

DPU

Dr. D. Y. PATIL VIDYAPEETH, PUNE
(DEEMED UNIVERSITY)

Syllabus
for
PG Surgical Specialities

2014-15

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**RADIO DIAGNOSIS
& IMAGING**

**RULES, REGULATION , SYLLABI & EXAMINATION
PATTERN FOR P.G. COURSES : M.D. (RADIODIAGNOSIS).**

ELIGIBILITY FOR REGISTRATION :-

Every Candidate for registration for Post Graduate Medical Course must have complied with the conditions laid hereunder:-

A. (i) For M.D. Course: -

The candidate should have passed the examination for the graduate Degree of Bachelor of Medicine and Bachelor of Surgery of this University or any other University or any other equivalent examination recognized by this University.

B. Completed such period of post examination or Pre-degree compulsory housemanship or internship or rotating internship which entitles him/her to the award of the degree of Bachelor of Medicine and Bachelor of Surgery required by and to the satisfaction of this Deemed University.

C. Acquired registration as a Medical Practitioner according to the rules in force under the Maharashtra State Medical Council prior to registration with this University for the Post Graduate degree course.

D. The Post–Graduate students will not be permitted to register their names simultaneously for Diploma and Degree courses of this University or any other University or any other College, e.g. C.P.S. Bombay. He/She may however, take up examination of National Academy of Medical Sciences.

2. PERIOD OF TRAINING: -

(A) The period of training for MD shall be three years viz. 6 academic terms of 6 months each after registration as Post-Graduate Student.

(B) No exemption/concession in the above mentioned period of training shall be granted.

3. NUMBER OF REGISTRATIONS:

(A) The student teacher ratio would be such that the numbers of Post-Graduate teachers to the number of Post-Graduate students admitted per year be maintained at 1: 1 for MD.

4. ACADEMIC YEAR AND TERMS :-

(A) The academic year for Post-Graduate medical courses will start on 1st May and end on 30th April. It will have two academic terms.

I Term	:	1 st May to 31 st October.
II Term	:	1 st November to 30 th April.

(B) Registrations as Post-Graduate students will be done once in the academic year only. Last date of registration as Post- Graduate student will be 31st May.

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(C) Granting of Terms :

(i) A student will be granted a term provided he/she puts in 75% attendance during the term excepting the last i.e. the examination term in which he/she can avail the accumulated leave upto a period of three months. The scale of leave of all types is fifteen days per term.

(ii) The University will not allow a student to continue the Post-Graduate course on the strength of his/her past registration. Past registration implies the maximum period of two years after the completion of terms. The past registration should be treated as lapsed. Such a student desiring to prosecute his/her Post- Graduate studies be advised to register his/her name afresh. In that case, the student will not get any concession in the terms.

(iii) As regards the dissertation subject, if a guide of the student is prepared to guide him/her on the previous topic, the student may be permitted to do the fresh registration with pervious topic.

(iv) In case a candidate registers his/her name for the Post-Graduate Degree course and then leaves the course on medical grounds, the six months gap be allowed and in that case the student may be permitted to continue his/her studies, on compassionate grounds on the recommendation of the Guiding Teacher, Head of the Department and the Dean of the College.

(D) Cancellation of Registration: -

Before cancellation of registration on account of adverse progress report, the University should get recommendation of guiding teacher, duly endorsed by the Head of the Department and the Dean of the College.

5. METHOD OF TRAINING :-

(A) The training of Post-Graduate for Degree should be of the Residency pattern with patient care. The participation of the students in all facets of the educational process i.e. lectures, lecture-demonstration, symposia, seminars, journal clubs etc. should be insisted upon and training in basic medical sciences and laboratory and experimental work emphasized. The course content/syllabus is att as Appx - 'A'.

(B) Candidate pursuing Degree course should work in the concerned department of the Institution for the full period on a full time basis.

(C) (i) In organization of Post-Graduate training, Clinical, Practical, laboratory, Clinico-Pathological conferences, post-mortem work, seminars, etc. and facilities offered by other Clinical and Basic Sciences department should be made available to Post-Graduate students. The co-ordination Committee of the college will be responsible to implement a co-ordinated Post-Graduate training programme of lectures, lecture-demonstration, group discussions, seminars, clinical meetings, clinico-pathological programmes etc. The Post-Graduate departments should submit the departmental programme at the beginning of each

academic term to the Co-ordination committee for approval.

(ii) The Dean will submit to the University the Post-Graduate programme of various departments, which shall be reviewed by the Board of Studies in the subject concerned. The Board of studies may address the faculty of medicine regarding improvements in the course of the study and its implementation.

(iii) During the course of studies the department should so arrange the training that the student should see large number of clinical cases, perform all Radiological/USG/ CT/MRI & Interventional procedures so that at the end of the training period the student has acquired the knowledge and skills expected from a specialist in the field of Radio-diagnosis & Imaging.

(iv) The Post-Graduate students are required to keep record of their clinical, laboratory, operative work, etc., countersigned by teachers under whose guidance the work was done.

(v) The Post-Graduate students should do emergency duties, night duties and attend work in casualities and wards pertaining to Radio-diagnosis & Imaging.

(vi) During the period of clinical training the Post-Graduate student should maintain regular contact with his/her thesis guide and while doing clinical training should continue the research work.

(vii) 75% attendance in the clinical posting is mandatory for grant of terms. The Post-Graduate students must keep record of work done. The Head of the Department is required to submit to the University

through the Dean six monthly report of the work of the candidates.

D. Thesis/ Dissertation: -

(i) The thesis/dissertation is compulsory for candidates registered for M.D.

(ii) The subject of thesis along with a synopsis (about 200 words) countersigned by the Post Graduate teacher, Head of the Department and the Head of the Institution should be submitted to the University within 4 months of registration as Post-Graduate student.

(iii) The subject and plan of work of the thesis should not be same as that of a thesis, which has been accepted by the University in the past three years.

(iv) If a work required for the thesis entails collaboration with other department or specialties, the collaborative portion of work will be supervised by a co-guide designated by the Head of the institution. A co-guide should normally be a Post-Graduate teacher in his own specialty. In cases where there is a guide and a co-guide for a thesis, the certificate required for submission of the thesis should be signed both by the guide and the co-guide.

(v) The subject of thesis should as far as possible reflect the research priorities of the Post-Graduate department where the work is being done. The Dean of the college while submitting the topic of thesis to the University for approval should make sure that the institution provides all facilities for the research work.

(vi) The candidate should submit to the University six monthly progress report of thesis and his other Post-Graduate work through his Post-Graduate teacher, Head of the Department and the Head of Institution.

(vii) If the progress of a candidate's work including thesis work is not satisfactory, the University on recommendation of Head of the Department, Head of the Institution and the Dean of faculty of Medicine may not grant that particular term and the period of training will be extended by the number of terms not granted.

(viii) If there is a minor change in the topic of dissertation the same be allowed at any time. However, if there is a major change the student may be allowed to change without keeping additional terms provided there is an interval of three clear terms between the date of application and the date of examination.

E. Lectures /Seminars etc.:-

The Post-Graduate department should arrange lectures, seminars, symposia, tutorials, journal-clubs etc. to keep the student abreast on the latest development in the subject. 75% attendance in these is mandatory for grant of terms.

6. POST-GRADUATE TEACHER: -

(A) Teacher in a Medical College/Medical Institution having atleast 8 years Under-Graduate and/or Post Graduate teaching experience of which not less than 5 years should be after obtaining the requisite recognized post-graduate qualifications shall be recognized as Post- Graduate teacher.

(B) In case of teacher in the Armed Forces Medical College teaching experience will be computed in terms of University of Pune letter No. BUTR/R-34/4257, dated 17/20 February, 1970 which lays down:

(i) An Officer who is classified specialist of more than two years standing and has obtained Post-Graduate degree 4 years earlier is given a credit of 6 years teaching experience.

(ii) In addition if he has worked in any of the hospitals recognized for Post-Graduate training after fulfilling the above requirement, the whole period, so spent will be considered as additional teaching experience.

(C) Notwithstanding the teaching experience prescribed in the teachers eligibility qualifications, in exceptional cases where a candidate has worked in a recognised research institution or a medical college and has produced original research work of a very high quality recognized as original scientific contribution at a national and/or international level this may also be considered and such research experience may be counted as equivalent to teaching experience provided other conditions are fulfilled.

(D) If a Post-Graduate teacher or a Co-guide supervising the research work of a student is transferred or retires when the research work is nearly completed and the thesis is in the process of finalization viz. of a candidate in the 5th and 6th terms of the M.D. course the Post-Graduate guide and the Co-guide can continue to guide such a student and sign the certificate on specific approval by the University.

(E) Students being guided by a guide who are in the first to fourth term of their studies will have to be transferred to a new guide. To maintain the teacher student ratio at 1: 1 the new guide will not register a new student in the next term or the next two terms as applicable.

(F) Post-Graduate teacher will cease to guide the research work of the candidate on attaining the age of 65 years.

7. EXAMINATION:-

(A) Thesis/Dissertation (For M.D.)

(i) Should be submitted to the University 6 months before the date of written, oral, clinical & practical examination. Approval of thesis is a precondition for permission to appear in the rest of the examination.

(ii) The thesis will be examined for acceptance by two external examiners one from Maharashtra state & the other from outside the state apart from assessment by the two internal examiners. Each will assign marks out of 100. The examiners will send the marks directly to the University. To qualify for appearing in the theory, clinical and practical part of the examination, candidate must receive a minimum of 50 marks out of 100 from each examiner. Thesis marks however, will not be taken into consideration in the final marksheet.

(iii) In the thesis the candidate will not disclose his/her identity or identity of the guide or institution in any way.

(iv) If a student has submitted his/her examination form as also his/her thesis previously, he/she will be permitted to take examination within a period of 4 years any time in future provided the thesis has been accepted. The terms satisfactorily kept by him/her are valid in future, only for a period of 4 years subsequent to submission of his/her thesis after which he/she will have to undergo Post-Graduate training again for 4 terms to be eligible for appearing for the theory, clinical and practical examination.

(B) Theory :

(i) There shall be four theory papers at M.D. examination of 80 marks each (Total $80 \times 4 = 320$).

(C) Clinical, Oral and Practical :

Consisting of long & short cases, instruments, X-rays, specimen spots, laboratory work, viva-voce etc. There will be 320 marks in clinical, oral and practicals in M.D. examination.

(D) Internal Assessment :

The internal assessment will be carried out thrice as follows :

- (1) (a) After 12 months of joining the course.
- (b) After 24 months of joining the course.
- (c) Preliminary examination after 33 months of joining the course.

(2) Pattern Of Internal Assessment :

It will consist of theory and practical examinations of 100 marks each, which will be reduced to total of 80 marks and added to the final theory and practical marks respectively.

(E) Heads and the Standard of Passing:

(1) There will be two heads of passing: -

- (i) Theory papers shall form one head of passing.
- (ii) Clinical, Oral and Practical taken together shall form the second head of passing.

(2) A candidate must pass in both the heads of passing that is the whole examination at one and the same attempt. A candidate passing in one head and failing to pass in the other head will be declared fail and shall not be entitled to any exemption in the head in which he/she has passed, in an examination taken subsequently.

(3) **Total Marks will be as under :**

(a) Theory :

Final Exam	Internal Assessments (I+II+III)	Total
Four papers 80 marks each = 320	80	400
(b) Practical : 320	80	400
Total		800

(4) **To pass a candidate must obtain :**

- (i) 50% of the total marks in theory examination.
- (ii) 50% of the total marks in clinical, oral and practicals taken together.
- (iii) In any of the papers in theory he/she must not obtain less than 40% marks to be declared pass.
- (iv) Grand total is not a head of passing.

(5) **Scheme of Paper-Setting**

1. For M.D. (Radio-diagnosis) there shall be four papers.
2. Each paper will be of 80 marks.
3. Each paper will have questions as follows :
 - a. Multiple Choice Questions (MCQ's) of 20 marks.
 - b. Two long answer questions (LAQ's) of 15 marks each. Total 30 marks.
 - c. Six short answer questions (SAQ's) of 05 marks each. Total 30 marks.

4. Each paper will be of three hours duration.
5. The composition of the papers will be as given below.

M.D. (Radio-Diagnosis)

- | | | |
|------------------|---|---|
| Paper I | - | Applied Basic Sciences including Radiological Physics as applicable to Radio-Diagnosis. |
| Paper II | - | Radio-Diagnosis including Radiographic Techniques. |
| Paper III | - | Radio-Diagnosis including Recent Advances. |
| Paper IV | - | General Medicine & General Surgery as applicable to Radio-Diagnosis. |

SYLLABUS/COURSE CONTENT

A. BASIC RADIOLOGY

I. RESPIRATORY SYSTEM :

1. **The Normal Chest :**
Anatomy, Techniques of Investigations & differential diagnosis.
2. **The Mediastinum :**
Normal Anatomy, Techniques of Investigations & differential diagnosis.
3. **THE PLEURA :**
4. **TUMOURS OF THE LUNG :**
5. **PULMONARY INFECTIONS :**
6. **DISEASES OF THE AIRWAY ; COLLAPSE & CONSOLIDATION :**
7. **DIFFUSE LUNG DISEASE :**
8. **CHEST TRAUMA ; THE POST OPERATIVE CHEST; INTENSIVE CARE ; RADIATION :**
9. **CHEST IN CHILDREN :**

II. CARDIAC VASCULAR SYSTEM :

1. The Normal Heart : Techniques of Investigations & differential diagnosis.
2. The Pericardium :
3. The Pulmonary circulation :
4. Congenital heart disease :
5. Acquired heart disease :
6. Arteriography & Interventional Angiography :
7. Phlebography :
8. The lymphatic system :

III. THE GASTRO-INTESTINAL TRACT & ABDOMEN :

1. The Salivary glands, pharynx and oesophagus:
2. The Stomach and duodenum :
3. The small intestine :

4. The colon :
5. The acute abdomen : abdominal trauma :
6. The biliary tract :
7. The liver and spleen :
8. The pancreas :
9. The adrenal glands :
10. The paediatric abdomen :

IV . THE UROGENITAL TRACT :

1. Imaging Investigating Techniques of the Urogenital Tract :
2. The kidneys :
3. The ureter & upper urinary tract obstruction :
4. The bladder and prostate :
5. The urethra :
6. The scrotum, testis & penis :
7. Obstetric Ultrasound :
8. Gynaecological Imaging :

V . BONES AND JOINTS :

1. Congenital skeletal anomalies : skeletal dysplasias ; chromosomal disorders :
2. Periosteal reaction : bone and joint infections ; sarcoid :
3. Avascular necrosis ; osteochondritis :
4. Diseases of joints :
5. Tumours and tumour - like conditions : Benign
6. Tumours and tumour like conditions : Malignant
7. Disorders of the lymphoreticular system & other haemopoietic disorders :
8. Metabolic & endocrine disorders affecting bone :
9. Skeletal trauma : general considerations :
10. Skeletal trauma : regional :

V. THE SKULL AND CENTRAL NERVOUS SYSTEM :

1. The Skull : Anatomy, Techniques of Investigations & differential diagnosis :
2. Neuro radiology of the spine :
3. Angiography in neuro radiology :

4. Interventional neuro radiology :
5. Intracranial lesions :

VII. ENT, EYES, TEETH & SOFT TISSUES :

1. The Pharynx and larynx : The Neck :
2. The Sinuses :
3. The Petrous temporal bone :
4. The Orbit :
5. Ultrasound of the Eye & Orbit :
6. Teeth & Jaws :
7. The Soft Tissues :
8. The Breast :

VIII. RECENT ADVANCES IN RADIO IMAGING :

B. RADIOLOGICAL PHYSICS & X-RAY TECHNOLOGY :

1. Radiation :
2. Production of X - Rays :
3. X- Ray generators :
4. Basic interaction between X- Rays and matter :
5. Attenuation :
6. Filters :
7. X- Ray beam restrictors :
8. Physical characteristics of X- Ray films & film processing :
9. Photographic characteristics of X- Ray films :
10. Fluroscopic imaging and image intensifier :
11. Viewing & recording of the fluroscopic image :
12. The radio graphic image :
13. Geometry of the radio graphic image :
14. Body section radiography :
15. Stereoscopy :
16. Xero- Radiography :
17. Computed Tomography :
18. Ultrasound :
19. Digital Radiography :
20. Nuclear Magnetic Resonance :
21. Magnetic Resonance Imaging :

22. Radiation hazards & protection :
23. Electric hazards & protection :
24. Cine Angiography :
25. Atomic structure, radioactive isotopes & gamma camera :
26. Positron Emission Tomography :
27. Digital Subtraction Angiography :
28. Catheters, guides wires, dilators, balloons & stents :
29. Pictorial Achieving & Communicating System (PACS) :
30. DICOM :

C. DARK ROOM TECHNIQUES :

1. Layout of Ideal Dark Room : maintenance and its accessories :
2. Developer : ingredients & their action :
3. Developer : exhaustion & methods of determination :
4. Replenisher & rapid development :
5. Fixer : ingredients & their action :
6. Fixer : exhaustion & methods of determination :
7. Effect of temp on standard development /fixing time & methods to maintain it. :
8. Tropical processing :
9. Intensifying screens /construction, types and advantages
10. Rare earth intensifying screens :
11. Intensification factor :
12. Cassette : construction & care
13. Factors affecting image details :
14. Factors affecting image contrast & density :
15. Grids : construction & types
16. Cones & collimeter :
17. X Ray films - construction, types & storage :
18. Film faults in dark room & their prevention :
19. Film fog :
20. Hangers :
21. Safe light :
22. Automatic developing unit :
23. Day light loading and unloading of films :