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**KRISHNA INSTITUTE OF MEDICAL SCIENCES “DEEMED TO BE”  
UNIVERSITY, KARAD**

**Programme Code-1714**

**Fellowship in vascular & interventional radiology**

**Course code- 1714-11**

- Duration: One Year
- Annual intake: One Fellow
- Eligibility: MD Radio diagnosis/ DNB Radio diagnosis / DMRD + 1 year Experience (Certificate by Dean, Medical superintendent of recognized medical college)
- Fee: Final fees shall be such as prescribed by the University from time to time
- Selection method: Entrance Examination conducted by the University
- **Preamble:** Scope of radiology is ever expanding not just in diagnostic but in therapeutic interventions also. Three year post graduate course is not sufficient to cover all aspects of therapeutic interventions. This course is designed to provide complete training in vascular and non vascular interventions and thereby helping clinicians in patient management.
- **Objectives:**
  - a) Knowledge: - At the end of the course the student shall be able to:
    - 1) Explain the interaction of the X-rays with mater to produce an image.
    - 2) Familiarize with the principles of digital subtraction angiography & their applications in medicine.
    - 3) Explain the biological hazards of ionizing radiation & protective measures.
    - 4) Explain the normal vascular anatomy and their deviation from normal & its consequences.
    - 5) Summarize the fundamental aspects of embryology & alteration in development with reference to congenital anomalies.
    - 6) Explain the role of digital subtraction angiography in pre-operative, intra-operative & post-operative conditions.
    - 7) Evaluate role of imaging modalities in various therapeutic applications (Interventional Radiology).
    - 8) Update information about recent advances in interventional sciences.

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9) Effectively organize & supervise the diagnostic and therapeutic procedures to ensure quality control/assurances.

b) Skills: - At the end of the course the student shall be able to:

- 1) Make use of intervention procedures to achieve definitive diagnosis and treatment.
- 2) Analyze & interpret imaging data.
- 3) Demonstrate the skills of solving scientific & clinical problems with decision making.
- 4) Develop skills as a self-directed learner recognizes continuing educational needs, select & use appropriate learning resources.
- 5) Demonstrate Competence in basic concepts of research methodology & be able to critically analyze relevant literature.

c) Integration: - Knowledge acquired in Radio diagnosis shall help the students to integrate imaging techniques with structure & function of the human body in health & disease.

→ Faculty:

Institute should fulfill the teaching staff requirement of postgraduate course in the parent subject i.e. Radiology. In addition the guide / faculty / teacher under whom fellowship candidate is registered should fulfill following criteria:

- a) Should have 8 years post MD/ DNB experience in subject of Radiology in MCI recognized teaching institute.
- b) Demonstrated experience and/or expertise in teaching residents, fellows, or post graduate radiologist on a regional, national or international level.
- c) Be licensed to practice medicine in the state in which the sponsoring institution is located.

→ Infrastructure: As per MCI requirement of MD Radiology

→ Contributing department: Department of Radio diagnosis

→ Medium of instruction: English

→ Attendance: As per Krishna University rules

→ Syllabus content:

A) Core Syllabus

- a) Venous access (PICC, tunneled and non tunneled central catheters, ports)

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- b) Image guided biopsies (including transjugular liver biopsy) and drainages
- c) Dialysis access / central venous angioplasty, stenting, thrombolysis
- d) Limb angioplasty/stenting (including subintimal and infrapopliteal angioplasty, SAFARI technique), thrombolysis and debulking procedures
- e) Aortic stent grafts for aneurysmal disease and dissection
- f) Angioplasty/stenting – abdominal
- g) DVT thrombolysis and venous stenting
- h) IVC filter insertion and removal
- i) Embolisation for trauma, tumour, bleeding GIT, PPH, hemoptysis
- j) Testicular vein embolisation
- k) Fallopian tube recanalization
- l) Uterine fibroid embolisation
- m) Transarterial Chemo-embolisation (cTACE, bTACE) and radio-embolisation (Y90 spheres)
- n) Thermal ablation (RFA; MWA) of liver and lung tumours
- o) Cryoablation of renal and bone tumors
- p) Vertebroplasty / cementoplasty for augmentation of musculoskeletal tumours
- q) Biliary drainages, dilatations and stenting
- r) Nephrostomies and ureteric stenting
- s) Radiological guided gastrostomy insertion, NJ tube insertion and GI stenting
- t) Fusion and contrast enhanced US guided procedures

**B) Skill Based Syllabus - Hands-on Procedural training:**

- a) Fellows will spend their time in the Interventional suites performing procedures under the supervision of VIR consultants, initially as assistants and subsequently as primary operators.
- b) Fellows will be rostered for on call duties to be exposed to emergency IR procedures.
- c) At the end of 6 months, Fellows are expected to be able to perform independently diagnostic angiography, tunnelled and non-tunnelled central venous catheters, simple biopsies and drainages, TACE, IVC filter insertion as well as uncomplicated femoral and dialysis access angioplasty procedures.

**C) Choice Based Syllabus (Any one):**

- a) Diagnostic cerebral and spinal digital subtraction angiography
- b) Basics in Neurointerventions (Stenting, coiling and thrombectomy)

**Hands-on Clinical training:**

- a) Fellows will be involved in the pre-, intra- and post- procedure assessment and management of patients.

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- b) Fellows are expected to go on daily ward rounds to review patients post (and sometimes pre) procedure.
- c) Fellows will be required to take informed consent for the various procedures performed and will be exposed to medical ethics, patient confidentiality and advocacy.
- d) Fellows will be given opportunities to attend Outpatient Clinic together with the Consultants and perform inpatient consults at the duty radiologist station.
- e) Fellows are also expected to attend interdisciplinary rounds (e.g. vascular surgery-DVIR rounds, Urology-Radiology rounds, Gastroenterology/hepatobiliary surgery-Radiology rounds, etc) to better appreciate the multi-disciplinary approach to patient management.

Non invasive imaging:

Fellows will have opportunities to report CTA/MRA examinations (pre and post aortic stent graft evaluation and lower extremity CTA/MRA) and immediate post ablation imaging together with VIR consultants.

**Course Outcomes:**

At the end of the fellowship course, candidates are expected to show proficiency in performing all procedures listed in core syllabus, CT, USG and Fluoroscopic guided interventions. Candidates show have basic knowledge about therapeutic intervention related to brain, TIPS and endoscopic USG and oncology interventions.

→ Teaching-learning method:

Teaching Sessions

In addition to conducting and reporting of routine and special investigation in the area of posting under direct supervision, formal teaching session to be held on working days. These include seminars in physics and general radiology, journal clubs, case presentations; Interdepartmental meets, film reading session.

Teaching Schedule

The suggested departmental teaching schedule is as follows:

- a) Seminar, Film reading & Case Presentation - Once a week
- b) Inter department meet twice a week
- c) Journal club once a week

Note: All sessions will be co-ordinated by the faculty members.

All the teaching sessions to be assessed by the consultants at the end of the sessions and graded

→ **Examination pattern** : Periodic assessment in the department with annual examination

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Theory - 100 Marks

Practical - 100Marks

Viva - 100 Marks

Total 300 Marks

→ Log book: The fellow will be expected to keep a log of the cases attended and submit it at the time of the examination

→ **Text books and Reference books:**

- a) Digital subtraction angiography in clinical practice by Philips
- b) Intr. Radiology volume I & II by Castaneda
- c) Intr. Radiology of abdomen by Rerruci
- d) Invasive radiology by Rose
- e) Percutaneous transluminal angiography by Dotter
- f) Vascular intervention by Perter/Becker
- g) Angiography in trauma by Benmenachen
- h) Angiography of bone & soft tissue lesions by I. Yaghmai
- i) Angiography volume I, angiography volume II & angiography volume III by Abrams
- j) Vascular and interventional radiology by Karim Valji
- k) Interventional radiology: adjunctive medication by W.Stanbuch, W.Cross-Fungels
- l) Patient care in interventional radiology by Sonja A. Bartolomci
- m) Vascular and interventional radiology: principles and practices by Bakal, Curtis w. Et al
- n) Practical interventional radiology of hepatobiliary system and gastrointestinal tract by Adam and Glbson.
- o) Interventional radiology procedure manual by Michael a. Braun, Albert a.

→ Additional reading:

Journal of vascular and interventional radiology

IJRI, AJNR, Clinical Radiology, AJR, Radiology, Radiographics journals