

Syllabus and Curriculum
of
Diploma in C.T. Scan Technician course

(To be implemented From 2015 - 16 session)

Uttar Pradesh State Medical Faculty, Lucknow.

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OBJECTIVES OF THE COURSE

To prepare a **C.T.Scan technician** who –

- Can perform CT Scans of all parts precisely.
- Is able to develop film.
- Can administer contrast & is able to handle adverse reactions to it.
- Is well aware of Radiation Hazards & protection measures.
- Can read basics of various CT Scan plates.

Outline of Curriculum of Diploma in C.T. Scan Technician course

FIRST YEAR

THEORY (Classes: 9 AM to 12 Noon)

First paper : Syllabus covers -

1. General Anatomy & Physiology (Cytology, Histology, Osteology and basics of all organ systems of body) and **detailed study of skull ,brain and spinal cord.**
2. Only basics of relevant Pathology, Pharmacology & Microbiology & drugs used during CT Scan.

Second paper : Syllabus covers -

1. Details of radiological Anatomy & surface making.
2. Radiophysics, Radiographic positions & Radiation hazards.
3. Hand hygiene & prevention of cross infection.
4. Basic life support (BLS) & Cardio-pulmonary resuscitation (CPR).

FIRST YEAR

PRACTICAL (Classes: 1 PM to 4 PM)

Practical classes will be after lunch; from 1 PM to 4 PM.

Students must present in the hospital/CT Scan unit for practicals.

During first year, they should be there only as “Observers” in practical classes.

Following subjects must be taught; though there will not be any exam from these-

1. Basic Computer skills.
2. Basic English.
2. **Soft skills like** - Interpersonal relationship skills & moral education.

Outline of Curriculum
of
Diploma in C.T. Scan Technician course

SECOND YEAR

THEORY (classes:9 AM to 12 Noon)

First paper : Syllabus covers -

1. Details of Only relevant surgical & medical conditions.
2. Nursing Procedures like vital recording, IM/IV/SC injection, Oxygen therapy, Nebulization, IV infusion.

Second paper : Syllabus covers -

1. CT physics, slice Anatomy & CT positioning.
2. CT guided procedures.
3. Bio-medical physics of CT Scan machine & developement of CT film etc.

SECOND YEAR

PRACTICAL (classes:9 AM to 12 Noon)

Practical exams syllabus should cover-

Hands on training of :-

- Preparation of patient for CT Scan.
- Performing all types of CT Scan.
- Contrast administration & management of adverse reactions to it.
- Protection from radiation hazards.
- Assisting CT guided procedures.
- Developing film.
- Record keeping.

ELIGIBILITY CRITERIA FOR ADMISSION & DURATION OF THE COURSE

COURSE DURATION:-

- It is 2 years, **full time** Diploma Course.

ELIGIBILITY:-

- Candidate must have passed 12th with
Physics, Chemistry, Biology

Or

Physics, Chemistry, Maths

with 35% marks in Intermediate exams.

(From UP board or any other recognised board).

- Candidate must have completed age of 17 years of age as on 31st December of admission year. There is no maximum age limit for the admission.

SCHEDULE OF EXAMINATION

FIRST YEAR

<u>Paper</u>	<u>Subjects</u>	<u>Mark</u>	<u>Internal Assessment Marks</u>	<u>Total Marks</u>	<u>Pass Marks</u>	<u>Duration of Exam.</u>
<u>First Paper Theory</u>	<p>1.General Anatomy & Physiology (Cytology, Histology, Osteology and basics of all organ systems of body) and detailed study of skull ,brain and spinal cord.</p> <p>2.Only basics of relevant Pathology, Pharmacology & Microbiology & drugs used during CT Scan.</p>	75	25	100	50	3 Hours
<u>Second Paper Theory</u>	<p>1.Details of radiological Anatomy & surface making.</p> <p>2.Radiophysics, Radiographic positions & Radiation hazards.</p> <p>3.Hand hygiene & prevention of cross infection.</p> <p>4.Basic life support (BLS) & Cardio-pulmonary resuscitation (CPR)</p>	75	25	100	50	3 Hours
<u>Practical</u>	Oral & Practical	75	25	100	50	3 Hours

SCHEDULE OF EXAMINATION

SECOND YEAR

<u>Paper</u>	<u>Subjects</u>	<u>Mark</u>	<u>Internal Assessment Marks</u>	<u>Total Marks</u>	<u>Pass Marks</u>	<u>Duration of Exam.</u>
<u>First Paper Theory</u>	1.Details of Only relevant surgical & medical conditions. 2.Nursing Procedures like vital recording, IM/IV/SC injection, Oxygen therapy, Nebulization, IV infusion.	75	25	100	50	3 Hours
<u>Second Paper Theory</u>	1.CT physics, slice Anatomy & CT positioning. 2.CT guided procedures. 3. Bio-medical physics of CT Scan machine & developement of CT film etc.	75	25	100	50	3 Hours
<u>Practical</u>	Oral & Practical	75	25	100	50	3 Hours

SCHEDULE OF COURSE

(List of holidays, Total hours, Subject wise allotment of hours)

- **List of Holidays:-**

Sundays	- 52 days
Summer vacation	- 10 days
Winter vacation	- 10 days
Gazetted holidays	- 23 days
Preparatory holidays	- 10 days
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Total Holidays	- 105 days
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- **Total Hours :-**

Theory classes per day	- 3 Hours
Practical classes per day	- 3 Hours
Total hours per day	- 6 Hours
Total days & hours in One year (after deduction of holidays)	- 260 days or - 1560 Hours

SCHEDULE OF COURSE

Subject wise allotment of hours

FIRST YEAR

Theory (780 Hours) Practical (780 Hours)

<u>First Paper Theory</u>	1.General Anatomy & Physiology (Cytology, Histology, Osteology and basics of all organ systems of body) and detailed study of skull ,brain and spinal cord.	300 Hrs
	2.Only basics of relevant Pathology, Pharmacology & Microbiology & drugs used during CT Scan.	100 Hrs
<u>Second Paper Theory</u>	1.Details of radiological Anatomy & surface making.	100 Hrs
	2.Radiophysics, Radiographic positions & Radiation hazards.	140 Hrs
	3.Hand hygiene & prevention of cross infection.	30 Hrs
	4.Basic life support (BLS) & Cardio-pulmonary resuscitation (CPR).	40 Hrs
<u>Third Paper Practical</u>	As described in curriculum	780 Hrs
<u>Theory: Other Subjects</u> (These subjects must be taught; though there will not be any exam from these)	1.Basic Computer skills.	30 Hrs
	2.Basic English.	30 Hrs
	3.Soft skills like - Interpersonal relationship skills & moral education	10 Hrs

SCHEDULE OF COURSE

Subject wise allotment of hours

SECOND YEAR

Theory (780 Hours) Practical (780 Hours)

<u>First Paper Theory</u>	1.Details of Only relevant surgical & medical conditions.	350 Hrs
	2.Nursing Procedures like vital recording, IM/IV/SC injection, Oxygen therapy, Nebulization, IV infusion.	20 Hrs
<u>Second Paper Theory</u>	1.CT physics, slice Anatomy & CT positioning.	200 Hrs
	2.CT guided procedures.	100 Hrs
	3. Bio-medical physics of CT Scan machine & development of CT film etc.	110 Hrs
<u>Third Paper Practical</u>	As described in curriculum	780 Hrs

Details of Curriculum for First Year Diploma in C.T. Scan Technician

PAPER 1st Theory	Topics	Hours.
1.General Anatomy & Physiology (Cytology, Histology, Osteology and basics of all organ systems of body) and detailed study of skull ,brain and spinal cord.	1. General Orientation about parts of human body. Various terms used in Anatomy. Total numbers of bones, their names & location. Basic idea about organization of body ,from cell to organ systems.	10 Hrs
	2. Structure of Animal cell, Cell organelles & their functions	05 Hrs
	3. Human tissue, types, structure & functions.	10 Hrs
	4. Osteology: Names, location, identification and basic details of all bones. Details of all bones of skull & various views.	60 Hrs
	5. Joints: types, basic structure & examples.	15 Hrs
	6. Skin & appendages.	02 Hrs
	7. GIT: : Location, Gross structure, various parts & their functions.	20 Hrs
	8. Respiratory tract: Location, Gross structure, various parts & their functions.	20 Hrs
	9. Urinary tract: Gross structure, various parts & their functions. (Microscopic structure is not required.)	10 Hrs
	10. Male reproductive system: Only gross structure & functions of different parts. (Microscopic structure is not required.)	05 Hrs
	11. Female reproductive system: Only gross structure & functions of different parts. (Microscopic structure is not required.)	05 Hrs

Details of Curriculum for First Year Diploma in C.T. Scan Technician

PAPER 1st Theory	Topics	Hours.
1. General Anatomy & Physiology (Cytology, Histology, Osteology and basics of all organ systems of body) and detailed study of skull, brain and spinal cord.	12. Endocrine system: Hormones secreted by Pituitary, Thyroid, Parathyroid, Pancreas, Adrenal cortex, Adrenal medulla, Gonads & functions of different hormones. (Details of structure of these glands not required).	20 Hrs
	13. Details of Gross structure of brain & spinal cord. Functions of different parts of brain & spinal cord.	40 Hrs
	14. Blood: Composition & Functions. Details about Plasma, RBCs, WBCs, Platelets, Clotting system.	20 Hrs
	15. Gross structure & functions of sensory Organs - Eye, Ear, Nose, Tongue. (Details not required).	20 Hrs
	16. Basic gross structure of heart, vessels opening into heart & Leaving the heart. Arterial & Venous tree of body.	20 Hrs
	17. Lymphatic system: Structure & Functions.	05 Hrs
	18. Inumune system: Components & various mechanisms of defense.	05 Hrs

Details of Curriculum for First Year Diploma in C.T. Scan Technician

PAPER 1st Theory	Topics	Hours.
2. Only basics of relevant Pathology, Pharmacology & Microbiology & drugs used during CT Scan.	1. Basic steps of Acute & chronic inflammation.	032Hrs
	2. Basics of Necrosis & apoptosis.	02 Hrs
	3. Basics of Shock.	02 Hrs
	4. Basics of Disorders of blood coagulation system.	04 Hrs
	5. Basics of Disorders of Immune system of body.	05 Hrs
	6. Modes of disease transmission & prevention of infection.	05 Hrs
	7. Sterilization & methods of sterilization used in hospitals.	10 Hrs
	8. Basic idea about types of Bacteria, Virus, Fungi.	15 Hrs
	9. Routes of drug administration.	02 Hrs
	10. Adverse effects & side effects of drugs.	02 Hrs
	11. Basic idea of Analgesics : Opioid & NSAIDs.	02 Hrs
	12. Basic idea of Drugs use in Cough & expectoration.	01 Hrs
	13. Basic idea of Drugs used in B. asthma & COPD.	02 Hrs
	14. Basic idea of Drugs used in GIT.	08 Hrs
	15. Basic idea of Anti Microbials.	20 Hrs
	16. Basic idea of Anti H-1 Histaminics & Corticosteroids.	02 Hrs
	17. Contrasts & drugs used in radiography.	15 Hrs

Details of Curriculum for First Year Diploma in C.T. Scan Technician

PAPER 2nd Theory	Topics	Hours.
1.Details of radiological Anatomy & surface making.	1. CT slices—Axial, coronal and sagittal sections of Brain and Spine.	20 Hrs
	2. CT slices—Axial, coronal and sagittal sections of Orbit.	05 Hrs
	3. CT slices—Axial, coronal and sagittal sections of PNS	05 Hrs
	4. CT slices—Axial, coronal and sagittal sections of Neck.	10 Hrs
	5. CT slices—Axial, coronal and sagittal sections of Thorax.	10 Hrs
	6. CT slices—Axial, coronal and sagittal sections of Abdomen.	10 Hrs
	7. CT slices—Axial, coronal and sagittal sections of Pelvis.	10 Hrs
	8. CT slices—Axial, coronal and sagittal sections of Limbs.	10 Hrs
	9. CT slices—Axial, coronal and sagittal sections of Hepatobiliary System.	10 Hrs
	10. CT slices—Axial, coronal and sagittal sections of KUB	10 Hrs

Details of Curriculum for First Year Diploma in C.T. Scan Technician

PAPER 2nd Theory	Topics	Hours.
2.Radiophysics, Radiographic positions & Radiation hazards.	INTRODUCTION TO Physics	
	1. Radiologic Physics,Electromagnetic radiation,Neil's Bohr Atomic model,Atomic number,Mass number,Isotopes, Valency.	10 Hrs
	2. Ionization.	03 Hrs
	3. X-Ray Physics,Discovery of X-Ray, Roentgenology, Fluroscopy,Nature of X-Ray,Wave length and Frequency Sources of X-Ray,X-Ray Tube & x ray control pane X ray circuit.	20 Hrs
	4. Necessary Conditions for the production of X-Ray.	02 Hrs
	5. Efficiency of X-Ray Production,properties of X-Ray, Quality and Quantity of X-Ray.	05 Hrs
	6. Basics of CT PHYSICS, Basics of multislice C.T. physics.	10 Hrs
	RADIATION	
	1. Radiation Dose,Radiation Hazards,Radiation Protection .	04 Hrs
	2. Dark Room.	01 Hrs
	RADIOGRAPHY	
	1. Concepts of Radiographic Positioning.	10 Hrs
	2. Scaphoid & hand.	03 Hrs
	3. Elbow & shoulder joint.	05 Hrs
	4. Foot AP & oblique.	05 Hrs
	5. Hip & Knee joint AP.	05 Hrs
	6. Pelvis AP.	02 Hrs
	7. Chest AP, PA & Lat.	05 Hrs
	8. Sub Mento vertical & PNS.	02 Hrs

Details of Curriculum for First Year Diploma in C.T. Scan Technician

PAPER 2nd Theory	Topics	Hours.
2.Radiophysics, Radiographic positions & Radiation hazards.	9. Skull and Towne's.	08 Hrs
	10. Abdomen Erect.	05 Hrs
	11. BARIUM Studies.	10 Hrs
	12. IVP	05 Hrs
	13. MCU/RGU/ T tube cholangiogram/ HSG.	05 Hrs
	14. Sinogram.	05 Hrs
	15. Contrast-Media, Radiographic Contrast, Density, Detail.	10 Hrs
	16. Types of film, Cassette, Intensifying Screen.	05 Hrs
	17. Safe Light, Developer and Fixer, Manual Processing.	05 Hrs
18. Causes of film fog, Factors of X-Ray.	02 Hrs	

PAPER 2nd Theory	Topics	Hours.
3. Hand hygiene & prevention of cross infection.	1. Hand hygiene & method of Hand washing.	15 Hrs
	2. Prevention of cross infection.	15 Hrs

PAPER 2nd Theory	Topics	Hours.
4. Basic life support (BLS) & Cardio-pulmonary resuscitation (CPR).	1. Code blue.	05 Hrs
	2. Details of basic life support (BLS) & Cardio-pulmonary resuscitation (CPR).	35 Hrs

Curriculum
for
Practical :- First Year
Diploma in C.T. Scan Technician

	Topics
Practical	<u>Observership for :-</u>
	1. Preparation of patient for CT Scan.
	2. Performing all types of CT Scan.
	3. Contrast administration & management of adverse reactions to it.
	4. Protection from radiation hazards.
	5. Assisting CT guided procedures.
	6. Developing film.
	7. Record keeping.

Details of Curriculum for Second Year Diploma in C.T. Scan Technician

PAPER 1st Theory	Topics	Hours.
1.Details of Only relevant surgical & medical conditions.	1. History taking. General examination of the patient. Filling Case-sheet. Common clinical words.	15 Hrs
	2. Hypertension:- Def, Causes, Pathology, Clinical features, Investigation & Management.	05 Hrs
	3. Hypotension :- Def, Causes, Pathology, Clinical features, Investigation & Management.	05 Hrs
	4. Diabetes mellitus :- Def, Causes, Pathology, Clinical features, Investigation & Management.	10 Hrs
	5. <u>Diseases of blood</u> :- Anaemia, Basics of coagulation Bleeding disorders & Haemophilia.	20 Hrs
	6. <u>Respiratory Tract</u> :- Pneumonia, Tuberculosis, B. asthma, COPD, Bronchiectasis, Collapse of lung, Pneumonitis, Pleural effusion, Pneumothorax, Empyema thoracis, Cancer lung.	40 Hrs
	7. <u>Diseases of GIT & Liver & GB</u> :-Reflux Oesophagitis, Peptic ulcers, Gastritis, Intestinal Obstruction, Hepatitis, Cirrhosis of liver, Cholecystitis, Common mass in abdomen.	50 Hrs
	8. <u>Diseases of Nervous system</u> :- Stroke, Meningo-encephalitis, Glasgow coma scale, Epilepsy etc.	25 Hrs
	9. Basic idea about fractures & their general management.	25 Hrs
	10. Head injury :- SCALP injury, skull fracture, intracranial bleeds, concussion, contusion etc.	20 Hrs
	11. Out line of thoracic injury.	10 Hrs
	12. Out line of abdominal injury.	10 Hrs
	13. PIVD & other spinal diseases.	10 Hrs
	14. Spina bifida, Meningocele, meningo-myelocele.	10 Hrs
	15. Hydrocephalus:- Def,Causes, Types, S/S, Management.	20 Hrs
	16. Brain tumors, tuberculoma & Neurocysticercosis.	20 Hrs

Details of Curriculum for Second Year Diploma in C.T. Scan Technician

1.Details of Only relevant surgical & medical conditions.	17. <u>Diseases of Urinary tract:-</u> Urolithiasis, Benign prostatic hyperplasia.	15 Hrs
	18. <u>Endocrine system :-</u> Diabetes mellitus, hypo & Hyper thyroidism.	10 Hrs
	19. <u>Miscellaneous:-</u> Hypo & Hyper Natraemia, Hypo & Hyper Kalaemia, Hypo & Hyper Calcaemia.	05 Hrs
	20. <u>Infections diseases :-</u> TB, Typhoid, Malaria, Dengue fever, Leprosy, AIDS, Amoebiasis.	10

PAPER 1st Theory	Topics	Hours.
2.Nursing Procedures like vital recording, IM/IV/SC injection, Oxygen therapy, Nebulization, IV infusion	1. Temperature monitoring & Fever.	02 Hrs
	2. Pulse monitoring.	02 Hrs
	3. BP monitoring.	02 Hrs
	4. Respiration monitoring.	01 Hrs
	5. Types of Injection routes.	01 Hrs
	6. IM Injection.	01 Hrs
	7. IV Injection.	01Hrs
	8. SC Injection.	01 Hrs
	9. Oxygen Therapy.	03 Hrs
	10. Nebulization	03 Hrs
	11. IV Infusion (Also with infusion pump).	01 Hrs
	12. Care of Unconscious patient.	02 Hrs

Details of Curriculum for Second Year Diploma in C.T. Scan Technician

PAPER 2nd Theory	Topics	Hours.
1.CT physics, slice Anatomy & CT positioning.	1. Physics Basic Principles of C.T Scan, Discovery of C.T Scan, Scanner Geometry:-1 st Generation, IInd Generation, III Generation, IVth Generation, Collimators, Artifacts, C.T Number, Attenuation values, Image Reconstruction Algorithm. System Components of Helical or spiral C.T. Scan, Gray Scale, MIP, MPR, VRT, Angiography. MDCT Cardiac C.T /64/128 Slice C.T Pitch / 3DCT Reconstruction / SSD/ PET CT	90 Hrs
	2. CT slices—Axial, coronal and sagittal sections of Brain and Spine.	20 Hrs
	3. CT slices—Axial,coronal and sagittal sections of Orbit.	05 Hrs
	4. CT slices—Axial,coronal and sagittal sections of PNS	05 Hrs
	5. CT slices—Axial,coronal and sagittal sections of Neck.	10 Hrs
	6. CT slices—Axial, coronal and sagittal sections of Thorax.	10 Hrs
	7. CT slices—Axial, coronal and sagittal sections of Abdomen.	10 Hrs
	8. CT slices—Axial, coronal and sagittal sections of Pelvis.	10 Hrs
	9. CT slices—Axial, coronal and sagittal sections of Limbs.	10 Hrs
	10. CT slices—Axial, coronal and sagittal sections of Hepatobiliary System.	10 Hrs
	11. CT slices—Axial, coronal and sagittal sections of KUB	10 Hrs
	12. Various positions used in duing CT Scan.	10 Hrs

Details of Curriculum for Second Year
Diploma in C.T. Scan Technician

PAPER 2nd Theory	Topics	Hours.
2. CT guided procedures.	CT PROCEDURES	
	1. C.T. Myelogram /cisternogram.	10 Hrs
	2. CT Guided FNAC / biopsy.	20 Hrs
	3. Other Special C.T. Procedures & common interventions.	30 Hrs
	4. C.T Enteroclysis/ CT IVP/ dual phase CT.	20 Hrs
	5. CT Angiography, mainly brain.	20 Hrs

PAPER 2nd Theory	Topics	Hours.
3. Bio-medical physics of CT Scan machine & development of CT film etc.	1. Basic Bio-medical physics of CT Scan machine.	80 Hrs
	2. Types of film, cassette, screen, Developer, fixer etc.	30 Hrs

Curriculum
for
Practical :- Second Year
Diploma in C.T. Scan Technician

	Topics
Practical	<u>Hands on training of :-</u>
	1. Preparation of patient for CT Scan.
	2. Performing all types of CT Scan.
	3. Contrast administration & management of adverse reactions to it.
	4. Protection from radiation hazards.
	5. Assisting CT guided procedures.
	6. Developing film.
	7. Record keeping.