Syllabus for CPS-PG-Course

FCPS (PATHO) : FELLOWSHIP IN PATHOLOGY

College of Physicians and Surgeons of Mumbai

CPS House, Dr. E. Borges Marg, Parel, Mumbai – 400012.
FCPS (PATHO) : FELLOWSHIP IN PATHOLOGY

SYLLABUS

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 and 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. Should be able to process and accurately interpret the representative materials obtained from the patients in order to arrive at a correct diagnosis.
(v) Should be able to recognize and report morphological changes in cells, tissues and organs.
(vi) Should be able to plan, perform and report specific research projects.
(vii) Should be able to perform clinical autopsy and present CPC (Clinico-Pathological Correlation)
(viii) Should be able to perform and report in the field of Transfusion medicine.

METHODS OF TRAINING

Duration of course: FCPS (3 years); DPB (2 years). 1. 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 2. P.G.

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

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

**TEACHING /LEARNING CONTENT**

A. **THEORY**

I **BASIC SCIENCES**

1. Anatomy/ Histology of all structures in human body/organs
2. Physiology and biochemistry-Basic aspects of various metabolism and functioning of endocrines
3. Genetics- Fundamental / Applied aspects
4. Biostatistics
5. Biomedical ethics- Ethical issues related to Medical practice and research

II **PATHOLOGY**

1. Historical aspects
2. General pathology
3. Systemic pathology
4. Haematology

FCPS (PATHO)
5. Blood banking and Transfusion Medicine
6. Cytopathology
7. Clinical Pathology
8. Medical autopsy: Techniques and interpretation
9. Recent advances in all fields, related to Pathology
10. Organization of laboratory including quality control

III  CLINICAL BIOCHEMISTRY:
Routine biochemical investigations and various organ function tests i.e. LFT, RFT et

PRACTICAL
Proficiency of technological methods should include the following:

1. Theoretical knowledge:-
   1. Gross pathology and histopathology
   2. Haematology
   3. Cytopathology
   4. Clinical pathology and Blood banking

2. Laboratory services.
   1. Clinical chemistry
   2. Serology

3. Techniques to understand and interpret data.
   1. Immunopathology
   2. Histochemistry
   3. Immunohistochemistry
   4. Cytogenetics
   5. Molecular biology
   6. Medical statistics

CYTOLOGY
1. Fine needle aspiration cytology – Staining & interpretation.
2. Cytology of body fluids – Staining and Interpretation

HISTOPATHOLOGY
1. Histopathologic techniques including section cutting
2. Haematoxylin and Eosin stain and special stains which include PAS stain, Acid blue stain, Recticulin stain, Masson’s Trichrome and Perl’s stain.

**HEMATOLOGY**

1. Anticoagulants
2. Preparation of Leishman’s stain and reagents for blood counts.
3. Hands on experience in different methods of Hemoglobin estimation
4. RBC, WBC, Platelets and Peripheral smear and Bone marrow.
5. Preparation and interpretation of Peripheral smear and Bone marrow.
6. Hemolytic workup incl. sickle cell preparation, Hb F & electrophoresis etc.
8. Quality Control and use of automated cell counters.

**BLOOD BANK**

1. Blood grouping and typing
2. Cross matching
3. Comb’s tests
4. Donor screening and blood collection
5. Testing for STS, HIV, Hepatitis B & C
6. Rh antibody titration
7. Cold agglutinin titre
8. Quality control

**CLINICAL BIOCHEMISTRY**

Basic Biochemistry applied to biochemical investigations: Handling of Photo colorimeter, Spectrophotometer PH – meter, Flame photometer, Semi Autoanalyser and Autoanalyser Electrophoresis, Carrying out biochemical investigations like blood sugar, urea, creatinine, proteins, bilirubin, SGOT, SGPT, Alkaline Phosphatase etc.

**Theory**

- **General Pathology:**
- Cellular adaptation cell injury and cell death
- Acute and chronic inflammation
- **Tissue renewal and repair: Regeneration healing and fibrosis.**
• Hemodynamic disorders, thrombo embolic disease and shock.

• **Genetic Disorders:** Principles of genetics, normal karyotyping, Mutations, Mendelian disorders, disorders with multifactorial inheritance, cytogenetic disorders involving autosomes and sex chromosomes., Single gene disorders with nonclassic inheritance., Diagnosis of genetic disorders involving molecular and genetic techniques.

• **Neoplasia:** Definition, nomenclature and biology of tumor growth. Molecular basis of cancer with special reference to carcinogenic agents and molecular basis of multistep carcinogenesis, Epidemiology and clinical features of tumors., Grading, staging and laboratory diagnosis of cancer.

• **Infectious Diseases:** General principles of microbial pathogenesis, bacterial, fungal, parasitic and viral infections.

• **Environmental and nutritional pathology:** Common environmental and occupational exposures leading on to disease. Nutritional deficiencies and obesity related disorders.

• **Disease of Infancy and Childhood:** Congenital anomalies, birth injuries, diseases of neonates, inborn errors of metabolism, tumor and tumor like lesions of infancy and childhood.

**Systemic Pathology:**

• **Blood vessels, lymphatic and veins:** Normal morphology, congenital anomalies, atherosclerosis, hypertensive vascular disease. Inflammatory and neoplastic diseases of all the vessels.

• **Heart:** Normal morphology, its blood supply and effect of aging on heart. Ischemic, hypertensive, valvular, congenital heart diseases and cardiomegaly, pericardial diseases. Tumors of the heart.

• **Lungs:** Congenital anomalies, Obstructive and restrictive pulmonary diseases., Diseases of vascular origin., Infections and tumors of lung, Lung transplantation, Diseases of pleura.


• **Gastro Intestinal Tract:** Disease Esophagus, stomach, small and large intestines, appendix and anal canal. Diseases of the peritoneum

• **Liver:** Normal morphology with general features of hepatic disease including LFTs. Infectious, autoimmune drug induced, metabolic and circulatory disorders of liver. Hepatic diseases associated with pregnancy, neonate’s organ and bone marrow transplantation, Liver
transplantation, Nodules and tumors of liver.

- **Biliary tract**: Congenital anomalies, injuries, Gallstones, cholecystitis and tumors of gall bladder and extra hepatic bile ducts.

- **Pancreas**: Congenital anomalies, pancreatitis and neoplasms of pancreas.


- **Lower urinary tract and male genital system**: Congenital anomalies, inflammation and tumors of ureter, urethra, penis, testis and epididymis. Inflammation, enlargement and tumors of prostate.

- **Female genital tract**: Embryology, Anatomy, Physiology and histology of female genital tract. Congenital anomalies, inflammation and tumors of vulva, vagina, cervix, uterus, fallopian tubes and ovaries. Gestational and placental disorders.

- **Breast**: Inflammations, benign epithelial lesions and tumors of the breast. Diseases of male breast.

- **The Endocrine System**: Normal hormonal levels and functions of all the endocrine glands. Hypo and hyperactivity of glands of endocrine system i.e. pituitary, thyroid, parathyroid, pancreas, adrenals and pineal gland. Autoimmune diseases, inflammations and tumors affecting these glands.

- **Skin**: Disorders of pigmentation and melanocytes, Inflammatory, vesiculobullous and infectious disease, Tumors of the epidermis, dermis and skin appendage.

**Musculoskeletal system:**


- **Central Nervous System**: Degenerative, metabolic, toxic, demyelinating, infectious, cerebrovascular malformations and traumatic injuries of skeletal muscle bundles. Tumors

- **Eye**: Infections, inflammatory, congenital diseases and neoplasms of orbit, eyelid, conjunctiva sclera, uvea, cornea, retina and optic nerves.

- **General Cytology**: Origin & principles with stress on basic structure of a mammalian cell. Recognition and classification of different cell types. Fundamental concepts of neoplasia – Benign & malignant.

- **Cytology of**: Female Genital Tract, Respiratory tract, GIT, kidney & lower urinary tract, Breast
cytology, Cytology of thyroid, lymph nodes, neck masses. of Skin, Bone & Soft tissue Cytology of common lesions

- Cytology of Liver, Spleen, Pancreas, Retroperitoneum, Abdominal lumps
- Cytology of neoplastic and non-neoplastic lesions
- Cytology of Testis & Prostate
- Cytology of all effusions & fluids in absence as well as presence of cancer.

**Haematology:** Clinical Correlation, Signs & Symptoms, General & Systemic examination) with various haematological disorders.

- Biology of stem cell & disorder of Hematopoiesis.
- Erythroid maturation, differentiation and abnormality.
- Pathobiology of human erythrocyte & Hemoglobin. Anemias
- WBC disorders, complement and immunoglobulin biology
- Hematological malignancies
- Hematopoietic stem cell transfusion
- Haemostasis & Thrombosis.
- Human blood group antigen and antibody
- Haematological manifestations of various diseases like liver disorders, renal disorders, infections, cancers, AIDS and Parasitic diseases.
- Hematological problem in surgical patients.
- Spleen and its disorders.
- Cytokines with details about their properties and functions.
- Disorders of the immune system.
- Amyloidosis including pathogenesis, special stains & clinical correlation.

**Transplant rejection in detail**

**A) PRACTICAL**

- Histopathology
- Cytopathology
- Haematology
- Clinical Pathology
- Immunopathology
  1. Agglutination Reactions- Principle, Techniques & practical Applications
  2. All tests based on ELISA – Principle, Techniques & practical Applications
  3. Protein electrophoresis – Principle, Technique & practical applications
  4. Immuno-electrophoresis
  5. Detailed knowledge of ANA & ANCA profile
  6. Immunohistochemistry Principle, Techniques & Practical Applications
  7. Immunofluorescence – Principle, Techniques & Practical Applications
  8. RIA (Radio immunoassay) Principle, Techniques & Practical Applications
  9. PCR- Principle, Techniques & Practical Applications
  10. FISH, CISH, SKY -Principle Techniques & Practical Applications
  11. Flow Cytometry- Principle, Techniques & Practical Applications
  12. Blot techniques – Principle, Techniques & Practical Applications

GENERAL MICROBIOLOGY
  1. History and pioneers in Microbiology
  2. Microscopy
  5. Growth and nutrition of bacteria.
  7. Sterilization and disinfection.
  8. Biomedical waste disposal
  13. Bacterial ecology-normal flora of human body, hospital environment, air, water and milk
  15. Quality control and Quality Assurance in Microbiology.
  16. Laboratory Bio safety
  17. Health care associated infections- prevention and control

IMMUNOLOGY AND APPLIED ASPECTS
1. The normal immune system.
2. Innate immunity.
3. Antigens.
4. Immunoglobulins.
5. Complement.
6. Antigen and antibody reactions.
7. Hypersensitivity.
9. Immunodeficiency.
10. Autoimmunity.
11. Immune tolerance.
12. Transplantation immunity.
13. Tumour immunity.
14. Prophylaxis and immunotherapy
16. Immunity and immunopathogenesis of specific infectious diseases
17. Molecular Biology Techniques. For e.g. PCR, DNA probes.

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) Serology

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:**

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<thead>
<tr>
<th>Posting</th>
<th>FCPS (Pathology)</th>
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<tbody>
<tr>
<td>Histopathology and Autopsy</td>
<td>15 months</td>
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<td>Clinical pathology</td>
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<td>Haematology</td>
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<td>Cytopathology</td>
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<td>Blood Bank</td>
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<td>Biochemistry</td>
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<td>Serology</td>
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<td>Museum</td>
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<td>Revision in all sections</td>
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<td><strong>TOTAL</strong></td>
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**RECOMMENDED MINIMUM TEXT BOOKS AND JOURNALS BOOKS:**

5. Juan Rosai, Ackerman’s Surgical Pathology, published by C.V. Mosby Company.
22. Elder D.E, Lever’s Histopathology of the skin – Published by J.B. Lippincott Company.
25. Recent advances in Histopathology, Haematology, Blood coagulation etc.
27. Interpretation of Breast Biopsies - Carter
34. Ioachim H.L, Lymphnode Pathology, published by Lippincott.
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
46. Weedon, Skin Pathology, published by Churchill Livingstone
47. Wickremasinghe, Blood and Bone marrow pathology, published by Churchill Livingstone
49. Cibas E.S, Cytology: Diagnostic principles and clinical correlates, published by Saunders
50. Geiinger, Modern cytopathology
53. Miettinen M, Diagnostic soft tissue pathology, published by Churchill Livingstone
55. Collins R.D, Paediatric Haematopathology, published by Churchill Livingstone
59. WHO Classification of tumours, published by IARC Press.

JOURNALS:
3. Journal of Clinical Pathology, published by B.M.J.
5. American Journal of Surgical Pathology, published by Lippincott & Raven
6. Indian Journal of Pathology & Microbiology, published by IAPM.
8. Indian Journal of Cytology, published by IAC.
9. LANCET published by Elsevier
11. Histopathology, journal of the British Division of the International Academy of Pathology- Published by Blackwell Science
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. Modern Pathology

ADDITIONAL READINGS:
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
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
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EXAMINATION PATTERN

**Theory Examination**

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Section I+II = 100 Marks

Total Theory = 400 Marks

**Practical Examination**

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<th>MORBID ANATOMY</th>
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<td>Histopathology Slides, Histopathology techniques, Grossing, Autopsy &amp; viva</td>
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<th>Paper 06</th>
<th>CLINICAL PATHOLOGY</th>
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<td>Haematology, hemat.+ Cyto,Slides Urine Examinations, Bio-Chemistry, Micro, Spots &amp; Viva</td>
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Total Marks (Aggregate marks for passing is 50% out of total.) 200

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<td>Paper 05</td>
<td>Oral &amp; Viva</td>
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<td>Paper 06</td>
<td>Cases-(1 Long, 2 short) 60+20+20</td>
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