

i) Teaching : **15 marks**

ii) Viva Voce :- **40 marks**

Student will be examined by all the examiners together, about students' subject knowledge, comprehension, analytical approach, expression and interpretation of data, and will include discussion related to dissertation.

Marking scheme for practical examination

Sr. No.	Exercises	Maximum marks
1	Histopathology slides	125
2	Clinical case	75
3	Haematology & Cytology slides	75
4	Grossing	30
5	Structured Autopsy	20
6	Histotechniques	20
7	Teaching	15
8	Viva Voice	40

Total marks 400

Final marking scheme for MD examination in Pathology

<u>Heads of Passing</u>	<u>'Max Marks'</u>	<u>Min marks for passing</u>
Theory	400	200
Practical and viva voce	400	200

MODEL QUESTION PAPERS

Amrita Institute of Medical Sciences ,Kochi
MD PATHOLOGY

Time 3 hours

Max.Marks:100

PAPER I GENERAL PATHOLOGY

Your answers should be specific to the questions asked.
Draw neat labeled diagrams wherever necessary.
Answer all questions.

LONG ESSAY

2X20= 40 Marks

1. Discuss the role of endothelium in health and disease.
2. Discuss the molecular basis of carcinogenesis.

SHORT ESSAY

6x10=60 marks

3. Role of oxygen free radicals in disease
4. Etiopathogenesis of amyloidosis
5. Pathogenesis of pathological calcification
6. Mechanism of immunological tolerance
7. Pathogenesis of disorders caused by smoking
8. Hypercoagulability

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Amrita Institute of Medical Sciences , Kochi

MD PATHOLOGY

Time 3 hours

Max Marks:100

PAPER II HAEMATOLOGY, CLINICAL PATHOLOGY,CYTOLOGY

AND

TRANSFUSION MEDICINE

Your answers should be specific to the questions asked.
Draw neat labeled diagrams wherever necessary.
Answer all questions.

LONG ESSAY

2X20=40Marks

1. Discuss the role of bone marrow biopsy in the diagnosis of haematological disorders.
2. Discuss the role of FNAC in soft tissue tumours.

SHORT ESSAY

6X10=60 Marks

3. Diagnosis of primary and secondary lymphomatous effusions
4. Utility of cytospin in clinical laboratory
5. Molecular pathogenesis & morphology of myeloproliferative disorders

6. Thin prep cytology
7. Role of urinary sediment examination.
8. Blood Transfusion Reactions

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Amrita Institute of Medical Sciences, Kochi
MD PATHOLOGY

Time: 3 hours
Max.Marks:100 Marks

PAPER III SYSTEMIC PATHOLOGY

Your answers should be specific to the questions asked.
Draw neat labelled diagrams, wherever necessary
Answer all questions

LONG ESSAY

2X20=40 Marks

1. Discuss the pathogenesis and pathology of Crohn's disease.
2. Discuss the differential diagnosis of granulomatous lesions in the liver.

SHORT ESSAY

6X10=60 Marks

3. Nephroblastoma
4. Endometrial carcinoma
5. Inflammatory myofibroblastic tumor
6. Male infertility diagnosis
7. Primary pulmonary hypertension.
8. WHO Classification of NHL with a brief note on ALCL

Amrita Institute of Medical Sciences, Kochi

MD PATHOLOGY

Time: Three Hours

Max:100 Marks

PAPER IV RECENT ADVANCES IN PATHOLOGY

Your answers should be specific to the questions asked.

Draw neat labeled diagrams wherever necessary.

Answer all questions.

LONG ESSAY

2X20=40Marks

1. Discuss the Recent advances in the histopathology and molecular pathology of carcinoma of the endometrium
2. Discuss the molecular diagnosis of small round blue tumours of childhood

SHORT ESSAY

6X10=60 Marks

3. Methods of detection of Apoptosis in tissues
4. Post transplantation Lymphoproliferative disease.
5. Papillary Carcinoma Thyroid, variants
6. Extra renal Rhabdoid tumour
7. Prognostic factors in Breast Carcinoma
8. Current methods of Chromosomal analysis.
