MAHATMA GANDHI UNIVERSITY
of
MEDICAL SCIENCES & TECHNOLOGY
JAIPUR

Super Specialty Courses

SYLLABUS
DM Interventional Radiology (DM07)

Edition 2021-22

Notice

1. Amendment made by the National Medical Commission (NMC) in Rules/Regulations of Post Graduate Medical Courses shall automatically apply to the Rules/Regulations of the Mahatma Gandhi University of Medical Sciences & Technology (MGUMST), Jaipur.

2. The University reserves the right to make changes in the syllabus/books/guidelines, fees-structure or any other information at any time without prior notice. The decision of the University shall be binding on all.

3. The Jurisdiction of all court cases shall be Jaipur Bench of Hon'ble Rajasthan High Court only.

Syllabus of DM / M.Ch. Courses

DM INTERVENTIONAL RADIOLOGY (DM07)

SELECTION OF CANDIDATES:

There shall be a uniform entrance examination to all medical educational institutions at the Postgraduate level namely 'National Eligibility-cum-Entrance Test' for admission to postgraduate courses in each academic year and shall be conducted under the overall supervision of the Ministry of Health & Family Welfare, Government of India.

In order to be eligible for admission to Postgraduate Course for an academic year, it shall be necessary for a candidate to obtain minimum of marks at 50th percentile in the 'National Eligibility-Cum-Entrance Test for Postgraduate courses' held for the said academic year. However, in respect of candidates belonging to Scheduled Castes, Scheduled Tribes, and Other Backward Classes, the minimum marks shall be at 40th percentile. In respect of candidates with benchmark disabilities specified under the Rights of Persons with Disabilities Act, 2016, the minimum marks shall be at 45th percentile for General Category and 40th percentile for SC/ST/OBC.

The percentile shall be determined on the basis of highest marks secured in the All India Common merit list in National Eligibility-cum-Entrance Test for Postgraduate courses.

Provided when sufficient number of candidates in the respective categories fail to secure minimum marks as prescribed in National Eligibility-cum-Entrance Test held for any academic year for admission to Postgraduate Courses, the Central Government in consultation with Medical council of India may at its discretion lower the minimum marks required for admission to Post Graduate Course for candidates belonging to respective categories and marks so lowered by the Central Government shall be applicable for the academic year only.

The reservation of seats in Medical Colleges/institutions for respective categories shall be as per applicable laws prevailing in States/Union Territories. An all India merit list as well as State-wise merit list of the eligible candidates shall be prepared on the basis of the marks obtained in National Eligibility-cum-Entrance Test and candidates shall be admitted to Postgraduate Courses from the said merit lists only.

There shall be no admission of students in respect of any academic session beyond 31st August under any circumstances. The Universities shall not register any student admitted beyond the said date.

ELIGIBILITY:

Candidates must meet the eligibility criteria required to get admission to DM courses through NEET-SS.

Common Counseling:

There shall be a common counseling for admission to all Postgraduate Super specialty Courses (DM/ M.Ch.) in all Medical Educational Institutions on the basis of merit list of the National Eligibility-cum-Entrance Test.

Period of Training:

The period of training for obtaining DM/M.Ch Degrees shall be three completed years including the examination period.

Migration:
Under no circumstance, Migration/transfer of student undergoing any Super Specialty course shall be permitted by any University/ Authority.

Staff - Faculty:
Only those teachers who possess 6 years teaching experience out of which at least 2 years teaching experience as Assistant Professor gained after obtaining the higher specialty degree shall be recognized post graduate teacher.

No teacher shall be considered as a postgraduate teacher in any other institution during the period till the postgraduate course at the institute which has been granted permission considering him as a postgraduate teacher is recognized u/s 11(2) of the Indian Medical Council Act, 1956.

Minimum staff required (Super-speciality):
1- Professor
1- Associate Professor
1- Assistant Professor
1- Senior Resident
2- Junior Resident

Training Programme:
All the candidates joining the Post Graduate training programme shall work as 'Full Time Residents' during the period of training and shall attend not less than 80% (Eighty percent) of the imparted training during each academic year (Academic Term of 6 months) including assignments, assessed full time responsibilities and participation in all facets of the educational process.

No candidate shall be permitted to run a clinic/work in clinic/laboratory/nursing home while studying postgraduate super specialty course. No candidate shall join any other course or appear for any other examination conducted by this university or any other university in India or abroad during the period of registration.

Every institution undertaking Post Graduate training programme shall set up an Academic cell or a curriculum committee, under the chairmanship of a senior faculty member, which shall work out the details of the training programme in each speciality in consultation with other department faculty staff and also coordinate and monitor the implementation of these training Programmes.

The training programmes shall be updated as and when required. The structured training programme shall be written up and strictly followed, to enable the examiners to determine the training undergone by the candidates and the Medical Council of India inspectors to assess the same at the time of inspection.

Post Graduate students shall maintain a record (log) book of the work carried out by them and the training programme undergone during the period of training including details of surgical operations assisted or done independently by M.Ch. candidates.

The Record (Log) Books shall be checked and assessed periodically by the faculty members imparting the training.

During the training for award of Degree / Superspecialty in clinical disciplines, there shall be proper training in Basic medical sciences related to the disciplines concerned; so also in

the applied aspects of the subject; and allied subjects related to the disciplines concerned. In the Post Graduate training programmes including both Clinical and Basic medical sciences, emphasis has to be laid on Preventive and Social aspects. Emergency care, facilities for Autopsies, Biopsies, Cytopsies, Endoscopy and Imaging etc. shall also be made available for training purposes.

The Post Graduate students shall be required to participate in the teaching and training programme of undergraduate students and interns.

Training in Medical Audit, Management, Health Economics, Health Information System, basics of statistics, exposure to human behaviour studies, knowledge of pharmaco – economics and introduction to nonlinear mathematics shall be imparted to the Post Graduate students.

The teaching and training of the students shall include graded responsibility in the management and treatment of patients entrusted to their care; participation in Seminars, Journal Clubs, Group Discussions, Clinical Meetings, Grand Rounds, and Clinico-Pathological Conferences; practical training in Diagnosis and Medical and Surgical treatment; training in the Basic Medical Sciences, as well as in allied clinical specialitites.

The training programme shall be on the same pattern as for M.D. / M.S. in clinical disciplines; with practical training including advanced Diagnostic, Therapeutic and Laboratory techniques, relevant to the subject of specialization. Postgraduate Superspecialty Residents in Surgical Specialties shall participate in Surgical operations as well.

A postgraduate student of a postgraduate degree course in super specialities would be required to present one poster presentation, to read one paper at a national/state conference and to present one research paper which should be published/accepted for publication/sent for publication during the period of his postgraduate studies so as to make him eligible to appear at the postgraduate degree examination.

ENROLMENT AND REGISTRATION:

Every candidate who is admitted to DM/MCh. course in Mahatma Gandhi Medical College & Hospital shall be required to get himself/herself enrolled and registered with the Mahatma Gandhi University of Medical Sciences & Technology upto November 30 of the year of admission without late fees upto December 31 of the year of admission with late fees after paying the prescribed eligibility and enrolment fees.

The candidate shall have to submit an application for the enrolment/eligibility along with the following original documents with the prescribed fees –

(a) MD/MS pass Marks sheet/Degree certificate issued by the University.
(b) Migration certificate issued by the concerned University (in case the University is other than the MGUMST).
(c) Date of Birth Certificate
(d) Certificate regarding registration with Rajasthan Medical Council / Medical Council of India / Other State Medical Council.

EXAMINATIONS:

The examination shall be held at the end of three academic years (six academic terms). The academic term shall mean six months training period. The examination shall consist of: Theory and Clinical/Practical and Oral.

The examinations shall be organised on the basis of 'Marking system' to evaluate and to certify candidate's level of knowledge, skill and competence.

For passing DM/M.Ch. examination as a whole, a candidate shall secure not less than 50% marks in each head of passing which shall include (1) Theory (2) Clinical / Practical and Oral examination.

(1) **Theory:**

There shall be four theory papers of 3 hours duration and 100 marks each. Out of the four theory papers, one Paper-I shall be on 'Basic Sciences', and another Paper-IV on 'Recent Advances'. The theory examination shall be held in advance before the Clinical and Practical examination, so that the answer books can be assessed and evaluated before the commencement of the clinical/Practical and Oral examination.

Paper I and II will be set by one external examiner from outside of the state and paper III and IV by another external examiner from outside of the state. The external examiner, who is paper setter for paper I & II shall evaluate the answer books of paper II. The external examiner, who is paper setter for paper III & IV shall evaluate the answer books of paper III. The answer books of paper I & IV shall be evaluated by internal examiners. The answer books of paper IV shall be evaluated by the Head of the Department and the answer books of paper I shall be evaluated by the second Internal Examiner.

Candidates will be required to attempt all the questions in every question paper. In Paper I, Paper II and Paper III there will be 10 questions. Each question shall carry 10 marks. In Paper IV there will be 5 questions of 20 marks each.

Obtaining a minimum of 40% marks in each theory paper and not less than 50% cumulatively in all the four papers shall be compulsory to pass the examination.

The paper wise distribution of the Theory Examination shall be as follows:

Paper-I	Basic Science (Consisting of vascular anatomy, Radiation physics and instrumentation related to interventional radiology)
Paper-II	Vascular interventional radiology
Paper-III	Non Vascular and Fetal interventional radiology
Paper-IV	Recent Advances in Interventional Radiology

(2) **Clinical / Practical and Oral:**

Clinical/Practical examination shall be conducted to test / aimed at assessing the knowledge and competence of the candidate for undertaking independent work as a specialist / teacher. Practical examination shall consist of carrying out special investigative techniques for Diagnosis and Therapy. M.Ch candidates shall also be examined in surgical procedures. Oral examination may be comprehensive enough to test the candidate's overall knowledge and competence about the subject, investigative procedures, therapeutic technique and other aspects of the specialty, which shall form a part of the examination.

There shall be one long case of 150 marks, two short cases of 75 marks each and oral examination of 100 marks. Obtaining of 50% marks in Clinical / Practical and Oral examination shall be mandatory for passing the Clinical / Practical and Oral examination.

Result:
For passing DM/M.Ch. Examination, a candidate will be required to obtain at least 40% marks in each theory paper, 50% marks in the aggregate of all the four theory papers and 50% marks in the aggregate of Clinical / Practical and Oral examination separately. A candidate failing in any theory paper or in the aggregate of all four theory papers or Clinical / Practical and Oral examination shall have to repeat the whole DM/M.Ch. examination.

Grace Marks:
No grace marks will be provided in DM/M.Ch. examinations.

Revaluation / Scrutiny:
No Revaluation shall be permitted in the DM/M.Ch. examinations. However, the student can apply for scrutiny of the answer books as per University Rules

Examiners:
As per the Amendment Notification of the MCI dated June 5, 2017, no person shall be appointed as an internal examiner in any subject unless he/she has three years experience as recognized PG teacher in the concerned subject. For external examiners, he/she should have minimum six years of experience as recognized PG teacher in the concerned subject.

For all Post Graduate Super specialties examinations, the minimum number of Examiners shall be four, out of which at least two (50%) shall be External Examiners, who shall be invited from other recognised universities from outside the State.

Number of Candidates:
The maximum number of candidates to be examined in Clinical / Practical and Oral on any day shall not exceed three for D.M./M.Ch. Examinations.

Number of Examinations:
The university shall conduct not more than two examinations in a year, for any subject, with an interval of not less than 4 and not more than 6 months between the two examinations.

DM INTERVENTIONAL RADIOLOGY (DM07)

Duration : 3 Years

Admission Eligibility : Competitive Exam (NEET)

GOALS

The goal of DM Interventional Radiology course is to develop new radiologist for the treatment of various diseases where operative procedure are difficult and to assist in various measures surgeries.

OBJECTIVES

At the end of the DM course in Interventional Radiology, the student should be able to:

- Non Vascular Interventional Procedure like Drainage, Aspiration, Biopsy's etc.
- To deal with vascular injury in cases of trauma.
- To deal with various embolization procedures in vascular pathologies.
- To assist surgeons in complicated vascular and non vascular surgeries.

SYLLABUS

Paper-I Basic Science (Consisting of vascular anatomy, Radiation physics and instrumentation related to interventional radiology)

- The embryology, anatomy, normal variants and physiology of the appropriate bodysystem(s)
- The current interventional equipment used including:
  - percutaneous access needles and kits
  - catheters and guidewires
  - dilating devices
  - stents
  - embolisation materials
- specific techniques of access to and therapeutic intervention within various organsand structures
- local, national and where appropriate, international imaging and interventionalguidelines

Relevant radiation physics for Interventional Radiology

1. Background Radiation and medical sources of Radiation Background: Cosmic, Terrestrial, Internal, Radon. Medical Sources: Projection Radiography, Fluoroscopy, Interventional Radiology and Diagnostic Angiography, Digital Subtraction

Angiography. and CT.

2. Physics of Angiography equipment: Xray tube, generators, image intensifier, flat panel detector, image magnification, Automatic brightness control, imaging chain, video cameras, artefacts, image processing, Subtraction , road maps and other techniques Quality assurance in Interventional suite: table top doses, kVp accuracy, timer consistency, mA consistency, focal spot resolution, fluoroscopic beam alignment, safety survey.
3. Radiation units, dose limits and Biological effects
4. Radiation units: Exposure, Absorbed dose, Effective dose, Collective dose.
5. Dose Limits: Occupational , Non-occupational Staff , Members of the Public , Fetus , Patient- Adult ,Child , Pregnancy and radiation, DRLs and "Trigger" Levels - Local and national.
6. Interactions of x-rays with matter, Deterministic effects and stochastic effects with examples.
7. Personnel and patient Dosimetry
8. Radiation Detectors – TLD, GaFchromic, transmission ion chamber, ionization chamber, survey meter,Gieger Muller counter.
9. Personnel Dosimetry: TLD badge, TLD regulations, Pocket dosimeter; dose map in the interventionalsuite.
10. Patient Dosimetry: Dose area product, cumulative KERMA, skin doses, interpretation of doses.
11. Factors Affecting Patient Dose: Fluoroscopy and Interventional Radiology- beam angulations, SID, Exposure factors, preset factors, dose settings, low dose protocols etc.
12. Principles of Radiation Protection: Time, Distance, Shielding - Facility, occupational Workers, Caregivers, Patients, Members of the Public, Appropriate Materials. As Low as Reasonably Achievable (ALARA): Culture of Safety – Justification, optimization and limitation, Procedure Appropriateness; Safety accessories: Lead aprons, thyroid shield, Goggles, movable and fixed shield barriers, ceiling mounted barriers. Radiological safety measures in interventional suites.
13. Advisory Bodies and Regulatory Authorities
14. International Commission on Radiological Protection (ICRP), National Council on Radiation Protection and Measurements (NCRP) , International Atomic Energy Agency (IAEA) , Atomic energy regulatory board (AERB). AERB guidelines for room layout,

licensing, type approval, eLora, RSO and Pre Conception Pre Natal Diagnostic Techniques Act (PCPNDT) Shielding: Design Philosophy- Occupancy and Workload.

Paper-II Vascular interventional radiology

Clinical knowledge will be acquired by a variety of means, including close liaison with appropriate medical and surgical and radiological meetings. Multidisciplinary meetings should be emphasised.

The following inter-relationships are important:

- Vascular surgery
- Urology
- Neurological sciences
- Gastroenterology
- Oncology and Haematology

The trainee should be encouraged and given the opportunity to attend and lead appropriate clinico- radiological and multidisciplinary meetings.

The trainee should be encouraged to attend appropriate educational meetings and courses. The trainee should participate in and initiate relevant clinical audit.

Trainees will be expected to be familiar with current interventional radiology literature.
The trainee should be encouraged to participate in research, and to pursue one or more projects up to and including publication. An understanding of the principles and techniques used in research, including the value of clinical trials and basic biostatistics, should be acquired. Presentation of researchand audit results at state and national meetings should be encouraged.

The trainee should continue to participate in the on-call rota, with appropriate consultant back up.

Acquisition of specific skills to enable:

- the conduct, supervision and accurate interpretation of all imaging techniques used to a highprofessional standard
- the safe and effective practice of interventional techniques in the appropriate body system(s)
- good communication with patients and professional colleagues
- accurate informed consent to be obtained
- appropriate decisions about terminating the procedure for technical reasons or grounds of safety/comfort to the patient

A clear understanding of the role of multidisciplinary meetings, including:

- planning of investigations including the selection of appropriate tests and imaging techniques fora clinical problem
- planning and outcomes of treatment
- promoting an understanding of relevant pathology

Procedural competence will need to be reviewed at intervals, and this regular review should also assess the number of cases required in order to ensure competence.

Radiologists who devote essentially all their time to interventional radiology will be expected to undertake a wide range of complex procedures. Acquisition of the necessary expertise requires such trainees to undertake a proportionately larger number of interventional procedures.

All interventional radiologists must have a thorough knowledge of the techniques required to perform sedation and analgesia procedures, as well as patient monitoring throughout and following the procedures, and should be familiar with existing guidelines.

The trainee should be aware of local and national guidelines on consent, and be capable of obtaining informed patient consent for practical procedures.

The groupings that follow are based on the concept of modular training, and the numbers for the more routine procedures (in parentheses) range from what might be expected as a guide for someone with more than one subspecialty interest up to that which might be expected for a dedicated interventional radiologist. The lists of procedures are by no means exhaustive and certain trainees may expand their repertoire to include certain musculoskeletal (eg vertebroplasty) and other techniques.

Subspecialty training in vascular interventional radiology

- diagnostic arteriography (50–150)
- percutaneous angioplasty (65–130)
- percutaneous central venous access (10–20)
- thrombolysis
- embolization
- percutaneous selerosants injection
- vascular stent insertion
- foreign body retrieval

- aspiration thrombectomy
- peripheral aneurysm exclusion
- transjugular intrahepatic portosystemic shunt
- chemoembolisation
- aortic stent grafting (thoraco-abdominal)
- Cerebral AVM – embolisation
- Intracranial aneurismal coiling

Oncology and Haematology

- FNAC/ Biopsy of the tumours in various sites
- Chemo embolisation
- RF/Cryo ablation
- venus stenting
- Ascitic and pleural drainage
- Drainage tube insertion
- PICC line
- Vascular lines insertion
- TARE
- TACE

Uroradiological intervention

- renal tract access, eg nephrostomy (20–40)
- ureteric dilatation/stent insertion (5–10)
- renal biopsy/cyst aspiration (5–10)
- drainage of collections
- varicocele embolisation
- fallopian tube recanalisation
- transrectal prostate biopsy (20–40)Gastointestinal intervention
- GI dilatations and stents (10–20)
- percutaneous gastrostomy (5–10)
- transjugular/plugged liver biopsy (5–10)
- radiofrequency ablation
- percutaneous biliary drainage procedures and/or stent insertion
- Microwave Ablation
- TIPS/DIPS

- PTBD
- HVPG

Paper-III Non Vascular and Fetal interventional radiology

Neuro and Spine interventions

- Ablations: metastatic spine tumors
- Aneurysm coiling/treatment
- Arteriovenous malformation (AVM)/ AVF embolization
- Balloon occlusion test
- Carotid angioplasty/stenting
- Cisternogram
- Discogram
- Vertebroplasty/kyphoplasty below
- Myelogram
    - Digital subtraction myelogram
- Stroke treatments
- Cerebral tumor embolization
- Intracranial venous disorders, including dural sinus stenosis and pseudo-tumor cerebri
- Intra-arterial chemotherapy
- Vascular anomalies or syndromes
- General surgery
- Obstetrics and Gynaecology
- TB and Chest Diseases

Pain and musculoskeletal procedures

- Epidural steroid injections
- Medial branch blocks/facet joint injections
- Radiofrequency nerve ablations
- Major joint injections
- Occipital nerve blocks
- Muscle and joint injections under ultrasound guidance
- Platelet-rich plasma (PRP) therapy

Facet Joint Injections

Trainees should acquire experience in the practical procedures listed above, and the number of cases undertaken should be recorded in their log book.

Regardless of the technique, the consultant trainer must be satisfied that the trainee is clinically competent, as determined by an in-training performance assessment, and can consistently interpret the results of investigations accurately and reliably and can safely perform interventional techniques.

CLINICAL SKILLS FOR Interventional Radiology

1. Good familiarity and adequate skills in performing / interpreting vascular imaging modalities(Ultra Sound, Doppler, CT angiograms, MR angiograms, MRI)
2. Work up of cases and decide on feasibility for intervention
3. Active involvement in the inter-departmental discussions
4. On call interventional duty
5. Independent skills in diagnostic interventional procedures
6. Partial independent skills in therapeutic interventional procedures

Paper-IV Recent Advances in Interventional Radiology

- Recent Advances in the oncology cardio vascular pathology
- Recent Advance in the instrumentation & hardware's

SUGGESTED BOOKS:

OSCE: (5 Stations)

1. Radiation physics instrumentation and radiation protection.

Vascular interventional radiology – instruments and techniques

2. Non vascular interventional radiology - instruments and techniques
3. Regulatory bodies and recent advances
4. Contract agents, drugs and embolic materials

Books

Author Name	Name of the Books	Publishing Company
Alrbert L. Abrams	Abrams Angiography, Vascular and Interventional Radiology V- I	Medical Education and Research Inc.
Alrbert L. Abrams	Abrams Angiography, Vascular and Interventional Radiology V- II	Medical Education and Research Inc.
Alrbert L. Abrams	Abrams Angiography, Vascular and Interventional Radiology V- III	Medical Education and Research Inc.
Paul Ross	An Atlas of Normal Vertebral Angiograms.	Butter worth Group
Paul Ross	An Atlas of Normal Vertebral Angiograms.	Butter worth Group
Kazuhiko	Cerebral Angio – CT	Raven Press
G. Ansel	Complications in Diagnostic Imaging	Black well scientific Pub
G. Ansell	Complications in diagnostic radiology.	Blackwell scientific
Joseph K. Lee	Computed Body Tomography. Vol - I	Raven Press Books Ltd.
Joseph K. Lee	Computed Body Tomography. Vol – II	Raven Press Books Ltd.

Charles F. Lanzleri	Computed Tomography and Magnetic Resonance Imaging of the whole body Vol - I	Mosby – Year book Inc.
Charles F. Lanzleri	Computed Tomography and Magnetic Resonance Imaging of the whole body Vol – II	Mosby – Year book Inc.
T. A. Lie	Congenital Anomalies of the Carotid Arteries	Williams & Wilkins
Malcolm Carpenter	Core Text of Neuro Anatomy	Williams and Wilkins
Sandler	Correlative Imaging. Nuclear medicine Magnetic Resonance, Computed Tomography, Ultrasound	Williams & Wilkins
Traveras	Diagnostic Neuroradiology Vol – I	Williams & Wilkins
Traveras	Diagnostic Neuroradiology Vol – II	Williams & Wilkins
Grainger	Diagnostic Radiology 3rd edition Vol – I	Churchill Livingstone
Grainger	Diagnostic Radiology 3rd edition Vol – II	Churchill Livingstone
Grainger	Diagnostic Radiology 3rd edition Vol – III	Churchill Livingstone
M. Pinson	Emergency Interventional Radiology	Little Brown
JJ Connors	Interventional Neuroradiology Practical Techniques.	W.B. Sounders Company
Albert Mass	Interventional Radiologic Techniques. Computed Tomography and Ultrasonography.	Academic Press Inc.
Joseph I Ferrucci	Interventional Radiology of the Abdomen	Williams & Wilkins
Ernest J. Ring	Interventional radiology principles and Techniques	Little Brown
Wilfrido R Castaneda	Interventional Radiology Vol – I	Williams & Wilkins
Wilfrido R Castaneda	Interventional Radiology Vol – II	Williams & Wilkins
Zwiebel	Introduction to Vascular Ultrasonography. 3rd edition.	
Scott Atlas	Magnetic Resonance Imaging of the Brain and Spine. Vol - I	
Scott Atlas	Magnetic Resonance Imaging of the Brain and Spine. Vol – II	
Bushberg, Seibert A, Leidholdt and Boone J.	The essential Physics of Medical Imaging	
David J Dowset, Patrick Kenny and Eugene Johnston.	The Physics of Diagnostic Imaging	Chapman and Hall Medical
Wolbarst AB, Capasso P and Wyant A.	Medical Imaging essentials for Physicians	Wiley Blackwell

Annexure I

Postgraduate Student Appraisal Form

Name of the Department/Unit :
Name of the PG Student :
Period of Training : FROM……TO……

Sr. No.	PARTICULARS	Not Satisfactory	Satisfactory	More Than Satisfactory	Remarks
		1 2 3	4 5 6	7 8 9	
1.	Journal based / recent advances learning				
2.	Patient based /Laboratory or Skill based learning				
3.	Self directed learning and teaching				
4.	Departmental and interdepartmental learning activity				
5.	External and Outreach Activities / CMEs				
6.	Thesis / Research work				
7.	Log Book Maintenance				

Publications **Yes/ No**

Remarks* _____

*REMARKS: Any significant positive or negative attributes of a postgraduate student tobe mentioned. For score less than 4 in any category, remediation must be suggested.
Individual feedback to postgraduate student is strongly recommended.

SIGNATURE OF ASSESSEE SIGNATURE OF CONSULTANT SIGNATURE OF HOD

MODEL PAPER

DM07301 **Basic.Sc.I**

DM Examination Month, Year

INTERVENTIONAL RADIOLOGY

Paper-I

Basic Science (Consisting of vascular anatomy, Radiation physics and instrumentation related to interventional radiology)

Time: Three Hours
Maximum Marks: 100

Attempt all questions
Each question carries 10 marks
Draw diagrams wherever necessary

Q1. Describe in detail radiation hazards.

Q2 Describe various ultrasound artifacts.

Q3 Describe the basic principle of DSA with diagram.

Q4 Describe principle of elastography in breast lesion.

Q5 Define principles of radiation protection & various parameters which can reduce patient radiation dose.

Q6 AREB guideline for DSA installation.

Q7 Describe various dosimeters.

Q8 Describe anatomy of liver with its vasculature.

Q9 Describe normal vascular variants from arch of aorta.

Q10 Describe normal arterial anatomy of lower limb.

MODEL PAPER

DM07302 **Vasc.I.R.II**

DM Examination Month, Year

INTERVENTIONAL RADIOLOGY

Paper-II

Vascular Interventional Radiology

Time: Three Hours
Maximum Marks: 100

Attempt all questions
Each question carries 10 marks
Draw diagrams wherever necessary

Q1. Describe basic principle of Cather angiography.

Q2 Describe various embolizing agents.

Q3 Discuss techniques of abdominal aortography. What are the features of abdominal aortic aneurysm.

Q4 Describe spinal angiography with its normal variation.

Q5 Describe various post operative complication of liver transplant & method to deal with them.

Q6 Describe procedure adrenal venous sampling.

Q7 Describe Interventional Radiological management of liver tumors.

Q8 Describe role of interventional radiology in gynecological pathologies.

Q9 Describe various hardware's used in neuro intervention.

Q10 Describe complication of catheter angiography.

MODEL PAPER

DM07303 **Non.Vasc.III**

DM Examination Month, Year

INTERVENTIONAL RADIOLOGY

Paper-III

Non Vascular and Fetal Interventional Radiology

Time: Three Hours
Maximum Marks: 100

Attempt all questions
Each question carries 10 marks
Draw diagrams wherever necessary

Q1. Describe various drainage procedures.

Q2 Describe procedures & complications of punch Biopsy's.

Q3 Describe different techniques of fluid aspiration with its complications & management.

Q4 Describe the treatment of DVT with its complications.

Q5 Describe radiological anatomy of lumber spine with different techniques of pain management.

Q6 Describe radiological evaluation of venous thrombosis & its management.

Q7 Describe role of interventional radiology in female infertility.

Q8 Describe role of interventional radiology in PPH.

Q9 Describe various embolizing agents.

Q10 Describe percutaneous nephrostomy, indication, contraindication & complication.

MODEL PAPER

DM07304 **Recent.Adv.IV**

DM Examination Month, Year

INTERVENTIONAL RADIOLOGY

Paper-IV

Recent Advances in Interventional Radiology

Time: Three Hours
Maximum Marks: 100

Attempt all questions
Each question carries 20 marks
Draw diagrams wherever necessary

Q1. Describe role of flow diverter in neuro intervention.

Q2 Describe various type of embolizing agents.

Q3 Describe various procedures of tumor ablation.

Q4 Describe role of intervention radiology in per operative procedures.

Q5 Describe lymphangiography, its technique indication and contraindication. Discuss procedure of thoracic duct embolization.