



Gujarat Council of Vocational Training Gandhinagar



1. Name of Course:

RADIOLOGY TECHNICIAN

N.C.O. No. for Skills Covered:
(Please refer National Classification of
Occupations -2004 available
on www.dget.nic.in)

DIVISION - 3 (3133) (3133.10)

2. Engineering OR Non-engineering: **NON ENGINEERING**

3. No. of students per batch: **10**

4. Duration in Hours. : **624 Hours**

5. Duration in Month: **6 @ 24 hours/Week.**

Duration in Month: **12 @ 12 hours/Week.**

5. Examination Scheme:

No.	Name of Subject	Teaching Hours during full course.	Maximum Marks. (Excluding Sessional)	Minimum Marks required for Passing (Excluding Sessional).	Sessional Marks if any.
Subject-1	Theory	156	100	40	-
Subject-2	Practical	468	300	180	-

7. Entry qualification for Trainee:

Minimum entry qualification (Essential):	SSC Pass, 18years or above
Desirable:	SSC Pass, Basic Computer literacy, 18years or above

3. Minimum qualification for Trainer:

Minimum qualification (Essential):	Certified Radiographer with more than 5 years of experience
Desirable:	Post Graduate Radiographer with 5-10 years of practical experience and 2-3 years as Trainer





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9. Syllabus Committee Member:

Sr. No.	Name	Organization	Designation	Technical Qualification	Experience in Years	Signature
1.	Dr. Sajan Nair	NHPL	Facility Director	MBBS, MD, Msc, Mphill	20	
2.	Mr. Jignesh Parmar	NHPL	GM- HR	MHRD, MLW	17	
3.	Dr. Prashant Deshmukh	NHPL	MS	MBBS, PGDBM	05	
4	Dr. Gaurav Goswami	NHPL	Consultant - Radiology	MBBS, DNB (Radiology), FRCS (London)	02	
5	Dr. Archana Jadav	NHPL	Jr. Consultant - Radiology	MBBS DMRD	01	
6.	Mr. A.R.Panchal	ITI, Kubernagar	Principal / Ex Officio	D.M.E	20	

10. Terminal Skills of trainee: (Should be well defined and having reference to NCO):

The trainee, after successful completion of training, will have following skills...

Will be able to deliver as mentioned in Division-3 – 3133 – 3133.10 of NCO

Details as :

3133.10 X-Ray Technician; Radiographer;

Radiological Assistant takes X-ray skiagraphs (Photographs) for diagnosis of ailments or gives ray treatment by operating X-ray equipment and exposing patient to rays. Prepares or gets patient prepared by Nurse for ray exposure. Regulates duration and intensity of exposure by adjusting machine and exposes patient to rays as directed by Radiologist. Positions patient on X-ray couch to ensure correct exposure of part of body required to be X-rayed and for ray exposure taking care to protect patient and himself from harmful exposure to X-ray. Adjusts X-ray tube at proper distance and angle, by rotating pivot etc. to ensure centering of tube on part of body to be X-rayed. Regulates controls of X-ray machine or therapy equipment, for duration intensity of exposure and exposes film or patient to rays as directed by Radiologist. Removes cassette with exposed film and hands over to **Dark Room Assistant** where available for developing fixing, washing, Labelling (date and name of patient) etc. mixes develops fixers etc. and processes X-ray films in accordance with techniques and instruction of Radiologist. Keeps records of raw and exposed films, spare parts and of patients X-rayed or treated. May mix developers and process film in accordance with prescribed techniques.





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11. Approximate cost of Tools
/ Equipments / Machinery for
Starting one batch of the course:

Rupees	Reference Year
10 cr.	2012

12. Area required for practical / Workshop for one batch.

800 Sq. Feet

13. Minimum Power connection required

110 K.W.

14.1 No of items in Standard list of Machinery:

3

14.1.1. Page NO from ___ to ___.

14.2 No of items in Standard list of Shop outfit:

3

14.2.1. Page NO from ___ to ___.

14.3 No of items in Standard list of Trainee Toll-Kit:

NA

14.1.1. Page NO from ___ to ___.

**Theory Classes – 18*15 sq feet, Practical Sessions in Radiology Department of NH
Multispeciality Hospitals, required machinery available in the department)**

***** FOR OFFICIAL USE *****

Approved by GCVT in ~~Governing Body meeting~~ on : 20/2/2014

Syllabus implemented w.e.f. admission session : Immediate

Revision History :
1. Revision No..... Revision Date.
2. Revision No..... Revision Date.
3. Revision No..... Revision Date.





Standard List of Machinery - Equipment / Shop-outfit / or Trainee Toolkit

For Trade of Radiology Technician

Sr. No.	Description of Item with detailed specifications	Item type i.e. Machinery / Equipment OR Shop Outfit OR Trainee Toolkit	Quantity Required per one Batch of Students	Quantity Required per one Batch of Students for Instructor	Total Quantity Required (Total of previous two columns)
1.	I. Conventional Radiography : A. X-Ray Machine 1. 60 MA portable 2. Pan Orthrogram 3. 100 MA or 4. 300 MA X-Ray Machine B. Dark Room with accessories C. Cassettes All Sizes 6 1/2 x 8"2 D. Screens All Sizes 10" x 8 E. Hangers All sizes 10" x 12" F. X-Ray Film All sizes 12' x 14', 12' x 15'	3	3	0	3
2.	II. Radiation Protection 1. Lead Apron 2. Lead divider 3. Lead Markers 4. Lead Gloves 5. Lead Screens 6. Gonad and thyroid protectors	10	One Each(10)	One Each	10
3.	III. Imageology 1. Ultra sound scanner (portable) 3.5. MHZ with single probe and 5.0 MHZ with multiple frequency 2. Colour Doppler ultrasound scanner	5	5	0	5



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Name of Syllabus: **Radiology Technician**

Sector: **HealthCare/Hospitals**

Terminal Competency:

After Completion course participant will be able to:

1. Use Techniques in Radiology and Imageology and Dark Room Techniques.
2. Know Radiological Emergencies & radiation Hazards.
3. Upkeep of M/C & equipment

Theory	Practical
<p>Review of Anatomy, Physiology & Related Pathology</p> <p>X-Ray Equipment for Radiographers:</p> <ul style="list-style-type: none"> • Electrical system, Main Supply, Components and controls in X-ray circuits Generation of electrical energy, distribution and uses of electrical energy, High tension transformer, the rectification of high tension, the control of kilo voltage, filament circuit and tube current • Exposure switches and exposure timers, switching and timing system exposure switching & its Radiographic application • X-Ray Tubes, Portable X-Ray equipment general Features of X-Ray, Fixed and rotating Anodes, Characteristics of X-Ray Tubes of Mammography and Faults in X-Ray Tube. • Image Intensifier/Fluoro Scopic equipment, standard Fluoro scopic table, Table for Myelography, X-Ray image intensifier Tube, Radiation protection and Radiation Hazards, • Dental Radiographic equipment specialized dental X-Ray equipment 	<p>Review of Anatomy, Physiology & Related Pathology i.e. Surface Marking & Identification of various parts and structures in of Human body ,Identification of bones and parts on X-Ray Film</p> <p>X-Ray Equipment for Radiographers:</p> <ul style="list-style-type: none"> • X-Ray tubes and general features and Mobile equipment • Image Intensifier • Care and Maintainance of X-Ray equipment • To study affects of KV and MAS. Demonstration of radiation safety devices • To Survey X-Ray control for Radiation • X-Ray intensifying Screens • Demonstrate the uses of grid, potter bucky and Radio graphic contrast • Demonstrate effects of improper centering of X-Ray tube • Radiation field coincidence.



- Care and Maintenance of X-Ray Tube
- Ionization Chamber, GM and Scintillation counter, Measuring radiation dose, absorption coefficient, grid, cones and filters.
- Inverse square law, scattered Radiation Radio Activity, Curie, Half life, Decay Factor, Doses, Film Badge, Pocket Ionization chamber, Maximum permissible dose.
- Patient safety

Basics of Imageology:

- Conventional (Ultra Sonography and Doppler Ultra Sound and Color Doppler flow imaging Principles of ultra sound, types of transducers basics of Doppler ultra sound system
- Interventional Radiology (Definition Names of different types of procedures.)
- Ultrasound: Conventional Doppler & Color Doppler, Preparation, Indication, Clinical application.
- Interventional radiology: Preparation of patient, indications & contraindications, techniques of various procedures & systems in the body
- Digital radiography & computed radiography

Radiographic and dark room techniques:

- Photography and Film Material: a) Image produced by Radiation, b) Latent Image formation, c) Structure of X-Ray Film, d) Sensitivity and contrast of film, e) Types of Films including Laser Film, f) Storage of Exposed films and unexposed films
- Screens and Cassettes: a)

Basics of Imageology:

- Demonstrate on USG machine
- Demonstration on patients

Radiographic and dark room techniques:

- Dark room lights (safe light) be tested for safety
- Intensifying screens be tested for uniform contrast
- Developer, Fixer
- Load, unload and processing of X-Ray films
- Taking X-Ray of all parts of Human body as per the theory syllabus

Special Investigation:

- Radiography in various position for all the special radiological procedures, using contrast media as per syllabus
- Positioning and treatment of various cancer patients by using; a) Prescribed filters and wedges, b) Protecting various organs



- Construction of intensifying screen.
- b) Choice of Fluorescent material,
c) Care of intensifying screens, d)
Types of Screen, e) Care of a
cassette, f) Mounting of intensifying
screen in the cassette
- Film Processing and Developing: a) Constituents of processing solution and replenisher factor affecting the developer, b) Components of developer, Fixer and replenisher, c) Film rinsing, washing and drying, d) Film processing equipment ; i) Manual, ii) Automatic
 - Dark Room Design: a) Outline structure of dark room and materials used, b) Miscellaneous: i) Trimming, ii) Identification of films, iii) Records Filing, iv) Records Distribution
 - Radiography: a) Upper limb (i) Fingers, ii) Hand, Carpal Tunnel, iii) Wrist Joint, iv) Fore arm, v) Elbow Joint, vi) Head of Radius and Ulna, vii) Humerus, viii) Shoulder Joint, ix) Acromio-clavicular joint, x) Scapula, xi) Sterno clavicular joint: b) Lower Limb i) Toes, ii) Foot, iii) Calcaneum, iv) Intercondylar Notch, v) Ankle Joint, vi) Tibia and Fibula, vii) Patella, viii) Knee Joint, ix) Femur; c) Hips and Pelvis: i) Theatre procedure for Hip Pinning and Reduction, ii) Pelvis, iii) Sacro Iliac Joint, iv) Pelvic Bone, v) Acetabulum, d) Vertebral Column: i) Atlanto - Axial Joint, ii) Odolontoid Peg, iii) Cervical Spine, iv) Thoracic Spine, v) Lumbar spine, vi) Lumbo Sacral spine, vii) Sacrum, viii) Coccyx, ix) Scoliosis, x) Kyphosis,
6. Bones of the Thorax, 7. Skull: a) Land Marks, Planes Cranium, Facila Bones, Maxilla, Mandible, ZygoMetic Bone, Temparo - Mandibular Joint, Mastoids, Petrous bones, Optic Foraman, Sella Turcica, Para Nasal Sinuses, 8. Abdomen: a) Acute Abdomen, b)



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Pregnancy, c) Pelvimetry, 9. Dental Radiography

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Special Investigation:

- General Pathology in relation to radiology. Define pathology, cell growth, cell damage,
- Neoplasia (a) Benign, b) Malignant, c) Mode of growth, d) Metastases
- Causes of Disease (a) Congenital, b) Traumatic, c) Metabolic, d) Deficiency
- Blood Diseases (a) Leukemia, b) Anemia
- Special Procedures and Related Contrast Media (a) Contrast Media, b) Emergencies in Radiology Department, c) Excretory System ;i) IVP, ii) RGU, iii) MCUG, d) Oral Cholecystography, e) Percutaneous Transhepatic Cholangiography, f) G.I. Tract, i) Barium Swallow, ii) Barium Meal Series, iii) Barium Meal Follow Through, iv) Barium Enema, g) Hystero Salpingography, h) Angio Graphy, i) Myelography, j) Tomography, k) Venography, l) Lymphangiography, m) Mammography, n) Dacryography, o) Sialography, p) Sinography, q) Laryngo graphy, r) Brancho graphy, s) Arthrography

Signature:

