

# उत्तर प्रदेश स्टेट मेडिकल फैकल्टी

5, सर्वपल्ली, माल एवेन्यू रोड, लखनऊ - 226001

फोन : 0522 - 2238846, 2236600, फैक्स : 0522-2237800



पत्रांक सं० ..... १२०८७/१५

दिनांक ..... ३०/११/१५

सेवा में,

प्रधानाचार्य/प्रबंधक,  
समस्त पैरामेडिकल डिप्लोमा प्रशिक्षण केन्द्र  
उत्तर प्रदेश।

विषय: पैरामेडिकल डिप्लोमा प्रशिक्षणों के रिवाइज्ड सिलैबस भेजने के संबंध में।

महोदय/महोदया,

उपर्युक्त विषयक के संदर्भ में आपको अवगत कराना है कि आपके संस्थान में संचालित समस्त पैरामेडिकल डिप्लोमा प्रशिक्षणों के रिवाइज्ड सिलैबस कार्यालय की वेबसाइट [www.upsmfac.org](http://www.upsmfac.org) पर अपलोड कर दिये गये हैं, से डाउनलोड करना सुनिश्चित करें। उक्त रिवाइज्ड सिलैबस सत्र 2015-16 में प्रवेशित छात्र-छात्राओं के लिये प्रभावी होंगे।

भवदीय,

सचिव,

उ०प्र० स्टेट मेडिकल फैकल्टी

UTTAR PRADESH STATE MEDICAL FACULTY  
उ०प्र० स्टेट मेडिकल फैकल्टी



Established - 10<sup>TH</sup> Nov 1926

स्थापित-10 नवम्बर, 1926

**REVISED SYLLABUS**  
(Paramedical Diploma Courses)

**5, Sarvpally, Mall Avenue Road, Lucknow(U.P)**

Phone :- 0522-2238846, 2235964, 2235065

Fax :- 0522-2236600

E-mail :- [upsmflucknow@yahoo.co.in](mailto:upsmflucknow@yahoo.co.in)

Website :- [www.upsmfac.org](http://www.upsmfac.org)

2015

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**Syllabus and Curriculum  
of  
Diploma in Lab 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 **Lab technician** who –

- Can perform all types of pathological tests.
- Can perform all types of Biochemistry tests.
- CanCan perform all types of Microbiology tests.
- Can help in processing of Histo-cytopathology.
- Can perform blood bank techniques.

## Diploma in Lab Technician course

### FIRST YEAR

Paper	Name of Paper	Internal	External	Total
<b>Theory First Paper</b>	General Anatomy, Physiology, Pathology, Pharmacology & Microbiology .	20	80	100
<b>Theory Second Paper</b>	Haematology, Microbiology-I & Biochemistry-I.	20	80	100
<b>Practical</b>		20	80	100

### SECOND YEAR

Paper	Name of Paper	Internal	External	Total
<b>Theory First Paper</b>	Relevant diseases & Microbiology-II & Biochemistry-II.	20	80	100
<b>Theory Second Paper</b>	Histo-Cyto pathology, Blood banking & Biomedical waste management.	20	80	100
<b>Practical</b>		20	80	100

**Outline of Curriculum  
of  
Diploma in Lab Technician course**

**FIRST YEAR**

**THEORY ( Classes: 9 AM to 12 Noon)**

**First paper : Syllabus covers -**

1. General Anatomy & Physiology (Cytology, Histology, Osteology and only basics of all organ systems of body).
2. Only basics of relevant Pathology, Pharmacology & Microbiology.

**Second paper : Syllabus covers -**

1. Clinical Hamatology & Clinical Microbiology-I.
2. Clinical Biochemistry-I.
3. Hand hygiene & prevention of cross infection.
4. Basics 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/ Lab for practicals.

(for curriculum, please see p.no.-21 to 23)

**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 Lab Technician course

SECOND YEAR

THEORY ( classes:9 AM to 12 Noon)

First paper : Syllabus covers -

1. Only relevant surgical & medical conditions (relevant to Lab technician).
2. Clinical Microbiology-II & Biochemistry-II.

Second paper : Syllabus covers -

1. Histopathology & Cytopathology.
2. Blood banking & Biomedical waste management.

**SECOND YEAR**

**PRACTICAL ( classes:9 AM to 12 Noon)**

Practical exams syllabus should cover-

(for details , please see p.no.- 30 to 32)

## ELIGIBILITY CRITERIA FOR ADMISSION & DURATION OF THE COURSE

### COURSE DURATION:-

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

### ELIGIBILITY:-

- Candidate must have passed 12<sup>th</sup> 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 31<sup>st</sup> 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>
<b><u>First Paper Theory</u></b>	1. General Anatomy & Physiology (Cytology, Histology, Osteology and only basics of all organ systems of body). 2. Only basics of relevant Pathology, Pharmacology & Microbiology.	75	25	100	50	3 Hours
<b><u>Second Paper Theory</u></b>	1. Clinical Hamatology & Clinical Microbiology-I. 2. Clinical Biochemistry-I. 3. Hand hygiene & prevention of cross infection. 4. Basics life support (BLS) & Cardio-pulmonary resuscitation (CPR).	75	25	100	50	3 Hours
<b><u>Practical</u></b>	Oral & Practical	75	25	100	50	3 Hours

**SCHEDULE OF EXAMINATION****SECOND YEAR**

<b><u>Paper</u></b>	<b><u>Subjects</u></b>	<b><u>Mark</u></b>	<b><u>Internal Assessment Marks</u></b>	<b><u>Total Marks</u></b>	<b><u>Pass Marks</u></b>	<b><u>Duration of Exam.</u></b>
<b><u>First Paper Theory</u></b>	1. Only relevant surgical & medical conditions (relevant to Lab technician). 2. Clinical Microbiology-II & Biochemistry-II.	75	25	100	50	3 Hours
<b><u>Second Paper Theory</u></b>	1. Histopathology & Cytopathology. 2. Blood banking & Biomedical waste management.	75	25	100	50	3 Hours
<b><u>Practical</u></b>	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)

<b><u>First Paper Theory</u></b>	1.General Anatomy & Physiology (Cytology, Histology, Osteology and only basics of all organ systems of body).	180 Hrs
	2.Only basics of relevant Pathology, Pharmacology & Microbiology.	80 Hrs
<b><u>Second Paper Theory</u></b>	1.Clinical Haematology & Clinical Microbiology-I.	280 Hrs
	2. Clinical Biochemistry-I.	100 Hrs
	3.Hand hygiene & prevention of cross infection.	30 Hrs
	4.Basics life support (BLS) & Cardio-pulmonary resuscitation (CPR).	40 Hrs
<b><u>Third Paper Practical</u></b>	As described in curriculum	780 Hrs
<b><u>Theory: Other Subjects</u></b> (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)

<b><u>First Paper Theory</u></b>	1. Only relevant surgical & medical conditions (relevant to Lab technician).	180 Hrs
	2. Clinical Microbiology-II & Biochemistry-II.	225 Hrs
<b><u>Second Paper Theory</u></b>	1. Histopathology & Cytopathology.	250 Hrs
	2. Blood banking & Biomedical waste management.	125 Hrs
<b><u>Third Paper Practical</u></b>	As described in curriculum	780 Hrs

**Details of Curriculum for First Year  
Diploma in Lab Technician**

<b>PAPER 1st Theory</b>	<b>Topics</b>	<b>Hours.</b>
<b>1.General Anatomy &amp; Physiology (Cytology, Histology, Osteology and only basics of all organ systems of body).</b>	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.	06 Hrs
	2. Structure of Animal cell, Cell organelles & their functions	06 Hrs
	3. Human tissue, types, structure & functions.	10 Hrs
	4. Osteology: Names, location, identification and basic details of all bones. (Details of skull bones is not required).	20 Hrs
	5. Joints: types, basic structure & examples.	06 Hrs
	6. Skin & appendages.	02 Hrs
	7. GIT: : Location, Gross structure, various parts & their functions. Details of process of food ingestion, digestion, absorption & defaecation. (Microscopic structure is not required.)	15 Hrs
	8. Respiratory tract: Location, Gross structure, various parts & their functions. Details of breathing mechanism, different respiratory volumes. (Microscopic structure is not required.)	15 Hrs
	9. Urinary tract: Gross structure, various parts & their functions. (Microscopic structure is not required.) Process of urine formation & voiding.	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.) Menstrual cycl	05 Hrs

**Details of Curriculum for First Year  
Diploma in Lab Technician**

PAPER 1st Theory	Topics	Hours.
<b>1.General Anatomy &amp; Physiology (Cytology, Histology, Osteology and only basics of all organ systems of body).</b>	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).	10 Hrs
	13. Gross structure of brain & spinal cord. Functions of different parts of brain & spinal cord.(Details not required.)	20 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).	10 Hrs
	16. Basic gross structure of heart, vessels opening into heart & Leaving the heart. Arterial & Venous tree of body.	10 Hrs
	17. Lymphatic system: Structure & Functions.	10 Hrs
	18. Inumune system: Components & various mechanisms of defense.	10 Hrs

**Details of Curriculum for First Year  
Diploma in Lab Technician**

<b>PAPER 1st Theory</b>	<b>Topics</b>	<b>Hours.</b>
<b>2.Only basics of relevant Pathology, Pharmacology &amp; Microbiology.</b>	1. Basic steps of Acute & chronic inflammation and Healing of wound.	05 Hrs
	2. Basics of Necrosis & apoptosis.	02 Hrs
	3. Basics of Shock.	02 Hrs
	4. Basics of Disorders of blood coagulation system.	08 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.	20 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.	03 Hrs
	15. Basic idea of Anti Microbials.	15 Hrs
	16. Basic idea of Anti H-1 Histaminics & Corticosteroids.	01 Hrs
	17. Drugs used in anaemia.	02 Hrs

**Details of Curriculum for First Year  
Diploma in Lab Technician**

PAPER 2nd Theory	Topics	Hours.	
<b>1.Clinical Hematology &amp; Clinical Microbiology- I.</b>	1	Introduction to pathology.	03 Hrs
	2	Composition of blood -1.(RBC,WBC,Platelet)	05 Hrs
	3	Composition of blood -2. (Plasma & Plasma Protein)	04 Hrs
	4	Routine Instruments in haematology	20 Hrs
	5	Collection and Preservation of Blood.	05 Hrs
	6	Use of autoanalyser in haematology.	05 Hrs
	7	Making of stains in haematology.	03 Hrs
	8	Preparation of thick & thin smears.	03 Hrs
	9	Leishman stain (PPreparation & method of staining)	03 Hrs
	10	Other stains in haematology (Preparation & Method of staining).	03 Hrs
	11	Anti coagulant vials-their preparation and use.	03 Hrs
	12	Erythrocytes & abnormal erythrocytes	03 Hrs
	13	Reticulocyte count.	03 Hrs
	14	Platelet count.	03 Hrs
	15	Absolute Values.	02 Hrs
	16	Hemoparasites	02 Hrs
	17	ESR,PCV	05 Hrs
	18	Osmotic fragility Test.	05 Hrs
	19	LE Cell I	03 Hrs
	20	Coagulation Disorders.	07 Hrs
	21	Lab Diagnosis of Bleeding Disorders.	05 Hrs
	22	Formation & Composition of Urine	05 Hrs
	23	Collection & Preservation of Urine.	02 Hrs
	24	Abnormal constituents of urine.	03 Hrs
	25	Urinometer & Esbach's Albuminometer	05 Hrs
	26	Physical & Chemical examination of urine.	10 Hrs
	27	Microscopic examination of urine.	10 Hrs
	28	Liver function test.	05 Hrs
	29	Renal Function Test.	05 Hrs
	30	Examination of body fluids -1. (Pleural,Peritoneal & Synovial.)	05 Hrs
	31	Examination of body fluids -2.CSF	05 Hrs
	32	Semen Examination.	05 Hrs
	33	Investigations for Aneamia.	10 Hrs
	34	Hemolytic Aneamia, Foetal Hb.	05 Hrs
	35	Bone Marrow indications,contra indications & aspiration.	15 Hrs
	36	Introduction to leukemia	05 Hrs
	37	Chronic leukemia & acute leukemia.	05 Hrs
	38	Use of auto analyser in Haematology	10 Hrs

**Details of Curriculum for First Year  
Diploma in Lab Technician**

PAPER 2nd Theory	Topics		Hours.
<b>1.Clinical Hematology &amp; Clinical Microbiology- I.</b>	39	General introduction & terms used in Microbiology	03 Hrs
	40	Safety measures in Microbiology	03 Hrs
	41	Universal precautions	03 Hrs
	42	Bio-Waste Disposal	03 Hrs
	43	Growth & nutrition of Bacteria	03 Hrs
	44	Care and Handling of Microscopes	03 Hrs
	45	Use, Care and maintenance of common Lab equipments like centrifuges-I	12 Hrs
	46	Use, Care and maintenance of common Lab equipments like centrifuges-II	10 Hrs
	47	Principles & methods of sterilization	05 Hrs
	48	Antiseptics and disinfectants	02 Hrs
	49	PH, Buffer & reagents-I	01 Hr
	50	PH, Buffer & reagents-II	01 Hr
	51	Routine bacteria Culture media-I	02 Hrs
	52	Routine bacteria Culture media-II	02 Hrs
	53	Media for bacterial identification-I	02 Hrs
	54	Media for bacterial identification-II	02 Hrs
	55	Media for Drug Sensitivity Testing	02 Hrs
	57	Classification of staining methods smear preparation	02 Hrs
	58	Gram stains and other routine stains in Microbiology	02 Hrs
	59	Z.N. Stains and other stains for Mycobacterium	02 Hrs
60	Leishman staining	01 Hr	
65	Mechanism of drug resistance in bacteria .	02 Hrs	
66	Anti bacterial sensitivity testing-I	02 Hrs	
67	Anti bacterial sensitivity testing-II	02 Hrs	

**Details of Curriculum for First Year  
Diploma in Lab Technician**

PAPER 2nd Theory	Topics		Hours.
<b>2.Clinical Biochemistry- I.</b>	1	Introduction of Biochemistry	05 Hrs
	2	Biochemistry Use in Medicine	05 Hrs
	3	Units of Measurement	05 Hrs
	4	Measurement of Volumetric Apparatus (Pipettes, Flasks & Cylinders)	05 Hrs
	5	Laboratory Hazards	05 Hrs
	6	Laboratory Safety	05 Hrs
	7	Laboratory Design & Administration	10 Hrs
	8	Sample Collection	10 Hrs
	9	Universal Precautions	05 Hrs
	11	Concept and Calculations Molecular Weight	03 Hrs
	12	Concept and Calculations Equivalent Weight	03 Hrs
	13	Basic Principles of Centrifugation	03 Hrs
	14	Mole, Molar, Buffer & Normal Solution	03 Hrs
	15	Definitions of Acid Base	03 Hrs
	16	Calorimeter	10 Hrs
	17	Preparation of Anticoagulants	05 Hrs
	18	Preservation of Anticoagulants	05 Hrs
	19	PH & Buffer	05 Hrs
	20	Water Purification	05 Hrs
	21	Sterilization	05 Hrs

**Details of Curriculum for First Year  
Diploma in Lab Technician**

<b>PAPER 2nd Theory</b>	<b>Topics</b>	<b>Hours.</b>
<b>3.Hand hygiene &amp; prevention of cross infection.</b>	1. Hand hygiene & method of Hand washing.	15 Hrs
	2. Prevention of cross infection.	15 Hrs

<b>PAPER 2nd Theory</b>	<b>Topics</b>	<b>Hours.</b>
<b>4.Basic life support (BLS) &amp; Cardio-pulmonary resuscitation (CPR).</b>	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 Lab Technician**

Topics	
<b>Practical</b>	1 Making of slide and staining.
	2 Assessing hemoglobin with different methods.
	3 Loading of Neubauer's chamber.
	4 TLC
	5 DLC
	6 ESR & PCV
	7 Reticulocyte count
	8 RBC Count
	9 Platelet Count
	10 Buffy coat preparation
	11 Coomb's Test - Direct & Indirect
	12 LE Cell
	13 Osmotic fragility Test
	14 PT/PC
	15 Blood grouping methods
	16 Uses of anti-coagulants
	17 Bone Marrow Aspirations
	18 Cell Count in Acute Leukemia
	19 Cell Count in Chronic Leukemia
	20 Examination of Malarial Parasite.
	21 Examination of Microfilaria.
	22 Fetal Hemoglobin
	23 Urine collection and preservation
	24 24 hrs. Urine protein estimation
	25 Urine examination – Physical / Chemical
	26 Urine examination – Microscopy
	27 CSF examination.
	28 Semen examination
	29 Other body fluid examination
	30 Rh antibody titre
	31 Automation in haematology

**Curriculum  
for  
Practical :- First Year  
Diploma in Lab Technician**

		Topics
<b>Practical</b>	32	Normal & Molar
	33	Percentage
	34	Buffers
	35	Glucose
	36	Albumin
	37	Physical Examination
	38	Chemical Examination (Chloride, Sulphate, Urea, Ammonia, Phosphate)
	39	Physical Examination
	40	Chemical Examination (Protein, Glucose, Ketone Bodies, Bile Salt, Bile Pigment, Blood, Urobilinogen, Chyle, Phenyl Ketoneuria, Alkaptoneuria)
	41	Normal Value
	42	. Hyper Value & Hypo Value
	43	Normal Value
	44	Hyper Value
	45	Normal Value
	46	Hyper Value & Hypo Value
	47	Programming of Different Analytes
	48	Standardization

**Curriculum  
for  
Practical :- First Year  
Diploma in Lab Technician**

	Topics	
	<b>Practical</b>	49
50		Preparation of load for autoclaving & hot air sterilization
51		Autoclaving
52		Use of hot air oven
53		Disinfection
54		Preparation of Buffer & reagents
55		Preparation of Culture media (Selective medias)
56		Preparation of Culture media (Special medias)
57		Smear preparation
58		Use of centrifuges
59		Preparation of stains
60		Gram's staining
61		Zeihl Neelsen staining
62		Leishman / romanowsky staining
63		Albert's & other special staining
64		Inoculation of culture media-I
65		Inoculation of culture media-II
66		Drug Sensitivity Testing-I
67		Drug Sensitivity Testing-II

**Details of Curriculum for Second Year  
Diploma in Lab Technician**

PAPER 1st Theory	Topics	Hours.
<b>1. Only relevant surgical &amp; medical conditions (relevant to Lab technician).</b>	1. History taking. General examination of the patient. Filling Case-sheet. Common clinical words.	05 Hrs
	2. Hypertension:- Def, Causes, Pathology, Clinical features, Investigation & Management.	03 Hrs
	3. Hypotension :- Def, Causes, Pathology, Clinical features, Investigation & Management.	01 Hr
	4. Diabetes mellitus :- Def, Causes, Pathology, Clinical features, Investigation & Management.	05 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.	15 Hrs
	7. <u>Diseases of GIT &amp; Liver &amp; GB</u> :-Reflux Oesophagitis, Peptic ulcers, Gastritis, Intestinal Obstruction, Hepatitis, Cirrhosis of liver, Cholecystitis, appendicitis, Hernia, Piles, Fissure, Fistula, Pancreatitis, Pancreatic Cancer.	20 Hrs
	8. <u>Diseases of Nervous system</u> :- Stroke, Meningo-encephalitis, Glasgow coma scale, Epilepsy, Head Injury.	20 Hrs
	9. <u>Diseases of Urinary tract</u> :- Urolithiasis, Benign prostatic hyperplasia, Hydrocoele, Cancer prostate, urethral stricture, Hypo & epi-spadias.	10 Hrs
	10. <u>Endocrine system</u> :- Diabetes mellitus, hypo & Hyper thyroidism.	05 Hrs
	11. <u>Miscellaneous</u> :- Hypo & Hyper Natraemia, Hypo & Hyper Kalaemia, Hypo & Hyper Calcaemia.	05 Hrs
	12. <u>Infections diseases</u> :- TB, Typhoid, Malaria, Dengue fever, Leprosy, AIDS, Amoebiasis.	15 Hrs

**Details of Curriculum for Second Year  
Diploma in Lab Technician**

PAPER 1st Theory	Topics	Hours.
<b>1. Only relevant surgical &amp; medical conditions (relevant to Lab technician).</b>	13. Head injury & Intracranial bleed.	10 Hrs
	14. D's of G& O: Caesarian section, fibroid uterus, Cancer uterus, prolapse uterus, PID.	10 Hrs
	15. Basics about fracture & management.	15 Hrs
	16. PIVD, Potts spine.	05 Hrs
	17. Oral cavity tumors.	05 Hrs
	18. Eye d's : Cataract, Glaucoma.	05 Hrs
	19. ENT: CSOM, ASOM, Laryngeal tumor, Nasal polyp, DNS.	06 Hrs

## Details of Curriculum for Second Year Diploma in Lab Technician

PAPER 1st Theory	Topics		Hours.
<b>2.Clinical Microbiology- II &amp; Biochemistry- II.</b>	1	Chemistry of Carbohydrate	05 Hrs
	2	Chemistry of Protein	05 Hrs
	3	Chemistry of Lipid	05 Hrs
	4	Radioisotopes & Their Use in Biochemistry	05 Hrs
	5	Principles of Electrophoresis	05 Hrs
	6	Liver Function Test	05 Hrs
	7	Renal Function Test	05 Hrs
	8	Thyroid Function Test	05 Hrs
	9	Body Fluid	10 Hrs
	10	Quality Control	05 Hrs
	11	Standardization	05 Hrs
	12	Ultraviolet and Visible Light Spectroscopy	03 Hrs
	13	Elisa	10 Hrs
	14	Radioimmunoassay	10 Hrs
	15	Polymerase Chain Reaction (PCR)	10 Hrs
	16	Chromatography	10 Hrs
	17	Spectrometry	03 Hrs
	18	Point of Care Testing	03 Hrs
	19	Introduction of Electrolyte & Water Balance	03 Hrs
	20	Clinical Approach of Electrolyte & Water Balance	03 Hrs
	21	Immunochemistry	05 Hrs
	22	Automation in Clinical Biochemistry	10 Hrs
	23	Collection of specimens	03 Hrs
	24	Identification methods for various bacterias	03 Hrs
	25	Methods to prepare Identification medias	03 Hrs
	26	Lab diagnosis of diarrhoea	03 Hrs
	27	Lab diagnosis of UTI	03 Hrs
	28	Lab diagnosis of respiratory tract infection	03 Hrs
	29	Lab diagnosis of meningitis	03 Hrs
	30	Lab Diagnosis of Tuberculosis	05 Hrs
	31	Lab diagnosis of wound infection	03 Hrs
	32	Bacteriological examination of water & air	03 Hrs
	33	Care and handling of lab animals	03 Hrs
	34	Preservation of bacteria	03 Hrs

**Details of Curriculum for Second Year  
Diploma in Lab Technician**

PAPER 1st Theory	Topics		Hours.
<b>2.Clinical Microbiology- II &amp; Biochemistry- II.</b>	35	Antigens and Antibodies	05 Hrs
	36	Antigen-Antibody reaction	05 Hrs
	37	Introduction and classification of viruses	05 Hrs
	38	Lab diagnosis of virus including cultivation of viruses	10 Hrs
	39	Medically important DNA viruses including HBV	05 Hrs
	40	Medically important RNA viruses including HIV	05 Hrs
	41	Introduction & classification of fungi	05 Hrs
	42	Lab diagnosis of fungi	03 Hrs
	43	Medically important fungi-I	03 Hrs
	44	Medically important fungi-II	03 Hrs
	45	Preparation of smears for fungus examination	03 Hrs
	46	Media for fungal culture of Fungi	03 Hrs

## Details of Curriculum for Second Year Diploma in Lab Technician

PAPER 2nd Theory	Topics		Hours.
<b>1.Histopathology &amp; Cytopathology.</b>	1	Instruments in Histopathology lab – 1. For grossing & for procesing.	15 Hrs
	2	Instruments in Histopathology lab – 2. For section cutting & staining.	15 Hrs
	3	Receiving of sample in Histopathology	10 Hrs
	4	Registration of samples and record keeping	05 Hrs
	5	Preservation of samples in Histopathology.	05 Hrs
	6	Grossing of general pathology specimens.	10 Hrs
	7	Grossing of respiratory system	05 Hrs
	8	Grossing of GIT	05 Hrs
	9	Grossing of Hepatobiliary system	05 Hrs
	10	Grossing of male genital system	05 Hrs
	11	Grossing of female genital system	05 Hrs
	12	Grossing of breast tissue.	05 Hrs
	13	Grossing of Urinary system	05 Hrs
	14	Grossing of Bones	05 Hrs
	15	Grossing of thyroid and and endocrine glands	05 Hrs
	16	Grossing of Brain tissue	05 Hrs
	17	Tissue Blocking and section cutting.	10 Hrs
	18	Reagents in Histopathology.	05 Hrs
	19	Staining of slides in Histopathology I (H & E).	05 Hrs
	20	Staining of slides in Histopathology II (Retic/PAS/VG/Amyloid).	10 Hrs
	21	Paraffin blocks filing.	05 Hrs
	22	Slide filing in Histopathology	05 Hrs
	23	Specimen mounting & Labeling.	10 Hrs
	24	Cataloguing for museum.	10 Hrs
	25	Instruments in Cytopathology laboratory.	20 Hrs
	26	Receiving of samples in Cytopathology	10 Hrs
	27	Preservatives used in Cytopathology	10 Hrs
	28	Staining of slides in cytopathology-1: H & E.	20 Hrs
	29	Staining of slides in cytopathology -2:Pap / gimsa	20 Hrs
	30	Slide Filing of slides in Cytopathology.	10 Hrs



**Details of Curriculum for Second Year  
Diploma in Lab Technician**

<b>PAPER 2nd Theory</b>	<b>Topics</b>		<b>Hours.</b>
<b>2. Blood banking &amp; Biomedical waste management.</b>	1	Blood Banking - an introduction.	05 Hrs
	2	Blood Bank setup and Functioning, sterilization & safety.	20 Hrs
	3	Common Blood groups.	10 Hrs
	4	Rare blood groups.	05 Hrs
	5	Genetics & Blood grouping methods.	05 Hrs
	6	Cross matching.	10 Hrs
	7	Preparation of grouping sera.	05 Hrs
	8	Storage of Blood.	10 Hrs
	9	Labeling & Maintenance of blood bags.	05 Hrs
	10	Transportation of Blood bags.	05 Hrs
	11	Preparation of different components of Blood-I	05 Hrs
	12	Preparation of different components of Blood-II	05 Hrs
	13	Immune sera – Types , production & uses .	05 Hrs
	14	Screening tests done in blood bank – Diseases & methods- I	05 Hrs
	15	Screening tests done in blood bank – Diseases & methods- II	05 Hrs
	16	Rh antibody titre.	05 Hrs
	17	Coombs test- Direct & Indirect.	05 Hrs
	18	Blood transfusion reactions.	05 Hrs
	19	Issuing the blood, medico-legal implications.	05 Hrs
	20	Disposal of expired blood.	05 Hrs
	21	Basics of Biomedical waste management	05 Hrs

**Curriculum  
for  
Practical :- Second Year  
Diploma in Lab Technician**

<b>Practical</b>	<b>Topics</b>	
	1	Grossing in General pathology
	2	Grossing of GIT
	3	Grossing of Hepatobiliary system
	4	Grossing of Female genital system
	5	Grossing of Breast tissue.
	6	Grossing of Urinary system
	7	Grossing of Bones
	8	Grossing of Thyroid and endocrine glands
	9	Staining of slides in Histopathology - H & E
	10	Staining of slides in Histopathology - PAS
	11	Staining of slides in Histopathology - AFB
	12	Staining of slides in Histopathology - GIEMSA
	13	Processing in Histopathology I
	14	Processing in Histopathology II
	15	Processing in Histopathology III
	16	Processing in Histopathology IV
	17	Blocking in Histopathology I
	18	Blocking in Histopathology II
	19	Section Cutting in Histopathology I
	20	Section Cutting in Histopathology II
	21	Section Cutting in Histopathology III
	22	Section Cutting in Histopathology IV
	23	Making Stain in Cytopathology I
	24	Making Stain in Cytopathology II
	25	Making Stain in Cytopathology III
	26	Making Stain in Cytopathology IV
	27	Making Stain in Cytopathology V
	28	Staining of slides in Cytopathology- H& E
	29	Staining of slides in Cytopathology - PAP
	30	Staining of slides in Cytopathology - AFB
	31	Staining of slides in Cytopathology - GIEMSA
	32	Blood Grouping And Cross Matching I
	33	Blood Grouping And Cross Matching II
34	Blood Grouping And Cross Matching III	

**Curriculum**  
for  
**Practical :- Second Year**  
**Diploma in Lab Technician**

	Topics	
	<b>Practical</b>	35
36		Rh Antibody II
37		Coomb's Test I
38		Coomb's Test II
39		Component Preparation I
40		Component Preparation II
41		Normal Value
42		Hyper Value & Hypo Value
43		Normal Value
44		Hyper Value & Hypo Value
45		Normal Value
46		Hyper Value & Hypo Value
47		Normal Value
48		Hyper Value & Hypo Value
49		Normal Value
50		Hyper Value & Hypo Value
51		Normal Value
52		Hyper Value & Hypo Value
53		T3 & T4
54		TSH
55		PRL
56		Centrifuge
57		PH Meter
58		Electrophoresis
59		PCR
60		Thin Layer Chromatography (TLC)
61		Urine Sample
62		Sputum
63		Wound swab
64		CSF

Curriculum  
for  
Practical :- Second Year  
Diploma in Lab Technician

		Topics
<b>Practical</b>	65	Stool
	66	Animal inoculation
	67	Bleeding of mice & rabbit
	68	Collection of sheep blood aseptically
	69	Care and handling of lab animals
	70	Introduction and classification of parasites
	71	Medically important parasites -I
	72	Medically important parasites -II
	73	Procedure/Method of stool examination
	74	Preparation & staining of blood films for haemoparasite
	75	Preparation of blood film for Parasites
	76	Staining (Leishman, Geimsa) & Blood smear examination
	77	Demonstration of P.vivax, P. falciparum & filarial worms
	78	Preparation of stool smears (i) Saline (ii) Concentrated
	79	VDRL test
	80	WIDAL test
	81	Latex agglutination
	82	ELISA Test
83	Staining methods for fungus	
84	Preparation of smears for fungus examination-I	
85	Preparation of smears for fungus examination-II	
86	Preparation of media for culture of fungi	

**Syllabus and Curriculum  
of  
Diploma in X-Ray Technician course**

**(To be implemented From 2015 - 16 session)**

**Uttar Pradesh State Medical Faculty, Lucknow.**

# Index

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## **OBJECTIVES OF THE COURSE**

To prepare a **X-Ray technician** who –

- Can perform X-rays 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 X-rays.

## Diploma in X-Ray Technician course

### FIRST YEAR

Paper	Name of Paper	Internal	External	Total
Theory First Paper	General Anatomy, Physiology, Pathology, Pharmacology & Microbiology .	20	80	100
Theory Second Paper	Radiological Anatomy, Basic radiophysics & radiation hazards.	20	80	100
Practical		20	80	100

### SECOND YEAR

Paper	Name of Paper	Internal	External	Total
Theory First Paper	Relevant medical & surgical diseases.	20	80	100
Theory Second Paper	Radiological imaging & Biomedical physics of X-ray machine.	20	80	100
Practical		20	80	100



# Outline of Curriculum of Diploma in X-Ray 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).
2. Only basics of relevant Pathology, Pharmacology & Microbiology & drugs used during X-ray.

#### 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/X-ray 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 X-Ray 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. Radiological imaging techniques & patient care.
2. Bio-medical physics of X-ray machine & development of X-ray film etc.

## SECOND YEAR

### PRACTICAL ( classes:9 AM to 12 Noon)

Practical exams syllabus should cover-

#### Hands on training of :-

- Preparation of patient for X-ray.
- Performing all types of X-ray.
- Contrast administration & management of adverse reactions to it.
- Protection from radiation hazards.
- 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 12<sup>th</sup> 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 31<sup>st</sup> 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 &amp; Physiology (Cytology, Histology, Osteology and basics of all organ systems of body).</p> <p>2.Only basics of relevant Pathology, Pharmacology &amp; Microbiology &amp; drugs used during X-ray.</p>	75	25	100	50	3 Hours
<u>Second Paper Theory</u>	<p>1.Details of radiological Anatomy &amp; surface making.</p> <p>2.Radiophysics, Radiographic positions &amp; Radiation hazards.</p> <p>3.Hand hygiene &amp; prevention of cross infection.</p> <p>4.Basic life support (BLS) &amp; 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>	<p>1.Details of Only relevant surgical &amp; medical conditions.</p> <p>2.Nursing Procedures like vital recording, IM/IV/SC injection, Oxygen therapy, Nebulization, IV infusion.</p>	75	25	100	50	3 Hours
<u>Second Paper Theory</u>	<p>1.Radiological imaging techniques &amp; patient care.</p> <p>2. Bio-medical physics of X-ray machine &amp; development of X-ray film etc.</p>	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
<hr/>	
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)

<b><u>First Paper Theory</u></b>	1.General Anatomy & Physiology (Cytology, Histology, Osteology and basics of all organ systems of body).	200 Hrs
	2.Only basics of relevant Pathology, Pharmacology & Microbiology & drugs used during X-ray.	100 Hrs
<b><u>Second Paper Theory</u></b>	1.Details of radiological Anatomy & surface making.	100 Hrs
	2.Radiophysics, Radiographic positions & Radiation hazards.	240 Hrs
	3.Hand hygiene & prevention of cross infection.	30 Hrs
	4.Basic life support (BLS) & Cardio-pulmonary resuscitation (CPR).	40 Hrs
<b><u>Third Paper Practical</u></b>	As described in curriculum	780 Hrs
<b><u>Theory: Other Subjects</u></b> (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)

<b><u>First Paper Theory</u></b>	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
<b><u>Second Paper Theory</u></b>	1.Radiological imaging techniques & patient care.	330 Hrs
	2.Bio-medical physics of X-ray machine & developement of X-ray film etc.	80 Hrs
<b><u>Third Paper Practical</u></b>	As described in curriculum	780 Hrs

## Details of Curriculum for First Year Diploma in X-Ray Technician

PAPER 1st Theory	Topics	Hours.
<b>1.General Anatomy &amp; Physiology (Cytology, Histology, Osteology and basics of all organ systems of body).</b>	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.	10 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 X-Ray Technician

PAPER 1st Theory	Topics	Hours.
<b>1. General Anatomy &amp; Physiology (Cytology, Histology, Osteology and basics of all organ systems of body).</b>	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).	10 Hrs
	13. Details of Gross structure of brain & spinal cord. Functions of different parts of brain & spinal cord.	20 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).	10 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 X-Ray Technician

PAPER 1st Theory	Topics	Hours.
<b>2. Only basics of relevant Pathology, Pharmacology &amp; Microbiology &amp; drugs used during X-ray Scan.</b>	1. Basic steps of Acute & chronic inflammation.	05 Hrs
	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 X-Ray Technician

PAPER 2nd Theory	Topics	Hours.
<b>1.Details of radiological Anatomy &amp; surface making.</b>	1. Radiological and surface Anatomy of Skull.	15 Hrs
	2. Radiological and surface Anatomy of Vertebral column.	05 Hrs
	3. Radiological and surface Anatomy of Ribs & sternum.	05 Hrs
	4. Radiological and surface Anatomy of Upper limb.	10 Hrs
	5. Radiological and surface Anatomy of Lower limb.	10 Hrs
	6. Radiological and surface Anatomy of Abdomen.	15 Hrs
	7. Radiological and surface Anatomy of Thorax.	15 Hrs
	8. Radiological and surface Anatomy of Breast.	05 Hrs
	9. Radiological and surface Anatomy of Para nasal sinuses.	05 Hrs
	10. Radiological and surface Anatomy of maxillo-facial region.	05 Hrs
	11. Radiological and surface Anatomy of various joints of body.	10 Hrs

## Details of Curriculum for First Year Diploma in X-Ray Technician

PAPER 2nd Theory	Topics	Hours.
<b>2.Radiophysics, Radiographic positions &amp; Radiation hazards.</b>	<b>INTRODUCTION TO Physics</b>	
	1. Radiologic Physics, Electromagnetic radiation, Neil's Bohr Atomic model, Atomic number, Mass number, Isotopes, Valency.	07 Hrs
	2. Ionization.	03 Hrs
	3. Principles of thermionic emission and rectification in x-ray technology. High voltage circuits in x-ray Units. Effects of variation of tube voltage, current, filtration, HT waveform and target material on X-ray production.	10 Hrs
	4. Attenuation, absorption and scattering phenomenon. Photoelectric absorption, Compton scattering, pair production and annihilation process.	05 Hrs
	5. X-Ray Physics, Discovery of X-Ray, Roentgenology, Fluoroscopy, Nature of X-Ray, Wave length and Frequency Sources of X-Ray, X-Ray Tube & X-ray control panel X ray circuit.	15 Hrs
	6. Necessary Conditions for the production of X-Ray.	02 Hrs
	7. Efficiency of X-Ray Production, properties of X-Ray, Quality and Quantity of X-Ray.	03 Hrs
	8. Transmission of X-ray through body tissues. Linear energy transfer. Range of secondary electrons and electrons build up. Relative amounts of scatter from homogeneous and heterogeneous beam during the passage through a patient.	05 Hrs
	9. Exponential and trigonometric functions used in radiological calculations.	05 Hrs
	10. Physical requirement of beam defining devices e.g. cones, diaphragm, collimators etc	05 Hrs
	11. Units of radiation measurements.	05 Hrs
	12. Specification of quality and half-value thickness (HVT) and its measurements	05 Hrs
13. Filters and filtration.	05 Hrs	

## Details of Curriculum for First Year Diploma in X-Ray Technician

PAPER 2nd Theory	Topics	Hours.
<b>2. Radiophysics, Radiographic positions &amp; Radiation hazards.</b>	14. Measurement of radiation and dosimetric procedures. Radiation detectors and their principles of working. Physical properties of phantoms, phantom materials.	10 Hrs
	15. Details of X-ray machines.	25 Hrs
	16. <u>Detection and measurement of Ionizing/radiation:</u> Field survey instrument, GM survey instruments, personnel Monitoring devices film badge, TLD, pocket dosimeter, pulsed optically stimulated Luminescence dosimeter (OSL) etc.	10 Hrs
	17. <u>Protection of Personnel -</u> Principles of personnel exposure. reduction - Time, distance, shielding, protective barriers, protective devices.	05 Hrs
	18. <u>Protection of the patient</u> Beam limitation, technique selection, general shielding, grids, image receptors, projection, repeat radiography etc.	05 Hrs
	19. <u>Radiation exposure and pregnancy -</u> ALARA and Pregnancy, the pregnant. radiation worker, patient and radiation exposure standards.	05 Hrs
	20. Film materials in X-ray departments, history, structure of an xray film, single and double emulsion films, types of films, cross over effect.	15 Hrs
	21. Spectral sensitivity of film material, graininess of film material, speed and contrast of photographic materials.	10 Hrs
	22. Sensitometry: Photographic density, characteristic curves, features of the characteristic curve. Variation in the characteristic curve with the development. Comparison of emulsions by their characteristic curves. Information from the characteristic curve.	10 Hrs
	23. The storage of film materials and radiograph; Storage of unprocessed films, storing of radiographs - expiry date, shelflife, storage condition, stock control.	05 Hrs



## Details of Curriculum for First Year Diploma in X-Ray Technician

PAPER 2nd Theory	Topics	Hours.
<b>2. Radiophysics, Radiographic positions &amp; Radiation hazards.</b>	24. Intensifying screens and cassettes. Luminescence: fluorescence and phosphorescence. Construction of an intensifying screen. The fluorescent materials. Types of intensifying screens, intensification factor. The influence of KV, scattered radiation. Detail, sharpness and speed, size of the crystals, reciprocity failure, quantum mottle	15 Hrs
	25. Cassette design, care of cassettes, types of cassettes, mounting of intensifying screens, loading and unloading of cassettes	05 Hrs
	26. Film processing: Development. The nature of development- manual or automatic. The PH scale. The constitution of developing solutions both in manual and automatic processing and properties of developing chemicals. The development time, factors in the use of a developer, developer activity. Film processing: Fixing and role of a fixing solution. Constitution of the fixing solutions and properties of the constituents. Fixer used in automatic processors. Factors affecting the use of the fixer. Regeneration of fixing solution. Silver recovery from waste fixer or from scrap film and its various methods. Rinsing, washing and drying. Objects of rinsing and washing, methods employed. Methods of drying films. Preparation of solutions and making stock solution.	25 Hrs
	27. Dark Room: Layout and planning. Dark room construction Nature of floor, walls, ceiling and radiation protection. Type of entry, door design. Dark room illuminations - white light and safe lighting Dark room equipment and its layout. Location of pass through boxes or cassette hatches. Systems for daylight film handling. Daylight systems using cassettes and without cassettes.	10 Hrs
	28. Viewing accessories: Viewing boxes, magnifiers, viewing conditions.	05 Hrs
	29. Barium Studies.	05 Hrs
	30. IVP	05 Hrs
	31. MCU/RGU/ T tube cholangiogram / HSG.	02 Hrs
	32. Sinogram.	02 Hrs

## Details of Curriculum for First Year Diploma in X-Ray Technician

PAPER 2nd Theory	Topics	Hours.
<b>3. Hand hygiene &amp; prevention of cross infection.</b>	1. Hand hygiene & method of Hand washing.	15 Hrs
	2. Prevention of cross infection.	15 Hrs

PAPER 2nd Theory	Topics	Hours.
<b>4. Basic life support (BLS) &amp; Cardio-pulmonary resuscitation (CPR).</b>	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 X-Ray Technician

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

## Details of Curriculum for Second Year Diploma in X-Ray Technician

PAPER 1st Theory	Topics	Hours.
<b>1.Details of Only relevant surgical &amp; medical conditions.</b>	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.	02 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.	30 Hrs
	7. <u>Diseases of GIT &amp; Liver &amp; GB</u> :-Reflux Oesophagitis, Peptic ulcers, Gastritis, Intestinal Obstruction, Hepatitis, Cirrhosis of liver, Cholecystitis, appendicitis, Hernia, Piles, Fissure, Fistula, Pancreatitis, Pancreatic Cancer.	60 Hrs
	8. <u>Diseases of Nervous system</u> :- Stroke, Meningo-encephalitis, Glasgow coma scale, Epilepsy, Head Injury.	30 Hrs
	9. <u>Diseases of Urinary tract</u> :- Urolithiasis, Benign prostatic hyperplasia, Hydrocoele, Cancer prostate, urethral stricture, Hypo & epi-spadias.	40 Hrs
	10. <u>Endocrine system</u> :- Diabetes mellitus, hypo & Hyper thyroidism.	10 Hrs
	11. <u>Miscellaneous</u> :- Hypo & Hyper Natraemia, Hypo & Hyper Kalaemia, Hypo & Hyper Calcaemia.	10 Hrs
	12. <u>Infections diseases</u> :- TB, Typhoid, Malaria, Dengue fever, Leprosy, AIDS, Amoebiasis.	30 Hrs

## Details of Curriculum for Second Year Diploma in X-Ray Technician

<b>1.Details of Only relevant surgical &amp; medical conditions.</b>	13. Head injury & Intra-cranial bleed.	20 Hrs
	14. D's of G & O: Caesarian section, fibroid uterus, Cancer uterus, prolapse uterus, PID.	20 Hrs
	15. Basics about fracture & management.	20 Hrs
	16. PIVD,Potts spine.	10 Hrs
	17. Oral cavity tumors.	10 Hrs
	18. ENT: CSOM, ASOM, Laryngeal tumor, Nasal polyp, DNS, Sinusitis.	10 Hrs

PAPER 1st Theory	Topics	Hours.
<b>2.Nursing Procedures like vital recording, IM/IV/SC injection, Oxygen therapy, Nebulization, IV infusion</b>	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 X-Ray Technician

PAPER 2nd Theory	Topics	Hours.
<b>1. Radiological imaging techniques &amp; patient care.</b>	1. Concepts of Radiographic Positioning.	20 Hrs
	2. Positioning & Procedure of X-ray of Scaphoid & hand.	05 Hrs
	3. Positioning & Procedure of X-ray of Elbow & shoulder joint.	15 Hrs
	4. Positioning & Procedure of X-ray of Foot AP & oblique.	15 Hrs
	5. Positioning & Procedure of X-ray of Hip & Knee joint AP.	15 Hrs
	6. Positioning & Procedure of X-ray of Pelvis AP.	15 Hrs
	7. Positioning & Procedure of X-ray of Chest AP, PA & Lat.	15 Hrs
	8. Positioning & Procedure of X-ray of Sub Mento vertical & PNS.	10 Hrs
	9. Positioning & Procedure of X-ray of Skull and Towne's.	15 Hrs
	10. Positioning & Procedure of X-ray of Abdomen Erect.	15 Hrs
	11. Positioning & Procedure of X-ray of Barium Studies.	10 Hrs
	12. Positioning & Procedure of X-ray of IVP	10 Hrs
	13. Positioning & Procedure of X-ray of MCU/RGU/ T tube cholangiogram/ HSG.	10 Hrs
	14. Positioning & Procedure of X-ray of Sinogram.	10 Hrs
	15. <u>Dental Radiography</u> : Radiography of teeth-intra oral, extraoral and Occlusal view.	10 Hrs
	16. <u>Macroradiography</u> : Principle, advantage, technique and applications.	10 Hrs
	17. <u>Tomography</u> - Principle and applications	20 Hrs
	18. <u>Stereography</u> - Procedure - presentation, for viewing, stereoscopes, stereometry. High KV techniques principle and its applications.	20 Hrs

## Details of Curriculum for Second Year Diploma in X-Ray Technician

PAPER 2nd Theory	Topics	Hours.
<b>1. Radiological imaging techniques &amp; patient care.</b>	19. <u>Soft tissue Radiography</u> including Mammography - its techniques, equipment and applications.	10 Hrs
	20. <u>Localization of foreign bodies.</u> Various techniques	10 Hrs
	21. <u>Ward /mobile radiography -</u> electrical supply, radiation protection, equipment and instructions to be followed for portable/ward radiography.	10 Hrs
	22. <u>Operation theatre techniques:</u> General precautions, Aspesis in techniques - Checking of mains supply and functions of equipment, selection of exposure factors, explosion risk, radiation protection and rapid processing techniques.	30 Hrs
	23. Trauma radiography/Emergency radiography and Paediatric Radiography	25 Hrs
	24. Mammography.	05 Hrs

PAPER 2nd Theory	Topics	Hours.
<b>2. Bio-medical physics of X-ray machine &amp; development of X-ray film fetc.</b>	1. Basic Bio-medical physics of X ray machine & Dark room.	50 Hrs
	2. Types of film, cassette, screen, Developer, fixer etc.	30 Hrs

Curriculum  
for  
Practical :- Second Year  
Diploma in X-Ray Technician

<b>Practical</b>	Topics
	<b><u>Hands on training of :-</u></b>
	1. Preparation of patient for X-ray.
	2. Performing all types of X-rays.
	3. Contrast administration & management of adverse reactions to it.
	4. Protection from radiation hazards.
	5. Performing contrast X rays.
	6. Developing film.
	7. Reading different X rays.
	8. Record keeping.



Syllabus and Curriculum  
of  
Diploma in Radiotherapy Technology  
(DRTT) 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 Radiotherapy Technology (DRTT) who-

1. Has basic understanding of Malignancy and treatment options.
2. Can provide radiotherapy as instructed.
3. Can provide psychological support to the patient and his/her relatives.

## Diploma in Radiotherapy Technology(DRTT) course

### FIRST YEAR

Paper	Name of Paper	Internal	External	Total
<b>Theory First Paper</b>	Basics of Anatomy, Physiology & Pathology.	20	80	100
<b>Theory Second Paper</b>	Principles of radiation therapy, units & measurement.	20	80	100
<b>Practical</b>		20	80	100

### SECOND YEAR

Paper	Name of Paper	Internal	External	Total
<b>Theory First Paper</b>	Modern Imaging & Conventional/ advanced radiotherapy techniques.	20	80	100
<b>Theory Second Paper</b>	Radiation biology, safety & IT.	20	80	100
<b>Practical</b>		20	80	100

Outline of Curriculum  
of  
Diploma in Radiotherapy Technology  
(DRTT) course

**FIRST YEAR**

**THEORY ( Classes: 9 AM to 12 Noon)**

**First paper : Syllabus covers -**

1. Fundamentals of Anatomy and Physiology and pathology.

**Second paper : Syllabus covers -**

1. Principles of Radiation Therapy, Radiation Units and Measurements.
2. Hand hygiene & prevention of cross infection.
3. Basics 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/ Lab for practicals.

**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 Radiotherapy Technology  
(DRTT) course**

**SECOND YEAR**

**THEORY ( classes:9 AM to 12 Noon)**

**First paper : Syllabus covers**

1. Modern Imaging and Conventional & advanced Radiotherapy Planning Techniques.

**Second paper : Syllabus covers**

1. Radiation Biology, Radiation Safety and Information Technology

## SECOND YEAR

### PRACTICAL ( classes:9 AM to 12 Noon)

Practical exams syllabus should cover-

1. Mechanical QA of Linear Accelerator.
2. Radiation Absorption Characteristics and HVL Measurement.
3. Familiarization with therapy and protection level instruments.
4. QA of HDR Brachytherapy.
5. Survey of HDR Brachytherapy Facility.
6. Dosimetry in Teletherapy .
7. Survey of Teletherapy Facility.
8. Co60 - Safety Aspects .
9. Radiation Absorption characteristics and HVT measurement.
10. Familiarization with therapy and protection level instruments.
11. Radiation protection survey of radiotherapy equipment and facilities
12. QA tests of Radiotherapy equipment's.
13. Quality Assurance Tests for Simulator.



## ELIGIBILITY CRITERIA FOR ADMISSION & DURATION OF THE COURSE

### COURSE DURATION:-

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

### ELIGIBILITY:-

- Candidate must have passed 12<sup>th</sup> 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 31<sup>st</sup> 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>External 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. Fundamentals of Anatomy and Physiology and pathology.	80	20	100	50	3 Hours
<u>Second Paper Theory</u>	1. Principles of Radiation Therapy, Radiation Units and Measurements. 2. Hand hygiene & prevention of cross infection. 3. Basics life support (BLS) & Cardio-pulmonary resuscitation (CPR).	80	20	100	50	3 Hours
<u>Practical</u>	Oral & Practical	100	NIL	100	50	3 Hours

## SCHEDULE OF EXAMINATION

### SECOND YEAR

<u>Paper</u>	<u>Subjects</u>	<u>External 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. Modern Imaging and Conventional & advanced Radiotherapy Planning Techniques.	80	20	100	50	3 Hours
<u>Second Paper Theory</u>	1. Radiation Biology, Radiation Safety and Information Technology	80	20	100	50	3 Hours
<u>Practical</u>	Oral & Practical	100	NIL	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
<hr/>	
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)

<b><u>First Paper Theory</u></b>	1. Fundamentals of Anatomy and Physiology and pathology.	110 Hrs
<b><u>Second Paper Theory</u></b>	1. Principles of Radiation Therapy, Radiation Units and Measurements.	600 Hrs
	2. Hand hygiene & prevention of cross infection.	10 Hrs
	3. Basics life support (BLS) & Cardio-pulmonary resuscitation (CPR).	10 Hrs
<b><u>Third Paper Practical</u></b>	As described in curriculum	780 Hrs
<b><u>Theory: Other Subjects</u></b> (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)

<b><u>First Paper Theory</u></b>	1. Modern Imaging and Conventional & advanced Radiotherapy Planning Techniques.	390 Hrs
<b><u>Second Paper Theory</u></b>	1. Radiation Biology, Radiation Safety and Information Technology	390 Hrs
<b><u>Third Paper Practical</u></b>	As described in curriculum	780 Hrs

**Details of Curriculum for First Year  
Diploma in Radiotherapy Technology (DRTT)**

<b>PAPER 1st Theory</b>	<b>Topics</b>	<b>Hours.</b>
<b>1.Fundamentals of Anatomy and Physiology and pathology.</b>	1.Introduction to Anatomy as a whole, Skeleton-bones & joints, formation of bones, structure of bones, classification of bones according to shape, Developmental classification, Regional classification, structural classification & growth of skeleton. Centre of ossification, type of bone, type of joints. Gross structure of human long bone. parts of young bone. Medico-legal & anthropological aspects of skeletal system. Estimation of age, sex, stature (height) and race. Classification & characters of joints, structural, functional & regional. Applied anatomy of joints, dislocation of joints. embryology, cell division, fertilization, development of embryo, gamete formation, menstrual cycle, formation of germ layers, development of embryonic disc, Placenta, formation of tissues, organs & systems of human body, congenital malformations.	40 Hrs
	2.Fundamentals of The Respiratory System: Heart and blood vessels (Circulatory system)	10 Hrs
	3.Heart: Position, structure and functions.	10 Hrs
	4.The lymphatic system.	10 Hrs
	5.The Urinary System.	10 Hrs
	6.The reproductive system.	10 Hrs
	7.The Endocrine system.	10 Hrs
	8.The Nervous system.	10 Hrs

**Details of Curriculum for First Year  
Diploma in Radiotherapy Technology (DRTT)**

PAPER 2nd Theory	Topics	Hours.
<b>1.Principles of Radiation Therapy, Radiation Units and Measurements.</b>	<b>Section A:-</b>	
	1.SI Units, Force, mass, momentum, work, energy, power, density, pressure, heat, sound, wave and oscillations. Atomic structure: Atom, nucleus, nuclear energy levels, particle radiations, electromagnetic radiations, Radiation Units: Activity, Becquerel (Bq), exposure, roentgen, absorbed dose, rad, Gray, dose-equivalent, rem, Sievert, KERMA. Relation between absorbed dose, exposure and KERMA. <b>Interaction of Radiation with Matter</b> Photoelectric effect. Compton Effect. Pair production, Ionisation of matter, Energy absorbed from X-rays, X-rays Scattering, X-rays transmission through the medium, linear and mass attenuation coefficient, HVT and TVT, Interaction of charged particle and neutrons with matter Calculation of absorbed dose from exposure, Absorbed dose to air, Absorbed dose to any medium, Exposure from radioactive sources, exposure rate constant. HVL and attenuations	80 Hrs
	2.Dose distribution and scattering in medium: Properties of phantom materials and various types of phantoms, depth dose distribution, dose build-up, percentage depth dose and its influencing factors. Back scatter factor, tissue-air-ratio and influencing factors. Relation between TAR and PDD. Scatter-air-ratio. Dose calculation of irregular fields using Clarkson's method	60 Hrs
3.Dosimetric calculations: Dose calculation parameters, collimator scatter factor (Sc), phantom scatter factor (Sp), Tissue phantom ratio (TPR), tissue maximum ratio (TMR), and their influencing factors. Relationship between TMR and PDD. Scatter maximum ratio (SMR). Dose calculations for linear accelerator and Co-60 unit using Sc, Sp factors for SSD and SAD methods, irregular fields, asymmetric fields etc.	60 Hrs	



**Details of Curriculum for First Year  
Diploma in Radiotherapy Technology (DRTT)**

PAPER 2nd Theory	Topics	Hours.
<b>1.Principles of Radiation Therapy, Radiation Units and Measurements.</b>	4.Isodose distribution of phantom beam: Isodose charts, measurement of isodose curves, parameters of isodose curves: beam quality, source size, SSD and SDD – penumbra effect, collimation and flattening filter, field size, Wedge filters: wedge angle, wedge transmission factor, wedge systems, effect of beam quality, design of wedge filters, Bolus, tissue compensators, shielding blocks.	60 Hrs
	5.Basics of Electron beam therapy Principles of Calibration of Cobalt Unit, mHDR and Linac	60 Hrs
	<b>Section B:-</b>	
	1.Basics of radiography of Chest & Thorax Bones, Abdomen, Upper limb, Lower limb; Vertebral Column, Hips & Pelvis:- Ward mobile radiography, Basics of mammography, Bone Densitometer, CT scan and MRI Dark Room Procedures : manual and auto processors. • Dark Room: Layout and planning. • Type of entry, door design. Dark room illuminations - white light and safe lighting	80 Hrs
	2.Basics of nuclear medicine : Fundamentals of Nuclear medicine. Isotopes used and their characteristics. Thyroid Uptake counter, gamma camera, SPECT-CT and PET CT, Radionuclide therapy	60 Hrs

**Details of Curriculum for First Year  
Diploma in Radiotherapy Technology (DRTT)**

PAPER 2nd Theory	Topics	Hours.
<b>1.Principles of Radiation Therapy, Radiation Units and Measurements.</b>	<b>Section C:-</b>	
	<p>1.Principles and working of x-ray tube. Measuring instruments voltage or KV meters. Measurement of tube current Principles of thermionic emission and rectification in x-ray technology. High voltage circuits in x-ray Units. Electrical hazards and safety. Tube rating in imaging and therapy x-ray tube and thermal safety. Intensity of radiation and its variation with distance,KV,MA. Introduction to electro-magnetic spectrum, definition of wave length and its quantum relationship with peak kilovoltage.</p> <p>Physical principles of radiation. Radioactivity and ionizing radiations used in treatment of malignancy, sources and techniques. Tissue tolerance, tumour lethal dose, therapeutic ratio and radiosensitivity.</p> <p>Units of exposure and radiation, prescription of radiation treatment. Definitions and basics of teletherapy techniques. Orthovoltage and megavoltage machines. Teletherapy machines – cobalt and linear accelerator. Basic principles and clinical applications of beam direction and modification devices. Clinical application of mould room techniques</p>	100 Hrs
	<p><b>2.Brachytherapy:</b></p> <p>Definition and basic principles. Radium and its substitutes used. Surface Moulds.</p> <p>Interstitial implantation. Intracavitary and intraluminal brachytherapy.</p>	60 Hrs

**Details of Curriculum for First Year  
Diploma in Radiotherapy Technology (DRTT)**

<b>PAPER 2nd Theory</b>	<b>Topics</b>	<b>Hours.</b>
<b>3.Hand hygiene &amp; prevention of cross infection.</b>	1. Hand hygiene & method of Hand washing.	15 Hrs
	2. Prevention of cross infection.	15 Hrs

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

**Details of Curriculum for Second Year  
Diploma in Radiotherapy Technology (DRTT)**

PAPER 1st Theory	Topics	Hours.
<b>1. Modern Imaging and Conventional &amp; advanced Radiotherapy Planning Techniques.</b>	<b>Section A:-</b>	
	<b>1. Physics of Diagnostic Radiology:-</b> Familiarisation with various X-ray diagnostic tools, Radiological image formation, Use of contrast media, Films, Characteristic of X-ray films, Film Processing, Optical Density Measurements, Different types of Screens, Use of fluorescent screens in radiology, Effect of screen in reduction of patient dose, Various types of grids	10 Hrs
	<b>2. Recent advances in imaging technology:-</b> ultrasound, color Doppler, different types of transducers, applications & role in medicine & cross sectional anatomy.	10 Hrs
	<b>3. CT scan, conventional, spiral (helical), Multislice:-</b> Historical development, its principle and applications, various generations & definition of terms and cross sectional anatomy & use of diagnostic methods.	10 Hrs
	<b>4. Magnetic Resonance Imaging (MRI):-</b> Principle, application, its advantage over computed tomography or ultrasonography. <b>Spectroscopy:-</b> Principle, application and uses.	10 Hrs
	<b>5. Computerized Radiography:-</b> Principle, application, advantage & technique.	10 Hrs
	<b>6. Digital Radiography:-</b> Principle, scanned projection radiography, digital subtraction angiography application, definition, advantages & techniques.	10 Hrs
	<b>7. Picture Archiving Communication System (PACS):-</b> Basic knowledge of PACS, application, principle & image transmission.	10 Hrs
	<b>8. Mammography:-</b> Principle, application, advantage in soft tissue radiography, physics, filtration, QA & QC	05 Hrs

**Details of Curriculum for Second Year  
Diploma in Radiotherapy Technology (DRTT)**

PAPER 1st Theory	Topics	Hours.
<b>1.Modern Imaging and Conventional &amp; advanced Radiotherapy Planning Techniques.</b>	<b>Section A:-</b>	
	<b>9.Positron Emission Tomography (PET) :</b> Basic principle, clinical application & advantages.	05 Hrs
	<b>10.Different types of cameras</b> e.g. laser, photography <i>etc-</i> : principle, processing & applications.	10 Hrs
	<b>11.Radio isotopes-</b> : Principles of Scanner, Rectilinear scanner, gamma camera.	10 Hrs
	<b>12.QA in Diagnostic Radiology</b> Verification of Optical and Radiation field congruence, Beam alignment, Focal spot size. Linearity of tube current mA and Timer, applied potential, HVT and total tube filter, Contact between film and intensifying screen, Contrast resolution, Grid alignment, Special techniques like mammography, CT and Digital Radiography.	20 Hrs
	<b>Section B:-</b>	
	<b>1. Isodose curves, isodose charts,.</b> Influency parameters of isodose curves: beam quality source size, SSD, SDD, penumbra, collimation & flattening filter. field size. Wedge filters: wedge angle, wedge factor, wedge systems, effect of beam quality, design of wedge filters. Combination of various radiation fields: Wedge field techniques. Definitions of following terms according to ICRU-50/62. Gross tumour volume (GTV), clinical target volume (CTV), planning target volume, irradiated volume cold and hot spots.	20 Hrs

**Details of Curriculum for Second Year  
Diploma in Radiotherapy Technology (DRTT)**

PAPER 1st Theory	Topics	Hours.
<b>1.Modern Imaging and Conventional &amp; advanced Radiotherapy Planning Techniques.</b>	<b>Section B:-</b>	
	2.Acquisition of patient data: body contours, internal structures using radiographs, CT, MRI, US etc.; for 2-D & 3-D treatment planning. Treatment simulation using conventional simulator, Simulator CT, CT simulator and virtual simulator. Treatment verification using port films, electronic portal imaging devices. Corrections for surface irregularities; effective SSD method, TAR/TMR method, isodose shift method. Corrections for internal tissue in homogeneities: for beam attenuation and scattering using TAR method, power law TAR method, equivalent TAR method, isodose shift method, typical correction factor. Absorbed dose within inhomogeneity: bone, bone tissue interface, tissue surrounding bone, lung tissue, and air cavity. Tissue compensator, bolus, patient positioning	30 Hrs
	3.Shielding blocks: block thickness, block divergence. Field shaping : custom blocking, independent jaws, multileaf collimators, skin dose; electron contamination of photon beams, dose distribution in build-up region, skin sparing effect, effect of absorber skin distance effect of field size, electron filters, skin sparing at oblique incidence. Separation of adjacent fields; orthogonal field junction, cranio-spinal fields, guidelines for field matching	30 Hrs
	4.Parallel opposed, small beam directed therapy and wedge fields in head and neck cancers. Treatment techniques in the treatment of brain, pituitary, oral cavity, larynx, hypo/oropharynx, maxillary antrum, nasopharynx, thyroid, tonsil, lip etc.	20 Hrs
	5.Treatment techniques in Carcinoma breast, esophagus, bladder, Gynecological cancers.	20 Hrs

**Details of Curriculum for Second Year  
Diploma in Radiotherapy Technology (DRTT)**

PAPER 1st Theory	Topics	Hours.
<b>1.Modern Imaging and Conventional &amp; advanced Radiotherapy Planning Techniques.</b>	<b>Section B:-</b>	
	6.Treatment techniques in medulloblastoma, Ca Lung, bone, lymphoma, with special emphasis on mantle field irradiation, Rx techniques in Ca. prostate, ophthalmic tumours. Hemi body, whole body, irradiation techniques using photons and electrons.	20 Hrs
	7.Basic terminology of brachytherapy, brachytherapy sources, properties of idea brachytherapy sources, construction of Ra-226, Cs-137 & Co-60 tubes and needles and Ir-192 wires. To decay processes of brachytherapy sources, calibration of brachytherapy (mg Ra), Air Kerma Strength, Reference-Air-Kerma, Radium mass equivalent (Ra mg Eq.), apparent Activity, milligram-hours, integrated reference Air-kerma total reference-air-kerma, Exposure rate calibration.ICRU-38/58. Techniques of brachytherapy – 1. Surface mould and interstitial implants.	30 Hrs
	8.Surface mould dosimetry system: construction and distribution rules of circular. square, rectangular. sandwich. concave and convex moulds. Use of surface moulds in the treatment of various anatomical sites. Interstitial implant dosimetry systems	20 Hrs
	<b>Section C:-</b>	
	1.Stockholm system: Source placement and dose prescription rules. Type of applicators and their packing.	05 Hrs
	2.Paris system: Source placement and dose prescription roles. Type of applicators and its packing.	05 Hrs
	3.Manchester system: Definition of points. A, B and MIR point P. Manchester applicators. radium loading as per Manchester and MIR criteria. Dose/dose-rate to points Z & B for different tandem and ovoid loadings. Tolerance doses of rectum and bladder. ICRU-38: Dose rate classifications, reference height, width & length. Reference volume. Reference points of rectum and bladder lymphatic trapezoid; pelvic wall points. Concept of 60 Gy.	10 Hrs

**Details of Curriculum for Second Year  
Diploma in Radiotherapy Technology (DRTT)**

PAPER 1st Theory	Topics	Hours.
<b>1.Modern Imaging and Conventional &amp; advanced Radiotherapy Planning Techniques.</b>	<b>Section C:-</b>	
	4.Applicators of Ca Cx: Pre-loaded applicators (Stockholm, Paris etc.), Fletcher suit applicators. Henschke applicators, ring applicators, vaginal applicators. Different tools, catheters and other necessary items required for interstitial implant. Dose calculations for brachytherapy sources .	10 Hrs
	5.Exposure rate constant, exposure rate and effect of inverse square law, sievert integral to calculate	10 Hrs
	<b>Section D:-</b>	
	1.Special techniques in Radiotherapy such as SRS, SRT, IMRT, IGRT and Tomotherapy Gamma Knife, construction, design and working principles. QA procedures and different clinical applications of gamma knife. Dose prescription criteria in the treatment of gamma knife.	10 Hrs
	2.X-knife, modification of LINAC, necessary accessories required for X-knife, energy choice of x-ray photons in X-knife, QA procedures and application and techniques in the treatment using circular cones and their planning. Cyber Knife: Principles and applications.	10 Hrs
	3.Design and working of MLC and MMLC. QA procedures of MLC and MMLC. Conformal radiotherapy (CRT) and intensity modulated radiotherapy (IMRT). Use of MMLC in stereotactic radiotherapy and IMRT. Inverse planning system. Intra- operative Radiotherapy (IORT).	10 Hrs



**Details of Curriculum for Second Year  
Diploma in Radiotherapy Technology (DRTT)**

PAPER 2nd Theory	Topics	Hours.
<p style="text-align: center;"><b>1. Radiation Biology, Radiation Safety and Information Technology</b></p>	<p><b>1.Radiation protection quantities and units:</b> Exposure, dose equivalent (H). Committed dose equivalent (<math>H_T</math>), effective dose equivalent (<math>H_E</math>), Equivalent dose (<math>H_{TR}</math>), effective dose (E). Sources of radiation exposure: Natural sources and human made sources. Standards and regulations, philosophies of exposure limit, occupational limits, non-occupational limits</p>	60 Hrs
	<p><b>2.Biological effects of radiation:</b> Direct and indirect action of radiation, cell cycle effect, somatic and genetic effects. Effects on tissues and organs: Stochastic and non-stochastic (deterministic) effects, acute effects, late effects, effects of radiation on Embryo &amp; fetus: lethal effects, organ malformation, growth impairment, mental retardation, cancer induction, genetic effects, Late (delayed) effects: cataract formation, organ function, cancer induction. Principles of basic radiobiology. Acute and chronic radiation effects. Cell survival curve. LET, RBE and OER. Time dose and fractionation. The Cell, Effect of ionising radiation on Cell, Chromosomal aberration and its application for the biological dosimetry, Somatic effects and hereditary effects, stochastic and deterministic effects, Acute exposure and Chronic exposure, LD50/60.</p>	100 Hrs
	<p><b>3.Personal dosimetry devices:</b> Film badges, TLD badges, pocket ion chambers, electronic devices, Cr-39 foils, bubble, counting statistics, distributions, standard deviation. Standard error, confidence interval.</p>	60 Hrs

**Details of Curriculum for Second Year  
Diploma in Radiotherapy Technology (DRTT)**

<b>PAPER 2nd Theory</b>	<b>Topics</b>	<b>Hours.</b>
<b>1. Radiation Biology, Radiation Safety and Information Technology</b>	<p><b>4. Basics of Radiation protection principles and Practice.</b></p> <p>Detection and measurement of Ionizing/radiation, Field survey instrument, GM survey instruments, personnel Monitoring devices film badge, TLD, pocket dosimeter, pulsed optically stimulated Luminescence dosimeter (POSL) etc. Radiation Protection Procedures for Patients and Personnel.</p>	30 Hrs
	<p><b>5. Radiation Hazard evaluation and control</b></p> <p>Philosophy of radiation protection, Effect of Time, Distance and Shielding, Calculation of workload, Calculation of Weekly dose to the radiation worker and general public, good work practices in diagnostic radiology and/or radiotherapy practices (including teletherapy and Brachytherapy), Planning consideration for radiology and/or radiotherapy installation</p> <p>Including work load, use factor &amp; occupancy factors, effect of different shielding material.</p>	60 Hrs

**Details of Curriculum for Second Year  
Diploma in Radiotherapy Technology (DRTT)**

<b>PAPER 2nd Theory</b>	<b>Topics</b>	<b>Hours.</b>
<p><b>1. Radiation Biology, Radiation Safety and Information Technology</b></p>	<p><b>6.Regulatory requirements</b>  National Regulatory Body, Responsibilities, organization, Safety Standards, Codes and Guides, Responsibilities of licensees, registrants and employers and Enforcement of Regulatory requirements Advisory Groups &amp; Regulatory Agencies - ICRP, NCRP, UNSCEAR, AERB.  Safety and security of radiation sources, case histories of emergency situations and preparedness, equipment and tools including role of Gamma Zone Monitor, Regulatory requirements and prevention of emergency, Preventive maintenance and Safety Culture, Role of technicians in handling radiation emergencies. Dose limits, ICRP recommendations ALARA principle.  Protection of Personnel - Principles of personnel exposure reduction - Time, distance, shielding, protective barriers, protective devices.  Protection of the patient  Beam limitation, technique selection, general shielding, grids, image receptors, projection, repeat radiography etc.  Radiation exposure and pregnancy - ALARA and Pregnancy, the pregnant radiation worker, patient and radiation exposure standards  Regulatory aspect of Radiation safety and personnel monitoring</p>	<p style="text-align: center;">80 Hrs</p>

**Curriculum  
for  
Practical :- Second Year  
Diploma in Radiotherapy Technology (DRTT)**

<b>Practical</b>	Topics
	14. Mechanical QA of Linear Accelerator.
	15. Radiation Absorption Characteristics and HVL Measurement.
	16. Familiarization with therapy and protection level instruments.
	17. QA of HDR Brachytherapy.
	18. Survey of HDR Brachytherapy Facility.
	19. Dosimetry in Teletherapy .
	20. Survey of Teletherapy Facility.
	21. Co60 - Safety Aspects .
	22. Radiation Absorption characteristics and HVT measurement.
	23. Familiarization with therapy and protection level instruments.
	24. Radiation protection survey of radiotherapy equipment and facilities
	25. QA tests of Radiotherapy equipment's.
	26. Quality Assurance Tests for Simulator.

**Syllabus and Curriculum  
of  
Diploma in Optometry Technician course**

**(To be implemented From 2015 - 16 session)**

**Uttar Pradesh State Medical Faculty, Lucknow.**

# Index

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## OBJECTIVES OF THE COURSE

To prepare a **Optometry technician** who -

- Can record vision.
- Can assess error of refraction & measure it with retinoscopy and subjective refraction.
- Can use common instruments & equipments related to ophthalmology.
- Can perform procedures like Tonometry, Syringing, Fundus photo, Slit lamp examination, Ophthalmoscopy, Corneal staining, FB removal, Dressing of eye etc.
- Can prepare & prescribe glasses/spectacles and low vision aids.
- Can assist common ophthalmic surgeries.
- Can play role in Blindness control programmes run by government.
- Is aware of latest machines like LASERS, OCT, Femtosecond etc.

## Diploma in Optometry Technician course

### FIRST YEAR

Paper	Name of Paper	Internal	External	Total
Theory First Paper	Anatomy, Physiology, Pathology, Microbiology & Pharmacology.	25	75	100
Theory Second Paper	Ocular Anatomy & Physical, Physiological optics.	25	75	100
Practical		25	75	100

### SECOND YEAR

Paper	Name of Paper	Internal	External	Total
Theory First Paper	Diseases of eye.	25	75	100
Theory Second Paper	Mechanical optics & Ocular Pharmacology.	25	75	100
Practical		25	75	100



**Outline of Curriculum  
of  
Diploma in Optometry Technician course**

**FIRST YEAR**

**THEORY ( Classes: 9 AM to 12 Noon)**

**First paper : Syllabus covers -**

1. Only basic idea of General Anatomy & Physiology (Cytology, Histology, Osteology and only basics of all organ systems of body
2. Only basics of relevant Pathology, Pharmacology, Microbiology & Ocular Pharmacology.

**Second paper : Syllabus covers -**

1. Detailed Ocular Anatomy and Physiology.
2. Basic physics related to light and physical, physiological optics.
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/ Optometry lab for practicals.

- Hands on training of Vision monitoring.
- Hands on training of Subjective refraction.
- Hands on training of Retinoscopy(wet and dry).
- Hands on training of Prescribing lenses & prisms.
- Hands on training of Tonometry (Schiotz).
- Hands on training of Corneal staining.
- Hands on training of Ishihara charting.
- Hands on training of Schirmer's test & TBUT.

**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 Optometry Technician course**

**SECOND YEAR**

**THEORY ( classes:9 AM to 12 Noon)**

**First paper : Syllabus covers -**

1. Details of Diseases of eye.
2. Nursing Procedures like vital recording, IM/IV/SC injection, Oxygen therapy, Nebulization, IV infusion.

**Second paper : Syllabus covers -**

1. Mechanical optics and Lenses, Lenses prescription.
2. Instruments and equipments used in eye.
3. Community ophthalmology.
4. Drugs used in Optometry.

## SECOND YEAR

### PRACTICAL ( classes:9 AM to 12 Noon)

Practical exams syllabus should cover-

- Hands on training of slit lamp biomicroscope examination.
- Hands on training of Gonioscopy.
- Hands on training of Applanation tonometry.
- Hands on training of Syringing.
- Hands on training of Perimetry.
- Hands on training of Keratometry, A scan.
- Hands on training of B Scan.
- Hands on training of Direct ophthalmoscopy.
- Hands on training of Indirect Ophthalmoscopy.
- Hands on training of assistance in Common Ocular surgeries.
- Hands on training of Fundus Camera & FFA.

## ELIGIBILITY CRITERIA FOR ADMISSION & DURATION OF THE COURSE

### **COURSE DURATION:-**

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

### **ELIGIBILITY:-**

- Candidate must have passed 12<sup>th</sup> 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 31<sup>st</sup> 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 Only basic idea of General Anatomy &amp; Physiology (Cytology, Histology, Osteology and only basics of all organ systems of body</p> <p>2.Only basics of relevant Pathology, Pharmacology, Microbiology &amp; Ocular Pharmacology.</p>	75	25	100	50	3 Hours
<u>Second Paper Theory</u>	<p>1.Detailed Ocular Anatomy and Physiology.</p> <p>2.Basic physics related to light and physical, physiological optics.</p> <p>3.Hand hygiene &amp; prevention of cross infection.</p> <p>4.Basic life support (BLS) &amp; 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 Diseases of eye 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. Mechanical optics and Lenses, Lenses prescription. 2. Instruments and equipments used in eye. 3. Community ophthalmology 4. Drugs used in Optometry .	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
<hr/>	
Total Holidays	- 105 days
<hr/>	

- **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)

<b><u>First Paper Theory</u></b>	1. Only basic idea of General Anatomy & Physiology (Cytology, Histology, Osteology and only basics of all organ systems of body).	150 Hrs
	2 Only basics of relevant Pathology, Pharmacology, Microbiology & Ocular Pharmacology.	150Hrs
<b><u>Second Paper Theory</u></b>	1. Detailed Ocular Anatomy and Physiology	160 Hrs
	2. Basic physics related to light and physical, physiological optics	140 Hrs
	3. Hand hygiene & prevention of cross infection.	30 Hrs
	4. Basic life support (BLS) & Cardio-pulmonary resuscitation (CPR).	40 Hrs
<b><u>Third Paper Practical</u></b>	As described in curriculum	780 Hrs
<b><u>Theory: Other Subjects</u></b> (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)

<b><u>First Paper Theory</u></b>	1. Details of Diseases of eye	250 Hrs
	2.Nursing Procedures like vital recording, IM/IV/SC injection, Oxygen therapy, Nebulization, IV infusion.	20 Hrs
<b><u>Second Paper Theory</u></b>	1.Mechanical optics and Lenses, Lenses prescription .	300 Hrs
	2.Instruments and equipments used in eye	100 Hrs
	3.Community ophthalmology.	50 Hrs
	4.Drugs used in Optometry .	60 Hrs
<b><u>Third Paper Practical</u></b>	As described in curriculum	780 Hrs

## Details of Curriculum for First Year Diploma in Optometry Technician

<b>PAPER 1st Theory</b>	<b>Topics</b>	<b>Hours.</b>
<b>1. Only basic idea of General Anatomy &amp; Physiology (Cytology, Histology, Osteology and only basics of all organ systems of body).</b>	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.	02Hrs
	2. Structure of Animal cell, Cell organelles & their functions	02 Hrs
	3. Human tissue, types, structure & functions.	05 Hrs
	4. Osteology: Names, location, identification of all bones. (Details of skull bones is not required).	10 Hrs
	5. Joints: types, basic structure & examples.	02 Hrs
	6. Skin & appendages.	02 Hrs
	7. GIT: : Location, Gross structure, various parts & their functions. Details of process of food ingestion, digestion, absorption & defaecation. (Microscopic structure is not required.)	20 Hrs
	8. Respiratory tract: Location, Gross structure, various parts & their functions. Details of breathing mechanism, different respiratory volumes. (Microscopic structure is not required.)	20 Hrs
	9. Urinary tract: Gross structure, various parts & their functions. (Microscopic structure is not required.) Process of urine formation & voiding.	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.) Menstrual cycle.	05 Hrs

## Details of Curriculum for First Year Diploma in Optometry Technician

PAPER 1st Theory	Topics	Hours.
<b>1. Only basic idea of General Anatomy &amp; Physiology (Cytology, Histology, Osteology and only basics of all organ systems of body).</b>	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).	10 Hrs
	13. Gross structure of brain & spinal cord. Functions of different parts of brain & spinal cord. (Details not required.)	10 Hrs
	14. Blood: Composition & Functions. Details about Plasma, RBCs, WBCs, Platelets, Clotting system.	10 Hrs
	15. Gross structure & functions of sensory Organs - Eye, Ear, Nose, Tongue. (Details not required).	05 Hrs
	16. Basic gross structure of heart, vessels opening into heart & Leaving the heart. Arterial & Venous tree of body.	10 Hrs
	17. Lymphatic system: Structure & Functions.	05 Hrs
	18. Inumune system: Components & various mechanisms of defense.	07 Hrs

## Details of Curriculum for First Year Diploma in Optometry Technician

PAPER 1st Theory	Topics	Hours.
<b>2. Only basics of relevant Pathology, Pharmacology, Microbiology &amp; Ocular Pharmacology.</b>	1. Basic steps of Acute & chronic inflammation.	03 Hrs
	2. Basics of Necrosis & apoptosis.	03 Hrs
	3. Basics of Shock.	03 Hrs
	4. Basics of Disorders of blood coagulation system.	08 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.	20 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 Anti Microbials.	20 Hrs
	13. Basic idea of Anti H-1 Histaminics & Corticosteroids.	02 Hrs
	14. Anti Glaucoma drugs.	15 Hrs
	15. Dyes used in Ophthalmology.	05 Hrs
	16. Artificial tears & Other drugs used in dry eye.	05 Hrs
	17. Topical Antimicrobials & NSAIDs and Steroids used in eye.	20 Hrs
	18. Mydriatics & Cycloplegics	05 Hrs
	19. Various methods of drug administration in eye.	15 Hrs

## Details of Curriculum for First Year Diploma in Optometry Technician

PAPER 2nd Theory	Topics	Hours.
<b>1.Detailed Ocular Anatomy and Physiology</b>	1.Detailed Structure of Orbit & Contents of orbit.	10 Hrs
	2.Eye ball: Comprehensive anatomy.	05 Hrs
	3.Extra Ocular muscles: gross structure, origin, insertion, nerve supply and action.	10 Hrs
	4.Blood supply to eye & Nerve supply to eye.	15 Hrs
	5.Gross, microscopic anatomy, blood & nerve supply of Conjunctiva.	10 Hrs
	6.Gross, microscopic anatomy, blood & nerve supply of Cornea.	15 Hrs
	7.Gross, microscopic anatomy, blood & nerve supply of Sclera.	10 Hrs
	8.Gross, microscopic anatomy, blood & nerve supply of Uvea.	15 Hrs
	9.Gross, microscopic anatomy, blood & nerve supply of Lens.	10 Hrs
	10.Gross, microscopic anatomy, blood & nerve supply of Angle of AC.	05 Hrs
	11.Physiology of aqueous production and drainage.	10 Hrs
	12.Gross, microscopic anatomy, blood & nerve supply of Vitreous.	05 Hrs
	13.Gross, microscopic anatomy, physiology, blood & nerve supply of retina & optic nerve.	20 Hrs
	14.Gross, microscopic anatomy, physiology, blood & nerve supply of Visual/pupillary pathway.	20 Hrs

## Details of Curriculum for First Year Diploma in Optometry Technician

PAPER 2nd Theory	Topics	Hours.
<b>2. Basic physics related to light and physical, physiological optics.</b>	1.Introduction	05 Hrs
	2.Light – Definition & Theory	03 Hrs
	3.Properties of Light	05 Hrs
	4.Reflection & Refraction	07 Hrs
	5.Diffraction & Dispersion	05 Hrs
	6.Transmission & Absorption	05 Hrs
	7.Geometrical Optics	05 Hrs
	8.Spherical Lenses	05 Hrs
	9.Astigmatic & Toric Lenses	05 Hrs
	10.Prism	05 Hrs
	11.Vergence of Light	05 Hrs
	12.Magnification of Lenses	05 Hrs
	13.Homocentric Lenses System Gausse's Theorem	05 Hrs
	14.Optical Aberration of images -Spherical Aberration - Chromatic Aberration	05 Hrs
	15.Lasers Fundamental	10 Hrs
	16.Schematic & Reduced Eye Angle Alpha	05 Hrs
	17.Visual Acuity	05 Hrs
	18.VA-Testing	15 Hrs
	19.Retinocopy	20 Hrs
	20.Cycloplegic Drugs & Mydriatics	05 Hrs
	21.Subjective Refraction	05 Hrs
	22.Simple & Toxic Transposition	05 Hrs
	23.Spherical Equivalent	05 Hrs
	24.Accommodation & Convergence	15 Hrs

## Details of Curriculum for First Year Diploma in Optometry Technician

PAPER 2nd Theory	Topics	Hours.
<b>3. Hand hygiene &amp; prevention of cross infection.</b>	1. Hand hygiene & method of Hand washing.	15 Hrs
	2. Prevention of cross infection.	15 Hrs

PAPER 2nd Theory	Topics	Hours.
<b>4. Basic life support (BLS) &amp; Cardio-pulmonary resuscitation (CPR).</b>	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 Optometry Technician**

<b>Practical</b>	<b>Topics</b>
	<ul style="list-style-type: none"><li>• Hands on training of Vision monitoring.</li><li>• Hands on training of Subjective refraction.</li><li>• Hands on training of Retinoscopy(wet and dry).</li><li>• Hands on training of Prescribing lenses &amp; prisms.</li><li>• Hands on training of Tonometry (Schiotz).</li><li>• Hands on training of Corneal staining.</li><li>• Hands on training of Ishihara chating.</li><li>• Hands on training of Schirmer's test &amp; TBUT.</li></ul>

## Details of Curriculum for Second Year Diploma in Optometry Technician

PAPER 1st Theory	Topics	Hours.
<b>1.Details of Diseases of eye.</b>	1. Common Symptoms in ophthalmology and Examination of eye.	15 Hrs
	2. Definition, Causes, s/s, investigations & management of error of refraction. (Myopia, Hypermetropia, Astigmatism, Presbyopia)	15 Hrs
	3. Definition, Causes, s/s, investigations & management of Diseases of Lacrimal apparatus. (Dacryocystitis, Lacrimal tumors, Dry eye, Watering of eye etc.)	15 Hrs
	4. Definition, Causes, s/s, investigations & management of Diseases of eyelids. (Ptosis, Lagophthalmos, blepharitis, stye, chalazion, int. hordeolom, Trichiasis, entropion, ectropion, Blepharospasm)	20 Hrs
	5. Definition, Causes, s/s, investigations & management of Diseases of Conjunctiva. (Conjunctivitis, Pterygium, Pinguecula, red eye, sub-conj. bleed)	15 Hrs
	6. Definition, Causes, s/s, investigations & management of Diseases of Cornea. (Keratitis, Cornealulcer, Corneal opacity, keratoconus, keraloplasty)	15 Hrs
	7. Definition, Causes, s/s, investigations & management of Diseases of Sclera. (Episcleritis, Scleritis & Staphyloma)	10 Hrs
	8. Definition, Causes, s/s, investigations & management of Diseases of uvea. (Uveities, endophthalmitis, Pan ophthalmitis)	15 Hrs
	9. Definition, Causes, s/s, investigations & management of Diseases of lens. (Cataract, Latest techniques in surgery of Cataract, Subluxation/dislocation of lens)	20 Hrs
	10. Definition, Causes, s/s, investigations & management of Diseases of Angle of AC. (Glaucoma)	20Hrs
	11. Definition, Causes, s/s, investigations & management of Diseases of Vitreous. (Vitreous haemmorrhage, Vitreal opacities, Vitrectomy)	05Hrs
	12. Definition, Causes, s/s, investigations & management of Diseases of Retina (Diabetic & hypertensive retinopathy, RD, CSR, CME, Retinoblastoma, CRAO, CRVO, BRAO, BRVO Eale's disease)	20Hrs
	13. Definition, Causes, s/s, investigations & management of Diseases of Optic nerve. (Optic neuritis, papillaedena, Optic atrophy)	15Hrs

## Details of Curriculum for Second Year Diploma in Optometry Technician

<b>1.Details of Diseases of eye.</b>	14. Destructive surgeries of eyeball	05Hrs
	15. Definition, Causes, s/s, investigations & management of Diseases of Strabismus	10Hrs
	16. Definition, Causes, s/s, investigations & management of Diseases of Orbit. (Proptosis, Orbital fracture, Orbital cellulitis)	05Hrs
	17. Community ophthalmology (Blindness, Various programmes related of blindness)	05Hrs
	18. Miscellaneous Vitamin A deficiency, Low vision aids, first aid in Ocular Injuries.	10Hrs
	19. Definition, Causes, s/s, investigations & management of Amblyopia	10Hrs
	20. Color blindness	05Hrs

## Details of Curriculum for Second Year Diploma in Optometry Technician

PAPER 1st Theory	Topics	Hours.
<b>2.Nursing Procedures like vital recording, IM/IV/SC injection, Oxygen therapy, Nebulization, IV infusion.</b>	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 Hr
	12. Care of Unconscious patient.	02 Hrs

## Details of Curriculum for Second Year Diploma in Optometry Technician

PAPER 2nd Theory	Topics	Hours.
<b>1.Mechanical optics and Lenses, Lenses prescription.</b>	1.A Brief History of Ophthalmic Lenses, Spectacles	05 Hrs
	2.Terms Used in Lens Workshop	05Hrs
	3.Ophthalmic Lens Material	20Hrs
	4.Lens Standard	10Hrs
	5.Ophthalmic Lens Blank Manufacture- Glass & Plastic	20Hrs
	6.Ophthalmic Prescription Lens Making	20Hrs
	7.Lens Defects	10Hrs
	8.Ophthalmic Lens Designs	20Hrs
	9.Types of Ophthalmic Lenses : Aspheric, High Index, Multifocal, Bifocal & Trifocal Lenses, Photo Chromatic Lenses, Polaroid Lenses, Tinted Lenses, Protective Lenses.	30Hrs
	10.Spectacles Frames: History, Nomenclature & Terminology, Classification.	10Hrs
	11.Types of Frame Material	10Hrs
	12.Types of Human Faces, Choice of Frames	10Hrs
	13.Cosmetic & Functional Dispensing of Spectacles	10Hrs
	14.Measurement for Ordering Spectacles : IPD, VD	10Hrs
	15.Special Measurement for Fitting Special Types of Lenses	10Hrs
	16.Fitting of Lenses in Various Types of frames	10Hrs
	17.Spectacles Intolerance	10Hrs
	18.Special types of Spectacles	10Hrs
	19.Dispensing of Prisms, Prismatic effect of lens	20Hrs
	20.Contact Lenses	20Hrs
	21.Low Vision Aids	10Hrs
	22.Magnification by Lenses	20Hrs

## Details of Curriculum for Second Year Diploma in Optometry Technician

PAPER 2nd Theory	Topics	Hours.
<b>2.Instruments and equipments used in eye.</b>	1.Refractrometer	10Hrs
	2.Lensometer	05Hrs
	3.Keratometer	05Hrs
	4.Ophthalmoscope	10Hrs
	5.Slit Lamp	10Hrs
	6.Corneal Loupe	05Hrs
	7.Operating Microscope	05Hrs
	8.Perimeter	03Hrs
	9..Tonometer	05Hrs
	10.Gonioscope	03Hrs
	11.Pachymeter	02Hrs
	12.Exophthalmometer	02Hrs
	13.ERG, EOG, VER	05Hrs
	14.Orthoptic instruments like synoptophore etc	15Hrs
	15.A and B scan	05Hrs
	16.Retinoscopes	05Hrs
	17.Ishihra Chart	05Hrs

PAPER 2nd Theory	Topics	Hours.
<b>3.Community ophthalmology.</b>	Introduction	03Hrs
	National Programme for Control of Blindness	17Hrs
	National Immunization Programme	10Hrs
	Blindness : Causes and its Prevention	20Hrs

PAPER 2nd Theory	Topics	Hours.
<b>4.Drugs used in Optometry.</b>	1. Topical NSAIDS.	05Hrs
	2. Topical Steroids.	05Hrs
	3. Anti Glancoma drugs.	10Hrs
	4. Anti VEGF drugs.	05Hrs
	5. Cycloplegics & Mydriatics.	10Hrs
	6. Drugs used in dry eye.	10Hrs
	7. Dyes used in ophthalmology.	05Hrs
	8. Topical Antimicrobials.	10Hrs

Curriculum  
for  
Practical :- Second Year  
Diploma in Optometry Technician

	Topics
<b>Practical</b>	<ul style="list-style-type: none"> <li>• Hands on training of slit lamp biomicroscope examination.</li> </ul>
	<ul style="list-style-type: none"> <li>• Hands on training of Gonioscopy.</li> </ul>
	<ul style="list-style-type: none"> <li>• Hands on training of Applanation tonometry.</li> </ul>
	<ul style="list-style-type: none"> <li>• Hands on training of Syringing.</li> </ul>
	<ul style="list-style-type: none"> <li>• Hands on training of Perimetry.</li> </ul>
	<ul style="list-style-type: none"> <li>• Hands on training of Keratometry, A scan.</li> </ul>
	<ul style="list-style-type: none"> <li>• Hands on training of B Scan.</li> </ul>
	<ul style="list-style-type: none"> <li>• Hands on training of Direct ophthalmoscopy.</li> </ul>
	<ul style="list-style-type: none"> <li>• Hands on training of Indirect Ophthalmoscopy.</li> </ul>
	<ul style="list-style-type: none"> <li>• Hands on training of assistance in Common Ocular surgeries.</li> </ul>
	<ul style="list-style-type: none"> <li>• Hands on training of Fundus Camera &amp; FFA.</li> </ul>

**Syllabus and Curriculum  
of  
Diploma in Physiotherapy 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 **Physiotherapy technician** who –

- Can examine and assess deficits of neurological & musculoskeletal systems.
- Can advise and execute appropriate exercise & electrotherapy.
- Can maintain rich communication with related consultant surgeons & physicians & follow their order.
- Can give psychological support to the patients and their relatives.

## Diploma in Physiotherapy Technician course

### FIRST YEAR

Paper	Name of Paper	Internal	External	Total
Theory First Paper	Anatomy. Physiology. Pathology. Microbiology & Pharmacology.	25	75	100
Theory Second Paper	Basics of exercise & electrotherapy.	25	75	100
Practical		25	75	100

### SECOND YEAR

Paper	Name of Paper	Internal	External	Total
Theory First Paper	Relevant medical & surgical diseases.	25	75	100
Theory Second Paper	Applied Physiotherapy in medical & surgical diseases.	25	75	100
Practical		25	75	100

**Outline of Curriculum  
of  
Diploma in Physiotherapy Technician course**

**FIRST YEAR**

**THEORY ( Classes: 9 AM to 12 Noon)**

**First paper : Syllabus covers -**

1. General Anatomy & Physiology (Cytology, Histology, Osteology and only basics of all organ systems of body).
2. Only basics of relevant Pathology, Pharmacology & Microbiology.

**Second paper : Syllabus covers -**

1. Detailed Anatomy of bones, muscles, joints, nerves of body.
2. Basics of exercise therapy, electrotherapy, physics used in physiotherapy, biomechanics & kinesiology.
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/ physiotherapy lab for practicals.

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

(Observership for Various technics of exercise & electrotherapy, Vital monitoring.)

**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 Physiotherapy Technician course**

**SECOND YEAR**

**THEORY ( classes:9 AM to 12 Noon)**

**First paper : Syllabus covers -**

1. Only relevant surgical & medical conditions (relevant to Physiotherapy but other than Orthopedics and neurological systems).
2. Nursing Procedures like vital recording, IM/IV/SC injection, Oxygen therapy, Nebulization, IV infusion.

**Second paper : Syllabus covers -**

1. Physiotherapy in Orthopaedics, Neurological, Medical, Surgical & Sports related conditions.
2. Drugs used in Physiotherapy & BLS.
3. Basic biomedical engineering physics of machines used in physiotherapy.

## SECOND YEAR

### PRACTICAL ( classes:9 AM to 12 Noon)

Practical exams syllabus should cover-

- Hands on training of Vital Monitoring .
- Hands on training of various exercise therapies.
- Hands on training of various electrotherapies.
- Hands on training of BLS.

## ELIGIBILITY CRITERIA FOR ADMISSION & DURATION OF THE COURSE

### COURSE DURATION:-

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

### ELIGIBILITY:-

- Candidate must have passed 12<sup>th</sup> 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 31<sup>st</sup> 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 &amp; Physiology (Cytology, Histology, Osteology and only basics of all organ systems of body).</p> <p>2.Only basics of relevant Pathology, Pharmacology &amp; Microbiology.</p>	75	25	100	50	3 Hours
<u>Second Paper Theory</u>	<p>1.Detailed Anatomy of bones, muscles, joints, nerves of body.</p> <p>2.Basics of exercise therapy, electrotherapy, physics used in physiotherapy, biomechanics &amp; kinesiology.</p> <p>3.Hand hygiene &amp; prevention of cross infection.</p> <p>4.Basic life support (BLS) &amp; 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**

<b><u>Paper</u></b>	<b><u>Subjects</u></b>	<b><u>Mark</u></b>	<b><u>Internal Assessment Marks</u></b>	<b><u>Total Marks</u></b>	<b><u>Pass Marks</u></b>	<b><u>Duration of Exam.</u></b>
<b><u>First Paper Theory</u></b>	<p>1.Only relevant surgical &amp; medical conditions (relevant to Physiotherapy but other than Orthopedics and neurological systems).</p> <p>2.Nursing Procedures like vital recording, IM/IV/SC injection, Oxygen therapy, Nebulization, IV infusion.</p>	75	25	100	50	3 Hours
<b><u>Second Paper Theory</u></b>	<p>1.Physiotherapy in Orthopaedics, Neurological, Medical, Surgical &amp; Sports related conditions.</p> <p>2.Drugs used in Physiotherapy &amp; BLS.</p> <p>3.Basic biomedical engineering physics of machines used in physiotherapy.</p>	75	25	100	50	3 Hours
<b><u>Practical</u></b>	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
<hr/>	
Total Holidays	- 105 days
<hr/>	

- **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)

<b><u>First Paper Theory</u></b>	1.General Anatomy & Physiology (Cytology, Histology, Osteology and only basics of all organ systems of body).	235 Hrs
	2.Only basics of relevant Pathology, Pharmacology & Microbiology.	100 Hrs
<b><u>Second Paper Theory</u></b>	1.Detailed Anatomy of bones, muscles, joints, nerves of body.	190 Hrs
	2.Basics of exercise therapy, electrotherapy, physics used in physiotherapy, biomechanics & kinesiology.	160 Hrs
	3.Hand hygiene & prevention of cross infection.	15 Hrs
	4.Basic life support (BLS) & Cardio-pulmonary resuscitation (CPR).	10 Hrs
<b><u>Third Paper Practical</u></b>	As described in curriculum	780 Hrs
<b><u>Theory: Other Subjects</u></b> (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)

<b><u>First Paper Theory</u></b>	1. Only relevant surgical & medical conditions (relevant to Physiotherapy but other than Orthopedics and neurological systems).	280 Hrs
	2. Nursing Procedures like vital recording, IM/IV/SC injection, Oxygen therapy, Nebulization, IV infusion.	20 Hrs
<b><u>Second Paper Theory</u></b>	1. Physiotherapy in Orthopaedics, Neurological, Medical, Surgical & Sports related conditions.	400 Hrs
	2. Drugs used in Physiotherapy & BLS.	30 Hrs
	3. Basic biomedical engineering physics of machines used in physiotherapy.	50 Hrs
<b><u>Third Paper Practical</u></b>	As described in curriculum	780 Hrs

## Details of Curriculum for First Year Diploma in Physiotherapy Technician

PAPER 1st Theory	Topics	Hours.
<b>1.General Anatomy &amp; Physiology (Cytology, Histology, Osteology and only basics of all organ systems of body).</b>	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.	06 Hrs
	2. Structure of Animal cell, Cell organelles & their functions	06 Hrs
	3. Human tissue, types, structure & functions.	10 Hrs
	4. Osteology: Names, location, identification and basic details of all bones. (Details of skull bones is not required).	20 Hrs
	5. Joints: types, basic structure & examples.	06 Hrs
	6. Skin & appendages.	02 Hrs
	7. GIT: : Location, Gross structure, various parts & their functions. Details of process of food ingestion, digestion, absorption & defaecation. (Microscopic structure is not required.)	20 Hrs
	8. Respiratory tract: Location, Gross structure, various parts & their functions. Details of breathing mechanism, different respiratory volumes. (Microscopic structure is not required.)	20 Hrs
	9. Urinary tract: Gross structure, various parts & their functions. (Microscopic structure is not required.) Process of urine formation & voiding.	20 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.) Menstrual cycle.	05 Hrs

## Details of Curriculum for First Year Diploma in Physiotherapy Technician

PAPER 1st Theory	Topics	Hours.
<b>1.General Anatomy &amp; Physiology (Cytology, Histology, Osteology and only basics of all organ systems of body).</b>	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. Gross structure of brain & spinal cord. Functions of different parts of brain & spinal cord.(Details not required.)	20 Hrs
	14. Blood: Composition & Functions. Details about Plasma, RBCs, WBCs, Platelets, Clotting system.	30 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.	10 Hrs
	18. Inumune system: Components & various mechanisms of defense.	10 Hrs

## Details of Curriculum for First Year Diploma in Physiotherapy Technician

PAPER 1st Theory	Topics	Hours.
<b>2.Only basics of relevant Pathology, Pharmacology &amp; Microbiology.</b>	1. Basic steps of Acute & chronic inflammation.	03 Hrs
	2. Basics of Necrosis & apoptosis.	03 Hrs
	3. Basics of Shock.	03 Hrs
	4. Basics of Disorders of blood coagulation system.	08 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.	20 Hrs
	9. Routes of drug administration.	02 Hrs
	10. Adverse effects & side effects of drugs.	02 Hrs
	11. Basic idea of Analgesics : Opioid & NSAIDs & Skeletal muscle relaxants	06 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.	03 Hrs



## Details of Curriculum for First Year Diploma in Physiotherapy Technician

PAPER 2nd Theory	Topics	Hours.
<b>1.Detailed Anatomy of bones, muscles, joints, nerves of body.</b>	1. General structure of long bone, flat bones (Histology & gross).	05 Hrs
	2. Detailed Histology & Physiology of skeletal muscles, ligaments & tendons.	10 Hrs
	3. Details of bones of upper limb.	05 Hrs
	4. Details of bones of lower limb.	05 Hrs
	5. Details of bones of vertebral column.	03 Hrs
	6. Details of ribs & sternum.	02 Hrs
	7. Details of muscles of upper limb (origin, insertion,action, nerve supply & surface marking).	25 Hrs
	26 Details of muscles of lower limb (origin, insertion,action, nerve supply & surface marking).	25 Hrs
	26 Details of muscles of abdomen & pelvic floor (origin, insertion,action, nerve supply & surface marking).	10 Hrs
	11 Details of muscles of neck (origin, insertion,action, nerve supply & surface marking).	05 Hrs
	12 Details of shoulder girdle, Shoulder, Elbow, Wrist, Hip, Knee & ankle , sub talar joints ).	35 Hrs
	13 Details of Basics of other joints of body.	10 Hrs
	14 Details of Brachial , sacral & lumbar plexes.	20 Hrs
	15 Details of spinal & cranial nerves.	20 Hrs
	16 General structure of Arteries, veins, capillaries.	05 Hrs
	17 Arterial & Venous tree of body.	05 Hrs

## Details of Curriculum for First Year Diploma in Physiotherapy Technician

PAPER 2nd Theory	Topics	Hours.
<b>2. Basics of exercise therapy, electrotherapy, physics used in physiotherapy, biomechanics &amp; kinesiology.</b>	<b>1. <u>Mechanical Principles:-</u></b> Definition of Biomechanics, Axis and Planes, Kinematics, Kinetics, gravity, centre of gravity, line of gravity, base of support, Equilibrium, fixation and stabilization, force, types of forces, levers of the body and their mechanical advantage, pulleys, springs, Elasticity, type of muscle contraction, range of muscle work, the group action of muscles, spurt and shunt muscles	25 Hrs
	2. Gait	10 Hrs
	3. Posture	05 Hrs
	4. Joint structure and function of all joints of the body -type, articulating surface, osteokinematics, Arthrokinematics, Pathomechanics.	30 Hrs
	5. Physics and Basic Electrical Components. Electromagnetic radiation, conductors, & Non Conductors of electricity, Transmission of heat, Physical effects of heat, static electricity, electric shock, earth shock.	20 Hrs
	6. Methods of heating the tissue. Physiological effects of heat, Paraffin wax bath, Hot packs, moist packs, Infra-red rays, U.V. rays. Definition, production, preparation of apparatus & patient, Physiological effects, techniques, dosage, indication, contraindication, dangers and precautions are to be covered.	20 Hrs
	7. Low Frequency Currents. Faradic & Galvanic currents, SD Curve, Iontophoresis, TENS. Definition, production, preparation of apparatus & patient, Physiological effects, techniques, dosage, indication, contraindication, dangers and precautions are to be covered.	20 Hrs
	8. Cryotherapy definition, production, preparation of apparatus & patient, Physiological effects, techniques, dosage, indication, contraindication, dangers and precautions	20 Hrs
	9. Medium Frequency current. definition, production, preparation of apparatus & patient, Physiological effects, techniques, dosage, indication, contraindication, dangers and precautions	20 Hrs
	10. HIGH FREQUENCY CURRENTS SWD, MWD, US. definition, production, preparation of apparatus & patient, Physiological effects, techniques, dosage, indication, contraindication, dangers and precautions	30 Hrs

## Details of Curriculum for First Year Diploma in Physiotherapy Technician

PAPER 2nd Theory	Topics	Hours.
<b>2. Basics of exercise therapy, electrotherapy, physics used in physiotherapy, biomechanics &amp; kinesiology.</b>	<b>11. <u>LASERS</u></b> Definition, Types, Production, Indications, contraindications Technique of Application	20 Hrs
	<b>12. Mechanical traction and CPM</b> Uses and Technique of application, Precautions.	10 Hrs
	<b>13. <u>MASSAGE THERAPY</u></b> History and development, Types and techniques, Physiological and therapeutic effects of various Manipulations, Indications and contraindications, Massage protocol for various conditions.	20 Hrs

PAPER 2nd Theory	Topics	Hours.
<b>3. Hand hygiene &amp; prevention of cross infection.</b>	1. Hand hygiene & method of Hand washing.	15 Hrs
	2. Prevention of cross infection.	15 Hrs

PAPER 2nd Theory	Topics	Hours.
<b>4. Basic life support (BLS) &amp; Cardio-pulmonary resuscitation (CPR).</b>	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 Physiotherapy Technician

<b>Practical</b>	Topics
	1. Observing various types of electro therapies.
	2 Observing various types of exercise therapy.
	3.Care of Unconscious patient.
	4.Monitoring Temperature(manual).
	5.Monitoring Pulse (manual).
	6.Monitoring Respiration (manual).
	7.Monitoring BP (manual).
	8.Basic life support (BLS).

## Details of Curriculum for Second Year Diploma in Physiotherapy Technician

PAPER 1st Theory	Topics	Hours.
<b>1. Only relevant surgical &amp; medical conditions (relevant to Physiotherapy but other than Orthopedics and neurological systems).</b>	1. History taking. General examination of the patient. Filling Case-sheet. Common clinical words.	10 Hrs
	2. Hypertension:- Def, Causes, Pathology, Clinical features, Investigation & Management.	05 Hrs
	3. Hypotension :- Def, Causes, Pathology, Clinical features, Investigation & Management.	02 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.	50 Hrs
	7. <u>Diseases of GIT &amp; Liver &amp; GB</u> :-Reflux Oesophagitis, Peptic ulcers, Gastritis, Intestinal Obstruction, Hepatitis, Cirrhosis of liver, Cholecystitis.	40 Hrs
	8. <u>Disease of Heart</u> :- CHF, Condiac arrest, Isaemic heart disease, Rheumatic Heart diseases.	30 Hrs
	9. <u>Diseases of Urinary tract</u> :- Urolithiasis, Benign prostatic hyperplasia.	03 Hrs
	10. <u>Endocrine system</u> :- Diabetes mellitus, hypo & Hyper thyroidism.	20 Hrs
	11. <u>Miscellaneous</u> :- Hypo & Hyper Natraemia, Hypo & Hyper Kalaemia, Hypo & Hyper Calcaemia.	10 Hrs
	12. <u>Infections diseases</u> :- TB, Typhoid, Malaria, Dengue fever, Leprosy, AIDS, Amoebiasis.	50 Hrs
	13. Burn & Physiotherapy management of burn.	05 Hrs

## Details of Curriculum for Second Year Diploma in Physiotherapy Technician

PAPER 1st Theory	Topics	Hours.
<b>2.Nursing Procedures like vital recording, IM/IV/SC injection, Oxygen therapy, Nebulization, IV infusion.</b>	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 Physiotherapy Technician

PAPER 2nd Theory	Topics	Hours.
<b>1. Physiotherapy in Orthopaedics, Neurological, Medical, Surgical &amp; Sports related conditions</b>	1. Details of examination of nervous system.	20 Hrs
	2. Details of Stroke & role of Physiotherapy in Stroke.	30 Hrs
	3. Details of Meningo-encephalitis & role of Physiotherapy in Meningo-encephalitis. .	20 Hrs
	4. Details of Epilepsy & role of Physiotherapy in Epilepsy.	10 Hrs
	5. Details of Intracranial bleed & Head injury & role of Physiotherapy in Intracranial bleed & Head injury.	30 Hrs
	6. Details of Traumatic Para & Quadriplegia & role of Physiotherapy in Traumatic Para & Quadriplegia.	30 Hrs
	7. Details of Facial nerve palsy & role of Physiotherapy in Facial nerve palsy.	10 Hrs
	8. Details of Parkinsonism & role of Physiotherapy in Parkinsonism.	05 Hrs
	9. Details of M.gravis & role of Physiotherapy in M. gravis.	05 Hrs
	10. Details of Motor neuron d's, GB syndrome & role of Physiotherapy in Motor neuron d's, GB syndrome.	20 Hrs
	11. Details of cerebral palsy & role of Physiotherapy in Cerebral palsy.	10 Hrs
	12. Details of Ataxia & role of Physiotherapy	05 Hrs
	13. Details of Types of fracture, basic principle of management of all types of fractures.	15 Hrs
	14. Details of Important fractures & role of Physiotherapy in Important fractures.	40 Hrs
	15. Details of Osteo-arthritis, Rheumatoid arthritis, Gouty arthritis, ankylosing spondylitis & role of Physiotherapy in Osteo-arthritis, Rheumatoid arthritis, Gouty arthritis, ankylosing spondylitis	20 Hrs
	16. Details of Tennis elbow, Golfer's elbow, Tenosynovitis, Plantar fasciitis & role of Physiotherapy in Tennis elbow, Golfer's, elbow Tenosynovitis, Plantar fasciitis.	10 Hrs

## Details of Curriculum for Second Year Diploma in Physiotherapy Technician

PAPER 2nd Theory	Topics	Hours.
<b>1. Physiotherapy in Orthopaedics, Neurological, Medical, Surgical &amp; Sports related conditions</b>	17. Basics of Subluxation & dislocations of joints & role of Physiotherapy in Subluxation & dislocations of joints.	20 Hrs
	18. Details of Osteoporosis, Osteomalacia & role of Physiotherapy in Osteoporosis, Osteomalacia.	10 Hrs
	19. Details of PIVD & role of Physiotherapy in PIVD.	10 Hrs
	20. Details of Spondylolisthesis & role of Physiotherapy in Spondylolisthesis.	05 Hrs
	21. Various types of sprains & strains & their basic principle of management.	15 Hrs
	22. Details of CTEV & role of Physiotherapy in CTEV.	05 Hrs
	23. Details of Scoliosis, lordosis, Kyphosis & role of Physiotherapy in Scoliosis, lordosis, Kyphosis.	05 Hrs
	24. Basic idea of Genu/ cubitus varum, Genu/cubitus valgum,	05 Hrs
	25. Details of TB of Bone, Osteomyelitis & role of Physiotherapy in TB of Bone, Osteomyelitis.	15 Hrs
	26. Splints & Prosthesis used in Orthopaedics.	30 Hrs



## Details of Curriculum for Second Year Diploma in Physiotherapy Technician

PAPER 2nd Theory	Topics	Hours.
<b>2. Drugs used in Physiotherapy &amp; BLS.</b>	1. Use of NSAIDs ,opioid analgesics.	10 Hrs
	2. Use of skeletal muscle relaxants.	03 Hrs
	3. Use of topical analgesics and muscle relaxants.	02 Hrs
	4. Use of emergency drugs.	15Hrs

PAPER 2nd Theory	Topics	Hours.
<b>3. Basic biomedical engineering physics of machines used in physiotherapy.</b>	1. About USG machine	10 Hrs
	2. About TENS machine.	10 Hrs
	3. About IFT machine.	10 Hrs
	4. About Diathermy machine.	10 Hrs
	5. About tread mill.	05Hrs
	6. About infra red machine.	05Hrs

**Curriculum  
for  
Practical :- Second Year  
Diploma in Physiotherapy Technician**

	<b>Topics</b>
<b>Practical</b>	1. Hand on training on various types of electro-therapies.
	2. Hand on training on various types of exercise therapy.
	3. IM Injection.
	4. IV Injection.
	5. SC Injection.
	6. Use of Infusion pump.
	7. Nebulisation.

**Syllabus and Curriculum  
of  
Diploma in Operation Theatre 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 **OT technician** who –

- Can prepare OT before surgery including process of sterilization.
- Can assist common surgeries to respective surgeons as first assistant.
- Can use C-Arm and other imagings effectively.
- Can take care of patient in post operative room.
- Can maintain all records.
- Can do CPR.
- Can perform basic nursing procedures like IV/IM/SC injections, Nebulization, catheterization ,Oxygen therapy.
- Can provide Psychological support to the patient & counsel him & his/her relatives.

## Diploma in Operation Theatre Technician course

### FIRST YEAR

Paper	Name of Paper	Internal	External	Total
<b>Theory First Paper</b>	Anatomy, Physiology, Pathology, Microbiology & Pharmacology.	25	75	100
<b>Theory Second Paper</b>	Surgical Anatomy & Basics of O.T. Techniques.	25	75	100
<b>Practical</b>		25	75	100

### SECOND YEAR

Paper	Name of Paper	Internal	External	Total
<b>Theory First Paper</b>	Relevant medical & surgical diseases.	25	75	100
<b>Theory Second Paper</b>	Practical O.T. techniques & CSSD techniques.	25	75	100
<b>Practical</b>		25	75	100

**Outline of Curriculum  
of  
Diploma in Operation Theatre Technician course**

**FIRST YEAR**

**THEORY ( Classes: 9 AM to 12 Noon)**

**First paper : Syllabus covers -**

1. General Anatomy & Physiology (Cytology, Histology, Osteology and only basics of all organ systems of body).
2. Only basics of relevant Pathology, Pharmacology ( including anaesthetic agents ) & Microbiology.

**Second paper : Syllabus covers -**

1. Detailed Surgical Anatomy.
2. Basics of OT techniques, CSSD techniques and Anaesthesia techniques.
3. Hand hygiene & prevention of cross infection.
4. Basics 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/ OT for practicals.

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

(Observership for Pre-operative preparation, Intra-operative assistance, Post operative care & CSSD techniques).

**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 Operation Theatre Technician course**

**SECOND YEAR**

**THEORY ( classes:9 AM to 12 Noon)**

**First paper : Syllabus covers -**

1. Only relevant surgical & medical conditions (relevant to OT technician).
2. Nursing Procedures like vital recording, IM/IV/SC injection, Oxygen therapy, Nebulization,, catheterisation, IV infusion.

**Second paper : Syllabus covers -**

1. Details of common surgeries & applied OT techniques.
2. Basics of CSSD & sterilization practices, biomedical waste management.
3. Basic biomedical engineering physics of OT equipments & instrument.

## SECOND YEAR

### PRACTICAL ( classes:9 AM to 12 Noon)

Practical exams syllabus should cover-

- Hands on training of Hand wash/scrubbing & sterilization practices.
- Hands on training of pre operative preparation.
- Assisting surgeries.
- Hands on training of Post operative care.
- Hands on training of biomedical waste management.
- Hands on training of BLS.
- Hands on training of basic anaesthesia techniques.
- Hands on training of use of drugs used in OT.

## ELIGIBILITY CRITERIA FOR ADMISSION & DURATION OF THE COURSE

### **COURSE DURATION:-**

- It is 2 years, full time Diploma Course.

### **ELIGIBILITY:-**

- Candidate must have passed 12<sup>th</sup> 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 31<sup>st</sup> 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>
<b><u>First Paper Theory</u></b>	<p>1.General Anatomy &amp; Physiology (Cytology, Histology, Osteology and only basics of all organ systems of body).</p> <p>2.Only basics of relevant Pathology, Pharmacology ( including anaesthetic agents ) &amp; Microbiology.</p>	75	25	100	50	3 Hours
<b><u>Second Paper Theory</u></b>	<p>1.Detailed Surgical Anatomy.</p> <p>2.Basics of OT techniques, CSSD techniques and Anaesthesia techniques.</p> <p>3.Hand hygiene &amp; prevention of cross infection.</p> <p>4.Basics life support (BLS) &amp; Cardio-pulmonary resuscitation (CPR).</p>	75	25	100	50	3 Hours
<b><u>Practical</u></b>	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>	<p>1. Only relevant surgical &amp; medical conditions (relevant to OT technician).</p> <p>2. Nursing Procedures like vital recording, IM/IV/SC injection, Oxygen therapy, Nebulization, IV infusion.</p>	75	25	100	50	3 Hours
<u>Second Paper Theory</u>	<p>1. Details of common surgeries &amp; applied OT techniques.</p> <p>2. Basics of CSSD &amp; sterilization practices, biomedical waste management.</p> <p>3. Basic biomedical engineering physics of OT equipments &amp; instrument.</p>	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
<hr/>	
Total Holidays	- 105 days
<hr/>	

- **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)

<b><u>First Paper Theory</u></b>	1.General Anatomy & Physiology (Cytology, Histology, Osteology and only basics of all organ systems of body).	300 Hrs
	2.Only basics of relevant Pathology, Pharmacology ( including anaesthetic agents ) & Microbiology.	120 Hrs
<b><u>Second Paper Theory</u></b>	1.Detailed Surgical Anatomy.	50 Hrs
	2.Basics of OT techniques, CSSD techniques and Anaesthesia techniques.	140 Hrs
	3.Hand hygiene & prevention of cross infection.	30 Hrs
	4.Basics life support (BLS) & Cardio-pulmonary resuscitation (CPR).	40 Hrs
<b><u>Third Paper Practical</u></b>	As described in curriculum	780 Hrs
<b><u>Theory: Other Subjects</u></b> (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)

<b><u>First Paper Theory</u></b>	1. Only relevant surgical & medical conditions (relevant to OT technician).	450 Hrs
	2. Nursing Procedures like vital recording, IM/IV/SC injection, Oxygen therapy, Nebulization, IV infusion	20 Hrs
<b><u>Second Paper Theory</u></b>	1. Details of common surgeries & applied OT techniques.	190 Hrs
	2. Basics of CSSD & sterilization practices, biomedical waste management.	60 Hrs
	3. Basic biomedical engineering physics of OT equipments & instrument.	60 Hrs
<b><u>Third Paper Practical</u></b>	As described in curriculum	780 Hrs



**Details of Curriculum for First Year  
Diploma in Operation Theatre Technician**

<b>PAPER 1st Theory</b>	<b>Topics</b>	<b>Hours.</b>
<b>1.General Anatomy &amp; Physiology (Cytology, Histology, Osteology and only basics of all organ systems of body).</b>	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.	06 Hrs
	2. Structure of Animal cell, Cell organelles & their functions	06 Hrs
	3. Human tissue, types, structure & functions.	10 Hrs
	4. Osteology: Names, location, identification and basic details of all bones. (Details of skull bones is not required).	20 Hrs
	5. Joints: types, basic structure & examples.	06 Hrs
	6. Skin & appendages.	02 Hrs
	7. GIT: : Location, Gross structure, various parts & their functions. Details of process of food ingestion, digestion, absorption & defaecation. (Microscopic structure is not required.)	30 Hrs
	8. Respiratory tract: Location, Gross structure, various parts & their functions. Details of breathing mechanism, different respiratory volumes. (Microscopic structure is not required.)	30 Hrs
	9. Urinary tract: Gross structure, various parts & their functions. (Microscopic structure is not required.) Process of urine formation & voiding.	20 Hrs
	10. Male reproductive system: Only gross structure & functions of different parts. (Microscopic structure is not required.)	10 Hrs
	11. Female reproductive system: Only gross structure & functions of different parts. (Microscopic structure is not required.) Menstrual cycle.	10 Hrs

**Details of Curriculum for First Year  
Diploma in Operation Theatre Technician**

PAPER 1st Theory	Topics	Hours.
<b>1. General Anatomy &amp; Physiology (Cytology, Histology, Osteology and only basics of all organ systems of body).</b>	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. Gross structure of brain & spinal cord. Functions of different parts of brain & spinal cord. (Details not required.)	30 Hrs
	14. Blood: Composition & Functions. Details about Plasma, RBCs, WBCs, Platelets, Clotting system.	30 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.	10 Hrs
	18. Inumune system: Components & various mechanisms of defense.	20 Hrs

## Details of Curriculum for First Year Diploma in Operation Theatre Technician

PAPER 1st Theory	Topics	Hours.
<b>2. Only basics of relevant Pathology, Pharmacology ( including anaesthetic agents ) &amp; Microbiology.</b>	1. Basic steps of Acute & chronic inflammation and Healing of wound.	05 Hrs
	2. Basics of Necrosis & apoptosis.	02 Hrs
	3. Basics of Shock.	02 Hrs
	4. Basics of Disorders of blood coagulation system.	08 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.	20 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.	03 Hrs
	15. Basic idea of Anti Microbials.	20 Hrs
	16. Basic idea of Anti H-1 Histaminics & Corticosteroids.	01 Hrs
	17. Drugs used in anaemia.	02 Hrs
	18. Anaesthetic agents(LA&GA).	25 Hrs
	19. Muscle relaxants.	05 Hrs

**Details of Curriculum for First Year  
Diploma in Operation Theatre Technician**

<b>PAPER 2nd Theory</b>	<b>Topics</b>	<b>Hours.</b>
<b>1.Detailed Surgical Anatomy.</b>	1. Detailed Structure of Anterior abdominal wall including clinical anatomy of Hernia.	10 Hrs
	2. Detailed Structure of Posterior abdominal wall.	03 Hrs
	3. Detailed Structure of thoracic wall.	03 Hrs
	4. Concept of meninges & SCALP.	03 Hrs
	5. Surface anatomy & Important bony land marks.	13 Hrs
	6. Concept of Mediastinum.	03 Hrs.
	7. Skin as sensory organ.	03 Hrs
	8. Applied Ocular anatomy.	02 Hrs
	9. Location of major muscles of body.	10 Hrs

## Details of Curriculum for First Year Diploma in Operation Theatre Technician

PAPER 2nd Theory	Topics	Hours.
<b>2. Basics of OT techniques, CSSD techniques and Anaesthesia techniques.</b>	1. Hand wash & surgical scrubbing.	03Hrs.
	2. Pre-operative preparation of patient including surgery site.	07 Hrs
	3. Post operative care including dressing.	05 Hrs
	4. Basic idea of various methods of sterilization & basic functioning of CSSD.	15 Hrs
	5. Various positions used in different surgeries.	15 Hrs
	6. Types of anaesthesia, Boyle's machine & anaesthesia work station.	10 Hrs
	7. Gases used in anaesthesia.	08 Hrs
	8. Triage of patients.	02 Hrs
	9. Diagram & details of hand instruments used in common surgeries.	40 Hrs
	10. Pre anaesthetic check up	03 Hrs
	11. Infection control in OT	05 Hrs
	12. Basic idea of different IV fluids	05 Hrs
	13. Needles , sutures and knots.	15 Hrs
	14. Cautery.	05 Hrs

**Details of Curriculum for First Year  
Diploma in Operation Theatre Technician**

<b>PAPER 2nd Theory</b>	<b>Topics</b>	<b>Hours.</b>
<b>3.Hand hygiene &amp; prevention of cross infection.</b>	1. Hand hygiene & method of Hand washing.	15 Hrs
	2. Prevention of cross infection.	15 Hrs

<b>PAPER 2nd Theory</b>	<b>Topics</b>	<b>Hours.</b>
<b>4.Basic life support (BLS) &amp; Cardio-pulmonary resuscitation (CPR).</b>	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 Operation Theatre Technician**

<b>Practical</b>	<b>Topics</b>
	1. Hand wash & scrubbing.
	2. Basics of various methods of sterilization.
	3. Care & identification of all equipments, instruments & hand instruments related to OT.
	4. Pre-operative care & preparation.
	5. Post-operative care of patient.
	6. BLS.
	7. Using medical gases.
	8. Working as second assistant.
	9. Details about sutures, needles, knots.
	10. IV fluids use.
	11. Recording vitals.
	12. IV, IM injection, Urinary catheterization.
13. Glove, Gown, Personal protection equipments.	

## Details of Curriculum for Second Year Diploma in Operation Theatre Technician

PAPER 1st Theory	Topics	Hours.
<b>1. Only relevant surgical &amp; medical conditions (relevant to OT technician).</b>	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.	02 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.	30 Hrs
	7. <u>Diseases of GIT &amp; Liver &amp; GB</u> :-Reflux Oesophagitis, Peptic ulcers, Gastritis, Intestinal Obstruction, Hepatitis, Cirrhosis of liver, Cholecystitis, appendicitis, Hernia, Piles, Fissure, Fistula, Pancreatitis, Pancreatic Cancer.	60 Hrs
	8. <u>Diseases of Nervous system</u> :- Stroke, Meningo-encephalitis, Glasgow coma scale, Epilepsy, Head Injury.	30 Hrs
	9. <u>Diseases of Urinary tract</u> :- Urolithiasis, Benign prostatic hyperplasia, Hydrocoele, Cancer prostate, urethral stricture, Hypo & epi-spadias.	40 Hrs
	10. <u>Endocrine system</u> :- Diabetes mellitus, hypo & Hyper thyroidism.	10 Hrs
	11. <u>Miscellaneous</u> :- Hypo & Hyper Natraemia, Hypo & Hyper Kalaemia, Hypo & Hyper Calcaemia.	10 Hrs
	12. <u>Infections diseases</u> :- TB, Typhoid, Malaria, Dengue fever, Leprosy, AIDS, Amoebiasis.	30 Hrs



**Details of Curriculum for Second Year  
Diploma in Operation Theatre Technician**

<b>PAPER 1st Theory</b>	<b>Topics</b>	<b>Hours.</b>
<b>1. Only relevant surgical &amp; medical conditions (relevant to OT technician).</b>	13. Head injury & Intracranial bleed.	20 Hrs
	14. D's of G& O: Caesarian section, fibroid uterus, Cancer uterus, prolapse uterus, PID.	20 Hrs
	15. Basics about fracture & management.	50 Hrs
	16. PIVD, Potts spine.	10 Hrs
	17. Oral cavity tumors.	10 Hrs
	18. Eye d's : Cataract, Glaucoma.	10 Hrs
	19. ENT: CSOM, ASOM, Laryngeal tumor, Nasal polyp, DNS.	20 Hrs
	20. <u>Paediatric surgery:-</u> Diaphragmatic Hernia, Meningo-Myelocoele & Spina bifida, Cystic hygroma, Basic of Congenital Heart d's, Hirschsprung d's, Ano-rectal malformation.	40 Hrs

## Details of Curriculum for Second Year Diploma in Operation Theatre Technician

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

## Details of Curriculum for Second Year Diploma in Operation Theatre Technician

PAPER 2nd Theory	Topics	Hours.
<b>1.Details of common surgeries &amp; applied OT techniques.</b>	1. Various Incisions and Suturings.	10 Hrs
	2. Use of Cautery machine.	05 Hrs
	3. Incision & drainage.	05 Hrs
	4. Mastectomy & MRM.	05 Hrs
	5. Open reduction & internal fixation.	15 Hrs
	6. Laboratory.	10 Hrs
	7. Craniotomy.	05 Hrs
	8. EDH, SDH & Intra parenchymal bleed drainage.	05 Hrs
	9. Cholecystectomy : Open & Laparoscopic.	10 Hrs
	10. Appendidectomy: Open & Laparoscopic.	10 Hrs
	11. Hernioplasty & Herniotomy.	10 Hrs
	12. Haemorroidectomy : Conventional & stapler.	10 Hrs
	13. Lower segment caesarian section.	10 Hrs
	14. Hysterectomy : Abdominal, Vaginal & laparoscopic.	10 Hrs
	15. Surgery for fistula in ano.	05 Hrs
	16. Surgery for Rectal prolapse.	05 Hrs
	17. Surgery for Intestinal perforation.	10 Hrs
	18. Surgery for Gastric perforation.	05 Hrs
	19. ureteroscopic removal of urinary stone.	05 Hrs
	20. TURP.	05 Hrs
	21. Surgery for Cataract.	05 Hrs

**Details of Curriculum for Second Year  
Diploma in Operation Theatre Technician**

<b>PAPER 2nd Theory</b>	<b>Topics</b>	<b>Hours.</b>
<b>1.Details of common surgeries &amp; applied OT techniques.</b>	22. Surgery for Glaucoma.	05 Hrs
	23. Surgery for DNS.	05 Hrs
	24. Thyroid surgery.	05 Hrs
	25. Thoracotomy.	10 Hrs

<b>PAPER 2nd Theory</b>	<b>Topics</b>	<b>Hours.</b>
<b>2.Basics of CSSD &amp; sterilization practices, biomedical waste management.</b>	1. Various methods of Sterilization.	20 Hrs
	2. Aseptic practices.	20 Hrs
	3. Basics of Biomedical waste management.	20 Hrs

<b>PAPER 2nd Theory</b>	<b>Topics</b>	<b>Hours.</b>
<b>3.Basic biomedical engineering physics of OT equipments &amp; instrument.</b>	1. Boyle's apparatus.	05 Hrs
	2. Anaesthesia work station.	20 Hrs
	3. Cautery machine.	10 Hrs
	4. Surgical endoscopes & Laparoscopes.	15 Hrs
	5. Monitors	05 Hrs
	6. C- Arm.	05 Hrs

**Curriculum  
for  
Practical :- Second Year  
Diploma in Operation Theatre Technician**

	Topics
<b>Practical</b>	1. Hand on training as first assistant in common surgeries as listed in paper second.
	2. Hand on training of maintaining Asepsis in OT.
	3. Hand on training of biomedical waste management.
	4. Hand on training on taking various consents & keeping records.

**Syllabus and Curriculum  
of  
Diploma in Cardiology 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 **Cardiac technician** who -

- Can work in ICU / ICCU and Cardiac catheterization lab.
- Can record vitals (manually and with multiparameter monitor), ECG and TMT.
- Can help in Echo- Cardiography, Cardiac catheterization.
- Can perform BLS & help in ACLS implementation.
- Can perform basic nursing procedures like IV/IM/SC injections, Nebulization, Oxygen therapy, use of infusion pump.
- Can use emergency drugs supporting the heart under guidance of doctor.
- Can provide Psychological support to the patient & counsel him & his/her relatives.



## Diploma in Cardiology Technician course

### FIRST YEAR

Paper	Name of Paper	Internal	External	Total
Theory First Paper	Anatomy, Physiology, Pathology, Microbiology & Pharmacology.	25	75	100
Theory Second Paper	Cardiovascular Anatomy & Basics of Cardiology techniques.	25	75	100
Practical		25	75	100

### SECOND YEAR

Paper	Name of Paper	Internal	External	Total
Theory First Paper	Relevant medical & surgical diseases.	25	75	100
Theory Second Paper	Diseases of CVS & Applied Cardiology.	25	75	100
Practical		25	75	100

**Outline of Curriculum  
of  
Diploma in Cardiology Technician course**

**FIRST YEAR**

**THEORY ( Classes: 9 AM to 12 Noon)**

**First paper : Syllabus covers -**

1. General Anatomy & Physiology (Cytology, Histology, Osteology and only basics of all organ systems of body).
2. Only basics of relevant Pathology, Pharmacology & Microbiology.
3. Basic Physics related to cardiology.

**Second paper : Syllabus covers -**

1. Detailed Cardiovascular system's Anatomy & Physiology (Heart & Blood vessels).
2. Basics of Vital monitoring, ECG, TMT, Echo- Cardiography.
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/ cardiac lab for practicals.

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

(Observership for ECG electrode placement, Vital monitoring, TMT, Echo- Cardiography ,Use of different drugs).

**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 Cardiology Technician course**

**SECOND YEAR**

**THEORY ( classes:9 AM to 12 Noon)**

**First paper : Syllabus covers -**

1. Only relevant surgical & medical conditions (relevant to cardiac tech but other than cardiology).
2. Nursing Procedures like vital recording, IM/IV/SC injection, Oxygen therapy, Nebulization, IV infusion.
3. Advanced cardiac life support (ACLS).

**Second paper : Syllabus covers -**

1. Diseases related to Cardio-vascular system (CVS).
2. Drugs used in Cardiology & BLS, ACLS.
3. Details about BLS, ACLS, Cardiac- Catheterization, Coronary angiography and angioplasty.
4. Basic biomedical engineering physics of ECG, ECHO, TMT, multipara monitors Cath.lab etc.

## SECOND YEAR

### PRACTICAL ( classes:9 AM to 12 Noon)

Practical exams syllabus should cover-

- Hands on training of Vital Monitoring (invasive & non-invasive).
- Hands on training of ECG, ECHO, TMT, multipara monitor , Cardiac catheterization.
- Hands on training of BLS & ACLS.
- Hands on training of use of drugs used in ICCU.

## ELIGIBILITY CRITERIA FOR ADMISSION & DURATION OF THE COURSE

### COURSE DURATION:-

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

### ELIGIBILITY:-

- Candidate must have passed 12<sup>th</sup> 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 31<sup>st</sup> 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 Assessme nt Marks</u>	<u>Total Marks</u>	<u>Pass Marks</u>	<u>Duration of Exam.</u>
<u>First Paper Theory</u>	<p>1.General Anatomy &amp; Physiology (Cytology, Histology, Osteology and only basics of all organ systems of body).</p> <p>2.Only basics of relevant Pathology, Pharmacology &amp; Microbiology.</p> <p>3.Basic Physics related to cardiology</p>	75	25	100	50	3 Hours
<u>Second Paper Theory</u>	<p>1.Detailed Cardiovascular system's Anatomy &amp; Physiology (Heart &amp; Blood vessels).</p> <p>2.Basics of Vital monitoring, ECG, TMT, Echo- Cardiography.</p> <p>3.Hand hygiene &amp; prevention of cross infection.</p> <p>4.Basic life support (BLS) &amp; 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>	<p>1. Only relevant surgical &amp; medical conditions (relevant to cardiac tech but other than cardiology).</p> <p>2. Nursing Procedures like vital recording, IM/IV/SC injection, Oxygen therapy, Nebulization, IV infusion.</p> <p>3. Advanced cardiac life support (ACLS).</p>	75	25	100	50	3 Hours
<u>Second Paper Theory</u>	<p>1. Diseases related to Cardio-vascular system (CVS).</p> <p>2. Drugs used in Cardiology &amp; BLS, ACLS.</p> <p>3. Details about BLS, ACLS, Cardiac-Catheterization, Coronary angiography and angioplasty.</p> <p>4. Basic biomedical engineering physics of ECG, ECHO, TMT, Cath.lab etc.</p>	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
<hr/>	
Total Holidays	- 105 days
<hr/>	

- **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)**

<b><u>First Paper Theory</u></b>	1.General Anatomy & Physiology (Cytology, Histology, Osteology and only basics of all organ systems of body).	300 Hrs
	2.Only basics of relevant Pathology, Pharmacology & Microbiology.	100 Hrs
	3.Basic Physics related to cardiology.	40 Hrs
<b><u>Second Paper Theory</u></b>	1.Detailed Cardiovascular system's Anatomy & Physiology (Heart & Blood vessels).	100 Hrs
	2.Basics of Vital monitoring, ECG, TMT, Echo- Cardiography.	100 Hrs
	3.Hand hygiene & prevention of cross infection.	30 Hrs
	4.Basic life support (BLS) & Cardio-pulmonary resuscitation (CPR).	40 Hrs
<b><u>Third Paper Practical</u></b>	As described in curriculum	780 Hrs
<b><u>Theory: Other Subjects</u></b> (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)**

<b><u>First Paper Theory</u></b>	1. Only relevant surgical & medical conditions (relevant to cardiac tech but other than cardiology).	250 Hrs
	2. Nursing Procedures like vital recording, IM/IV/SC injection, Oxygen therapy, Nebulization, IV infusion.	20 Hrs
	3. Advanced cardiac life support (ACLS).	20 Hrs
<b><u>Second Paper Theory</u></b>	1. Diseases related to Cardio-vascular system (CVS).	140 Hrs
	2. Drugs used in Cardiology & BLS, ACLS.	60 Hrs
	3. Details about BLS, ACLS, Cardiac- Catheterization, Coronary angiography and angioplasty.	230 Hrs
	4. Basic biomedical engineering physics of ECG, ECHO, TMT, Cath.lab, multi para monitors etc.	60 Hrs
<b><u>Third Paper Practical</u></b>	As described in curriculum	780 Hrs

## Details of Curriculum for First Year Diploma in Cardiology Technician

PAPER 1st Theory	Topics	Hours.
<b>1. General Anatomy &amp; Physiology (Cytology, Histology, Osteology and only basics of all organ systems of body).</b>	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.	06 Hrs
	2. Structure of Animal cell, Cell organelles & their functions	06 Hrs
	3. Human tissue, types, structure & functions.	10 Hrs
	4. Osteology: Names, location, identification and basic details of all bones. (Details of skull bones is not required).	20 Hrs
	5. Joints: types, basic structure & examples.	06 Hrs
	6. Skin & appendages.	02 Hrs
	7. GIT: : Location, Gross structure, various parts & their functions. Details of process of food ingestion, digestion, absorption & defaecation. (Microscopic structure is not required.)	30 Hrs
	8. Respiratory tract: Location, Gross structure, various parts & their functions. Details of breathing mechanism, different respiratory volumes. (Microscopic structure is not required.)	30 Hrs
	9. Urinary tract: Gross structure, various parts & their functions. (Microscopic structure is not required.) Process of urine formation & voiding.	20 Hrs
	10. Male reproductive system: Only gross structure & functions of different parts. (Microscopic structure is not required.)	10 Hrs
	11. Female reproductive system: Only gross structure & functions of different parts. (Microscopic structure is not required.) Menstrual cycle.	10 Hrs

## Details of Curriculum for First Year Diploma in Cardiology Technician

PAPER 1st Theory	Topics	Hours.
<b>1. General Anatomy &amp; Physiology (Cytology, Histology, Osteology and only basics of all organ systems of body).</b>	<b>12. Endocrine system: Hormones secreted by Pituitary, Thyroid, Parathyroid, Pancreas, Adrenal cortex, Adrenal medulla, Gonads &amp; functions of different hormones. (Details of structure of these glands not required).</b>	20 Hrs
	<b>13. Gross structure of brain &amp; spinal cord. Functions of different parts of brain &amp; spinal cord. (Details not required.)</b>	20 Hrs
	<b>14. Blood: Composition &amp; Functions. Details about Plasma, RBCs, WBCs, Platelets, Clotting system.</b>	30 Hrs
	<b>15. Gross structure &amp; functions of sensory Organs - Eye, Ear, Nose, Tongue. (Details not required).</b>	20 Hrs
	<b>16. Basic gross structure of heart, vessels opening into heart &amp; Leaving the heart. Arterial &amp; Venous tree of body.</b>	20 Hrs
	<b>17. Lymphatic system: Structure &amp; Functions.</b>	10 Hrs
	<b>18. Inumune system: Components &amp; various mechanisms of defense.</b>	20 Hrs

## Details of Curriculum for First Year Diploma in Cardiology Technician

PAPER 1st Theory	Topics	Hours.
<b>2.Only basics of relevant Pathology, Pharmacology &amp; Microbiology.</b>	1. Basic steps of Acute & chronic inflammation.	03 Hrs
	2. Basics of Necrosis & apoptosis. Atherosclerosis.	03 Hrs
	3. Basics of Shock.	03 Hrs
	4. Basics of Disorders of blood coagulation system.	08 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.	20 Hrs
	9. Routes of drug administration.	02 Hrs
	10. Adverse effects & side effects of drugs.	02 Hrs
	11.	
	12. Basic idea of Analgesics : Opioid & NSAIDs.	02 Hrs
	13. Basic idea of Drugs use in Cough & expectoration.	02 Hrs
	14. Basic idea of Drugs used in B. asthma & COPD.	02 Hrs
	15. Basic idea of Drugs used in GIT.	08 Hrs
	16. Basic idea of Anti Microbials.	20 Hrs
	17. Basic idea of Anti H-1 Histaminics & Corticosteroids.	02 Hrs
	18. Basic idea of Diuretics.	03 Hrs

## Details of Curriculum for First Year Diploma in Cardiology Technician

<b>PAPER 1st Theory</b>	<b>Topics</b>	<b>Hours.</b>
<b>3. Basic Physics related to cardiology.</b>	1. Principles of AC & DC.	10 Hrs
	2. Ohm's law.	10 Hrs
	3. Types of batteries & power supply.	10 Hrs
	4. Electrodes.	10 Hrs

## Details of Curriculum for First Year Diploma in Cardiology Technician

PAPER 2nd Theory	Topics	Hours.
<b>1.Detailed Cardiovascular system's Anatomy &amp; Physiology (Heart &amp; Blood vessels).</b>	1. Details of sternum, ribs & dorsal vertebrae.	05 Hrs
	2. Detailed structure of Mediastinum. Contents of Mediastinum.	05 Hrs
	3. Gross structure of Heart & precordial surface markings.	10 Hrs
	4. Histology of Heart.	05 Hrs
	5. Great vessels.	05 Hrs
	6. Systemic & Pulmonary Circulation	05 Hrs
	7. Blood supply of Heart.	05 Hrs
	8. Nerve supply of Heart.	02 Hrs
	9. Cardiac cycle.	12 Hrs
	10. Cardiac output & stroke volume.	06 Hrs
	11. Cardiac sounds.	05 Hrs
	12. Conduction system of Heart.	05 Hrs
	13. Blood pressure.	05 Hrs
	14. Pulse.	05Hrs
	15. General structure of Arteries, veins, capillaries.	05 Hrs
	16. Arterial & Venous tree of body.	15 Hrs



## Details of Curriculum for First Year Diploma in Cardiology Technician

PAPER 2nd Theory	Topics	Hours.
<b>2. Basics of Vital monitoring, ECG, TMT, Echo-Cardiography.</b>	1. Temperature monitoring & Fever.	05 Hrs
	2. Pulse monitoring & applied aspects.	05 Hrs
	3. Blood Pressure monitoring (manual).	05 Hrs
	4. Respiration monitoring.	05 Hrs
	5. Placing & using multipara-monitors.	10 Hrs
	6. ECG recording.	30 Hrs
	7. Basics of ECG.	10 Hrs
	8. Common anomalies of ECG & their interpretation.	10 Hrs
	9. Basics of TMT.	10 Hrs
	10. basics of Echo-cardiography	10 Hrs

PAPER 2nd Theory	Topics	Hours.
<b>3. Hand hygiene &amp; prevention of cross infection.</b>	1. Hand hygiene & method of Hand washing.	15 Hrs
	2. Prevention of cross infection.	15 Hrs

PAPER 2nd Theory	Topics	Hours.
<b>4. Basic life support (BLS) &amp; Cardio-pulmonary resuscitation (CPR).</b>	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 Cardiology Technician**

<b>Practical</b>	<b>Topics</b>
	1.Orientation for Cardiac technician towards importance & need of the technician.
	2.Care of Unconscious patient.
	3.Monitoring Temperature(manual).
	4.Monitoring Pulse (manual).
	5.Monitoring Respiration (manual).
	6.Monitoring BP (manual).
	7. Monitoring Temperature (with Multiparamonitor).
	8.Monitoring Pulse (with Multiparamonitor).
	9.Monitoring Respiration (with Multiparamonitor).
	10.Monitoring BP (with Multiparamonitor).
	11.Invasive monitoring.
	12.ECG procedure (as technician).
	13.Echo- Cardiography procedure (as assistant).
	14.Basic life support (BLS).

## Details of Curriculum for Second Year Diploma in Cardiology Technician

PAPER 1st Theory	Topics	Hours.
<b>1.Only relevant surgical &amp; medical conditions (relevant to cardiac tech but other than cardiology).</b>	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.	02 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.	30 Hrs
	6. <u>Respiratory Tract</u> :- Pneumonia, Tuberculosis, B.asthma, COPD, Bronchiectasis, Collapse of lung, Pneumonitis, Pleural effusion, Pneumothorax, Empyema thoracis, Cancer lung.	50 Hrs
	7. <u>Diseases of GIT &amp; Liver &amp; GB</u> :-Reflux Oesophagitis, Peptic ulcers, Gastritis, Intestinal Obstruction, Hepatitis, Cirrhosis of liver, Cholecystitis.	40 Hrs
	8. <u>Diseases of Nervous system</u> :- Stroke, Meningo-encephalitis, Glasgow coma scale, Epilepsy, Head Injury.	30 Hrs
	9. <u>Diseases of Urinary tract</u> :- Urolithiasis, Benign prostatic hyperplasia.	13 Hrs
	10. <u>Endocrine system</u> :- Diabetes mellitus, hypo & Hyper thyroidism.	10 Hrs
	11. <u>Miscellaneous</u> :- Hypo & Hyper Natraemia, Hypo & Hyper Kalaemia, Hypo & Hyper Calcaemia.	10Hrs
	12. <u>Infections diseases</u> :- TB, Typhoid, Malaria, Dengue fever, Leprosy, AIDS, Amoebiasis.	30 Hrs

## Details of Curriculum for Second Year Diploma in Cardiology Technician

PAPER 1st Theory	Topics	Hours.
<b>2. Nursing Procedures like vital recording, IM/IV/SC injection, Oxygen therapy, Nebulization, IV infusion.</b>	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.	01 Hrs
	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

PAPER 1st Theory	Topics	Hours.
<b>3. Advanced cardiac life support (ACLS).</b>	1. Advanced cardiac life support (ACLS).	20 Hrs

## Details of Curriculum for Second Year Diploma in Cardiology Technician

PAPER 2nd Theory	Topics	Hours.
<b>1. Diseases related to Cardio-vascular system (CVS).</b>	1. Auscultation & Heart Sounds.	05 Hrs
	2. Hypertensive vascular disease and hypertensive emergencies.	05 Hrs
	3. Cardiogenic shock.	05 Hrs
	4. Congestive Heart failure.	05 Hrs
	5. Cardiac arrest.	10 Hrs
	6. Ischemic heart disease.	20 Hrs
	7. Valvular heart diseases.	20 Hrs
	8. Rheumatic heart diseases.	20 Hrs
	9. Congenital heart diseases.	20 Hrs
	10. Cardiac arrhythmia.	10 Hrs
	11. Infective endocarditis.	05 Hrs
	12. Pericarditis & pericardial effusion.	05 Hrs
	13. Myocarditis & cardiomyopathies.	05 Hrs
	14. Epidemiology of heart diseases.	05 Hrs
	15. Preventive cardiology.	05 Hrs

## Details of Curriculum for Second Year Diploma in Cardiology Technician

PAPER 2nd Theory	Topics	Hours.
<b>2. Drugs used in Cardiology &amp; BLS, ACLS.</b>	1. Use of Adrenaline/ Nor-adrenaline.	10 Hrs
	2. Use of Dopamine/ Dobutamine.	10 Hrs
	3. Use of Atropine.	10 Hrs
	4. Use of Anti arrhythmic drugs.	10 Hrs
	5. Use of Anti hypertensives.	10 Hrs
	6. Use of DC shock.	05 Hrs
	7. Use of Defibrillator.	05 Hrs

PAPER 2nd Theory	Topics	Hours.
<b>3. Details about BLS, ACLS, Cardiac-Catheterization, Coronary angiography and angioplasty.</b>	1. Basic life support (BLS).	20 Hrs
	2. Advanced cardiac life support (ACLS).	30 Hrs
	3. <u>Cardiac Catheterization, Angiography &amp; Plasty:-</u>  Equipments & instruments used, Dyes & drugs used, Indications of procedure, Steps of procedure, Pre and post procedure care of the patients, Part Preparation, before procedure & discharge advices.	180 Hrs

PAPER 2nd Theory	Topics	Hours.
<b>4. Basic biomedical engineering physics of ECG, ECHO, TMT, Cath.lab, multi para monitors etc</b>	1. About Multiparamonitor.	10 Hrs
	2. About ECG machine.	10 Hrs
	3. About Echo-Cardiography machine.	10 Hrs
	4. About TMT.	10 Hrs
	5. About Infusion pump.	10 Hrs
	6. About Defibrillator.	10 Hrs

Curriculum  
for  
Practical :- Second Year  
Diploma in Cardiology Technician

	Topics
<b>Practical</b>	1. IM Injection.
	2. IV Injection.
	3. SC Injection.
	4. Use of Infusion pump.
	5. Nebulisation.
	6. Use of Defibrillator.
	7. Use of TMT machine.
	8. Practical exposure in Cardiac Cath lab(Pre, Intra & Post procedure)
	9. Use of Kits/Cards for Troponin measurements.
	10. Advanced cardiac life support(ACLS training).
	8. Use of inotropic, chronotropic & dromotropic drugs like Dopamine, Dobutamine, Adrenaline, NA, Atropine etc.

Syllabus and Curriculum  
of  
Diploma in Dialysis Technician course

**(To be implemented From 2015 - 16 session)**

Uttar Pradesh State Medical Faculty, Lucknow.



# Index

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## OBJECTIVES OF THE COURSE

To prepare a **Dialysis technician** who -

- Can conduct dialysis procedure (including maintaining vascular access e.g. femoral, I J V, A-V fistula).
- Can use drugs for dialysis.
- Can perform CPR, if required.
- Can perform basic nursing procedures like IV/IM/SC injections, Nebulization, Oxygen therapy.
- Has basic understanding of Renal diseases.
- Can provide Psychological support to the patient & counsel him & his/her relatives.

## Diploma in Dialysis Technician course

### FIRST YEAR

Paper	Name of Paper	Internal	External	Total
Theory First Paper	Anatomy, Physiology, Pathology, Microbiology & Pharmacology.	25	75	100
Theory Second Paper	Nephrological Anatomy & Basics of dialysis.	25	75	100
Practical		25	75	100

### SECOND YEAR

Paper	Name of Paper	Internal	External	Total
Theory First Paper	Relevant medical & surgical diseases.	25	75	100
Theory Second Paper	Diseases of kidney & Dialysis procedure.	25	75	100
Practical		25	75	100

**Outline of Curriculum  
of  
Diploma in Dialysis Technician course**

**FIRST YEAR**

**THEORY ( Classes: 9 AM to 12 Noon)**

**First paper : Syllabus covers -**

1. General Anatomy & Physiology (Cytology, Histology, Osteology and only basics of all organ systems of body).
2. Only basics of General Pathology, Pharmacology & Microbiology.

**Second paper : Syllabus covers -**

1. Detailed Urology system's Anatomy , Physiology & Histology.
2. Basics of dialysis technics.
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/dialysis lab for practicals.

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

(Observership for various Venous accesses, A-V fistula making, vitals recording, Procedure of dialysis).

**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 Dialysis Technician course

### SECOND YEAR

#### THEORY ( classes:9 AM to 12 Noon)

##### First paper : Syllabus covers -

1. Only relevant surgical & medical conditions (relevant to dialysis technician but other than nephrology).
2. Nursing Procedures like vital recording, IM/IV/SC injection, Oxygen therapy, Nebulization, IV infusion.

##### Second paper : Syllabus covers -

1. Diseases related to Nephrology.
2. Details about dialysis (Haemodialysis & CAPD) procedure.
3. Basic biomedical engineering physics of dialysis machine, multipara monitors.

## SECOND YEAR

### PRACTICAL ( classes:9 AM to 12 Noon)

Practical exams syllabus should cover-

- Hands on training of Vital Monitoring (invasive & non-invasive).
- Hands on training of femoral/jugular access.
- Assisting and Care of AV-Fistula.
- Hands on training of Haemodialysis.
- Hands on training of Peritoneal dialysis.
- Hands on training of BLS .
- Hands on training of use of drugs used in ICU.

## ELIGIBILITY CRITERIA FOR ADMISSION & DURATION OF THE COURSE

### COURSE DURATION:-

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

### ELIGIBILITY:-

- Candidate must have passed 12<sup>th</sup> 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 31<sup>st</sup> 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>
<b><u>First Paper Theory</u></b>	<p>1.General Anatomy &amp; Physiology (Cytology, Histology, Osteology and only basics of all organ systems of body).</p> <p>2.Only basics of General Pathology, Pharmacology &amp; Microbiology.</p>	75	25	100	50	3 Hours
<b><u>Second Paper Theory</u></b>	<p>1.Detailed Urology system's Anatomy , Physiology &amp; Histology.</p> <p>2. Basics of dialysis technicians.</p> <p>3.Hand hygiene &amp; prevention of cross infection.</p> <p>4.Basic life support (BLS) &amp; Cardio-pulmonary resuscitation (CPR).</p>	75	25	100	50	3 Hours
<b><u>Practical</u></b>	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>	<p>1. Only relevant surgical &amp; medical conditions (relevant to dialysis technician but other than nephrology).</p> <p>2. Nursing Procedures like vital recording, IM/IV/SC injection, Oxygen therapy, Nebulization, IV infusion.</p>	75	25	100	50	3 Hours
<u>Second Paper Theory</u>	<p>1. Diseases related to Nephrology.</p> <p>2. Details about dialysis (Haemodialysis &amp; CAPD) procedure.</p> <p>3. Basic biomedical engineering physics of dialysis machine, multipara monitors.</p>	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
<hr/>	
Total Holidays	- 105 days
<hr/>	

- **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)**

<b><u>First Paper Theory</u></b>	1.General Anatomy & Physiology (Cytology, Histology, Osteology and only basics of all organ systems of body).	300 Hrs
	2.Only basics of General Pathology, Pharmacology & Microbiology .	100 Hrs
<b><u>Second Paper Theory</u></b>	1.Detailed Urology system's Anatomy , Physiology & Histology.	100 Hrs
	2. Basics of dialysis technicians.	140 Hrs
	3.Hand hygiene & prevention of cross infection.	30 Hrs
	4.Basic life support (BLS) & Cardio-pulmonary resuscitation (CPR).	40 Hrs
<b><u>Third Paper Practical</u></b>	As described in curriculum	780 Hrs
<b><u>Theory: Other Subjects</u></b> (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)

<b><u>First Paper Theory</u></b>	1. Only relevant surgical & medical conditions (relevant to dialysis technician but other than nephrology).	250 Hrs
	2. Nursing Procedures like vital recording, IM/IV/SC injection, Oxygen therapy, Nebulization, IV infusion.	20 Hrs
<b><u>Second Paper Theory</u></b>	1. Diseases related to Nephrology.	220 Hrs
	2. Details about dialysis (Haemodialysis & CAPD) procedure.	230 Hrs
	3. Basic biomedical engineering physics of dialysis machine, multipara monitors.	60 Hrs
<b><u>Third Paper Practical</u></b>	As described in curriculum.	780 Hrs

## Details of Curriculum for First Year Diploma in Dialysis Technician

PAPER 1st Theory	Topics	Hours.
<b>1.General Anatomy &amp; Physiology (Cytology, Histology, Osteology and only basics of all organ systems of body).</b>	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.	06 Hrs
	2. Structure of Animal cell, Cell organelles & their functions	06 Hrs
	3. Human tissue, types, structure & functions.	10 Hrs
	4. Osteology: Names, location, identification and basic details of all bones. (Details of skull bones is not required).	20 Hrs
	5. Joints: types, basic structure & examples.	06 Hrs
	6. Skin & appendages.	02 Hrs
	7. GIT: : Location, Gross structure, various parts & their functions. Details of process of food ingestion, digestion, absorption & defaecation. (Microscopic structure is not required.)	30 Hrs
	8. Respiratory tract: Location, Gross structure, various parts & their functions. Details of breathing mechanism, different respiratory volumes. (Microscopic structure is not required.)	30 Hrs
	9. Male reproductive system: Only gross structure & functions of different parts. (Microscopic structure is not required.)	10 Hrs
	10. Female reproductive system: Only gross structure & functions of different parts. (Microscopic structure is not required.) Menstrual cycle.	10 Hrs

## Details of Curriculum for First Year Diploma in Dialysis Technician

PAPER 1st Theory	Topics	Hours.
<b>1. General Anatomy &amp; Physiology (Cytology, Histology, Osteology and only basics of all organ systems of body).</b>	<b>11. Endocrine system: Hormones secreted by Pituitary, Thyroid, Parathyroid, Pancreas, Adrenal cortex, Adrenal medulla, Gonads &amp; functions of different hormones. (Details of structure of these glands not required).</b>	20 Hrs
	<b>12. Gross structure of brain &amp; spinal cord. Functions of different parts of brain &amp; spinal cord. (Details not required.)</b>	30 Hrs
	<b>13. Blood: Composition &amp; Functions. Details about Plasma, RBCs, WBCs, Platelets, Clotting system.</b>	30 Hrs
	<b>14. Gross structure &amp; functions of sensory Organs - Eye, Ear, Nose, Tongue. (Details not required).</b>	20 Hrs
	<b>15. Basic gross structure of heart, vessels opening into heart &amp; Leaving the heart. Arterial &amp; Venous tree of body.</b>	30 Hrs
	<b>16. Lymphatic system: Structure &amp; Functions.</b>	10 Hrs
	<b>17. Immune system: Components &amp; various mechanisms of defense.</b>	20 Hrs

## Details of Curriculum for First Year Diploma in Dialysis Technician

PAPER 1st Theory	Topics	Hours.
<b>2.Only basics of relevant Pathology, Pharmacology &amp; Microbiology.</b>	1. Basic steps of Acute & chronic inflammation.	03 Hrs
	2. Basics of Necrosis & apoptosis.	03 Hrs
	3. Basics of Shock.	03 Hrs
	4. Basics of Disorders of blood coagulation system.	08 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.	20 Hrs
	9. Routs 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.	03 Hrs
	14. Basic idea of Drugs used in GIT.	05 Hrs
	15. Basic idea of Anti Microbials.	20 Hrs
	16. Basic idea of Anti H-1 Histaminics & Corticosteroids.	02 Hrs
	17. Diuretics.	03 Hrs
	18. Drugs used in anaemia.	05 Hrs



## Details of Curriculum for First Year Diploma in Dialysis Technician

PAPER 2nd Theory	Topics	Hours.
<b>1.Detailed Urology system's Anatomy , Physiology &amp; Histology.</b>	1. Surface marking of urological system.	05 Hrs
	2. Detailed structure of kidney including histology.	20 Hrs.
	3. Nephron structure & urine formation structure of Anatomy abdominal wall.	15 Hrs
	4. Process of Voiding.	05 Hrs
	5. Blood supply of Kidney.	05 Hrs
	6. Nerve supply of Kidney.	02 Hrs
	7. Blood pressure.	05 Hrs
	8. General structure of Arteries,veins, capillaries.	05 Hrs
	9. Arterial & Venous tree of body.	20 Hrs
	10. Structure of anterior abdominal wall.	05 Hrs
	11. Structure of anterior post abdominal wall.	05 Hrs

## Details of Curriculum for First Year Diploma in Dialysis Technician

PAPER 2nd Theory	Topics	Hours.
<b>2. Basics of dialysis technicians.</b>	1. Body fluids, Homeostasis & fluid balance.	05 Hrs
	2. Physics of Diffusion, Osmosis.	02 Hrs
	3. Types of dialysis & role of dialysis technician.	03 Hrs
	4. Principles & Procedure of haemodialysis.	20 Hrs
	5. Principles & Procedure of Peritoneal dialysis.	20 Hrs
	6. Instruments & Equipments used in dialysis.	30 Hrs
	7. Composition of dialysates (for Haemo & Peritoneal dialysis).	20 Hrs
	8. Types of dialyzers & their care.	10 Hrs
	9. Details about various types of access (I J V, Femoral & A-V fistula)	20 Hrs
	10. Record keeping;	10 Hrs

## Details of Curriculum for First Year Diploma in Dialysis Technician

PAPER 2nd Theory	Topics	Hours.
<b>3. Hand hygiene &amp; prevention of cross infection.</b>	1. Hand hygiene & method of Hand washing.	15 Hrs
	2. Prevention of cross infection.	15 Hrs

PAPER 2nd Theory	Topics	Hours.
<b>4. Basic life support (BLS) &amp; Cardio-pulmonary resuscitation (CPR).</b>	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 Dialysis Technician

<b>Practical</b>	<b>Topics</b>
	1.Orientation for Dialysis technician towards importance & need of the technician.
	2.Care of Unconscious patient.
	3.Monitoring Temperature(manual).
	4.Monitoring Pulse (manual).
	5.Monitoring Respiration (manual).
	6.Monitoring BP (manual).
	7. Monitoring Temperature (with Multiparamonitor).
	8.Monitoring Pulse (with Multiparamonitor).
	9.Monitoring Respiration (with Multiparamonitor).
	10.Monitoring BP (with Multiparamonitor).
	11. Obtaining femoral access.
	12.Obtaining jugular access.
	13. Process of Haemodialysis & peritoneal dialysis.
14.Basic life support (BLS).	

## Details of Curriculum for Second Year Diploma in Dialysis Technician

PAPER 1st Theory	Topics	Hours.
<b>1.Only relevant surgical &amp; medical conditions (relevant to dialysis technician but other than nephrology).</b>	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.	02 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.	30 Hrs
	6. <u>Respiratory Tract</u> :- Pneumonia, Tuberculosis, B. asthma, COPD, Bronchiectasis, Collapse of lung, Pneumonitis, Pleural effusion, Pneumothorax, Empyema thoracis, Cancer lung.	50 Hrs
	7. <u>Diseases of GIT &amp; Liver &amp; GB</u> :-Reflux Oesophagitis, Peptic ulcers, Gastritis, Intestinal Obstruction, Hepatitis, Cirrhosis of liver, Cholecystitis.	40 Hrs
	51 <u>Diseases of Nervous system</u> :- Stroke, Meningo-encephalitis, Glasgow coma scale, Epilepsy, Head Injury.	30 Hrs
	52 <u>Diseases of Urinary tract</u> :- Urolithiasis, Benign prostatic hyperplasia.	13 Hrs
	53 <u>Endocrine system</u> :- Diabetes mellitus, hypo & Hyper thyroidism.	10 Hrs
	54 <u>Miscellaneous</u> :- Hypo & Hyper Natraemia, Hypo & Hyper Kalaemia, Hypo & Hyper Calcaemia.	10Hrs
55 <u>Infections diseases</u> :- TB, Typhoid, Malaria, Dengue fever, Leprosy, AIDS, Amoebiasis.	30 Hrs	

## Details of Curriculum for Second Year Diploma in Dialysis Technician

PAPER 1st Theory	Topics	Hours.
<b>2.Nursing Procedures like vital recording, IM/IV/SC injection, Oxygen therapy, Nebulization, IV infusion.</b>	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 Dialysis Technician

PAPER 2nd Theory	Topics	Hours.
<b>1.Diseases related to Nephrology.</b>	1. ARF- Definition, causes, types, clinical features, investigations & management.	20 Hrs
	2. CRF – Definition, causes, types, clinical features, investigations & management.	20 Hrs
	3. Basics of various types of Glomerulonephritis.	30 Hrs
	4. Basics of Tubulo-interstitial diseases.	20 Hrs
	5. Diabetic Nephropathy : Definition, Pathology, Clinical features, Investigations & management.	15 Hrs
	6. Hypertensive nephropathy : Definition, Pathology, Clinical features, Investigations & management.	15 Hrs
	7. Basics idea of Analgesic & Heavy metal nephropathy	05 Hrs
	8. Urolithiasis – Definition, types, causes, effect on kidneys, Clinical features, Investigations & management.	20 Hrs
	9. Urinary tract infection & urosepsis.	10 Hrs
	10. Basics of Congenital abnormalities of kidney.	20 Hrs
	11. Nephro toxic drdugs.	10 Hrs
	12. Hypo & Hyper natraemia.	05 Hrs
	13. Hypo & Hyper Kalaemia.	05 Hrs
	14. Basics of acidosis (metabolic & respiratory).	05 Hrs
	15. Basics of Alkalosis (metabolic & respiratory).	05 Hrs
	16. Basics of other dys-electronaemia.	20 Hrs

## Details of Curriculum for Second Year Diploma in Dialysis Technician

PAPER 2nd Theory	Topics	Hours.
<b>2.Details about dialysis (Haemodialysis &amp; CAPD) procedure.</b>	1. Types of dialysis & role of dialysis technician.	05 Hrs
	2.Details about dialysis machine & other instruments/equipments used in dialysis.	25 Hrs
	3.Details about dialysate fluids & dialyzers.	10 Hrs
	4.Details about RO plant & water composition used in dialysis.	10 Hrs
	5. <u>Haemodialysis</u> - Indications, preprocedure care, detail procedure, post procedure care, interaction with patients, complications & their management, record keeping.	50 Hrs
	6. <u>Peritoneal dialysis</u> - Indications, preprocedure, care, detail procedure, post procedure care, interaction with patients, complications & their management, record keeping.	50 Hrs
	7.Re-dialysis Assessment.	05 Hrs
	8.Anticoagulants used in dialysis.	10 Hrs
	9.Emergency drugs used during dialysis.	20 Hrs
	10.Venous accesses: types, procedure detail & role of technician.	40 Hrs
	11.Nutritional advices in a patient of dialysis.	05 Hrs

PAPER 2nd Theory	Topics	Hours.
<b>3.Basic biomedical engineering physics of dialysis machine, multipara monitors.</b>	1.Basics of biomedical physics of dialysis machine.	40 Hrs
	2Basics of biomedical physics of multi-para monitors.	20 Hrs



**Curriculum  
for  
Practical :- Second Year  
Diploma in Dialysis Technician**

	Topics
<b>Practical</b>	1. Hand on training of IM Injection.
	2. Hand on training of IV Injection.
	3. Hand on training of SC Injection.
	4. Use of Infusion pump.
	5. Hand on training of Nebulisation.
	6. Use of Defibrillator.
	7. Hands on training of femoral & jugular access.
	8. Hand on training of Assisting A-V fisthla making.
	9. Hands on training of peritoneal dialysis (Pre, Intra & Post procedure role).
	10. Hands on training of Haemodialysis. (Pre, Intra & Post procedure role).
	11. Hands on training of use of regular & emergency drugs used in dialysis.
	12. Care & keeping of Instruments/equipments & consummables use in dialysis.
	13. Record keeping.

**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.

## Diploma in C.T. Scan Technician course

### FIRST YEAR

Paper	Name of Paper	Internal	External	Total
Theory First Paper	Anatomy, Physiology, Pathology, Microbiology & Pharmacology.	25	75	100
Theory Second Paper	Basics of radiographic and CT techniques & radiological anatomy.	25	75	100
Practical		25	75	100

### SECOND YEAR

Paper	Name of Paper	Internal	External	Total
Theory First Paper	Relevant medical & surgical diseases.	25	75	100
Theory Second Paper	CT Scan: Tools & techniques.	25	75	100
Practical		25	75	100

**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 12<sup>th</sup> 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 31<sup>st</sup> 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 Assessme nt Marks</u>	<u>Total Marks</u>	<u>Pass Marks</u>	<u>Duration of Exam.</u>
<u>First Paper Theory</u>	<p>1.General Anatomy &amp; 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 &amp; Microbiology &amp; drugs used during CT Scan.</p>	75	25	100	50	3 Hours
<u>Second Paper Theory</u>	<p>1.Details of radiological Anatomy &amp; surface making.</p> <p>2.Radiophysics, Radiographic positions &amp; Radiation hazards.</p> <p>3.Hand hygiene &amp; prevention of cross infection.</p> <p>4.Basic life support (BLS) &amp; 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>	<p>1.Details of Only relevant surgical &amp; medical conditions.</p> <p>2.Nursing Procedures like vital recording, IM/IV/SC injection, Oxygen therapy, Nebulization, IV infusion.</p>	75	25	100	50	3 Hours
<u>Second Paper Theory</u>	<p>1.CT physics, slice Anatomy &amp; CT positioning.</p> <p>2.CT guided procedures.</p> <p>3. Bio-medical physics of CT Scan machine &amp; developement of CT film etc.</p>	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
<hr/>	
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)

<b><u>First Paper Theory</u></b>	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
<b><u>Second Paper Theory</u></b>	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
<b><u>Third Paper Practical</u></b>	As described in curriculum	780 Hrs
<b><u>Theory: Other Subjects</u></b> (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)

<b><u>First Paper Theory</u></b>	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
<b><u>Second Paper Theory</u></b>	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
<b><u>Third Paper Practical</u></b>	As described in curriculum	780 Hrs

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

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

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

PAPER 1st Theory	Topics	Hours.
<b>2. Only basics of relevant Pathology, Pharmacology &amp; Microbiology &amp; drugs used during CT Scan.</b>	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.
<b>1.Details of radiological Anatomy &amp; surface making.</b>	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.
<b>2.Radiophysics, Radiographic positions &amp; Radiation hazards.</b>	<b>INTRODUCTION TO Physics</b>	
	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, Fluoroscopy, 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
	<b>RADIATION</b>	
	1. Radiation Dose, Radiation Hazards, Radiation Protection .	04 Hrs
	2. Dark Room.	01 Hrs
	<b>RADIOGRAPHY</b>	
	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.
<b>2. Radiophysics, Radiographic positions &amp; Radiation hazards.</b>	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.
<b>3. Hand hygiene &amp; prevention of cross infection.</b>	1. Hand hygiene & method of Hand washing.	15 Hrs
	2. Prevention of cross infection.	15 Hrs

PAPER 2nd Theory	Topics	Hours.
<b>4. Basic life support (BLS) &amp; Cardio-pulmonary resuscitation (CPR).</b>	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

<b>Practical</b>	Topics
	<b><u>Observership for :-</u></b>
	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.
<b>1.Details of Only relevant surgical &amp; medical conditions.</b>	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 &amp; Liver &amp; 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. <u>Head injury</u> :- 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

<b>1.Details of Only relevant surgical &amp; medical conditions.</b>	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.
<b>2.Nursing Procedures like vital recording, IM/IV/SC injection, Oxygen therapy, Nebulization, IV infusion</b>	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.
<b>1. CT physics, slice Anatomy &amp; CT positioning.</b>	<b>1. Physics</b> Basic Principles of C.T Scan, Discovery of C.T Scan, Scanner Geometry:-1 <sup>st</sup> 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
	<b>2. CT slices—Axial, coronal and sagittal sections of Brain and Spine.</b>	20 Hrs
	<b>3. CT slices—Axial, coronal and sagittal sections of Orbit.</b>	05 Hrs
	<b>4. CT slices—Axial, coronal and sagittal sections of PNS</b>	05 Hrs
	<b>5. CT slices—Axial, coronal and sagittal sections of Neck.</b>	10 Hrs
	<b>6. CT slices—Axial, coronal and sagittal sections of Thorax.</b>	10 Hrs
	<b>7. CT slices—Axial, coronal and sagittal sections of Abdomen.</b>	10 Hrs
	<b>8. CT slices—Axial, coronal and sagittal sections of Pelvis.</b>	10 Hrs
	<b>9. CT slices—Axial, coronal and sagittal sections of Limbs.</b>	10 Hrs
	<b>10. CT slices—Axial, coronal and sagittal sections of Hepatobiliary System.</b>	10 Hrs
	<b>11. CT slices—Axial, coronal and sagittal sections of KUB</b>	10 Hrs
	<b>12. Various positions used in doing CT Scan.</b>	10 Hrs

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

PAPER 2nd Theory	Topics	Hours.
<b>2. CT guided procedures.</b>	<b>CT PROCEDURES</b>	
	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.
<b>3. Bio-medical physics of CT Scan machine &amp; development of CT film etc.</b>	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

<b>Practical</b>	Topics
	<b><u>Hands on training of :-</u></b>
	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.

**Syllabus and Curriculum  
of  
Diploma in M.R.I. Technician course**

**(To be implemented From 2015 - 16 session)**

**Uttar Pradesh State Medical Faculty, Lucknow.**

# Index

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## OBJECTIVES OF THE COURSE

To prepare a **M.R.I. technician** who –

- Can perform MRI 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 MRI Scan plates.

## Diploma in M.R.I. Technician course

### FIRST YEAR

Paper	Name of Paper	Internal	External	Total
Theory First Paper	Anatomy, Physiology, Pathology, Microbiology & Pharmacology.	25	75	100
Theory Second Paper	Radiological Anatomy & Basic Physics of MRI.	25	75	100
Practical		25	75	100

### SECOND YEAR

Paper	Name of Paper	Internal	External	Total
Theory First Paper	Relevant medical & surgical diseases.	25	75	100
Theory Second Paper	Applied MRI techniques & procedures.	25	75	100
Practical		25	75	100

# Outline of Curriculum of Diploma in M.R.I. 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 MRI Scan.

#### Second paper : Syllabus covers -

1. Details of radiological Anatomy & surface marking.
2. Basic physics, Electricity, Magnetism, Physics of MRI.
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/MRI 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 M.R.I. 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. MRI physics, MRI positioning, Various MRI techniques & Radiation Hazards.
2. MRI guided procedures.
3. Bio-medical physics of MRI Scan machine & developement of MRI film etc.

## SECOND YEAR

### PRACTICAL ( classes:9 AM to 12 Noon)

Practical exams syllabus should cover-

#### Hands on training of :-

- Preparation of patient for MRI Scan.
- Performing all types of MRI Scan.
- Contrast administration & management of adverse reactions to it.
- Protection from radiation hazards.
- Assisting MRI 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 12<sup>th</sup> 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 31<sup>st</sup> 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 &amp; 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 &amp; Microbiology &amp; drugs used during MRI Scan.</p>	75	25	100	50	3 Hours
<u>Second Paper Theory</u>	<p>1.Details of radiological Anatomy &amp; surface marking.</p> <p>2 Basic physics, Electricity, Magnetism, Physics of MRI.</p> <p>3.Hand hygiene &amp; prevention of cross infection.</p> <p>4.Basic life support (BLS) &amp; 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.MRI physics, MRI positioning, Various MRI techniques & Radiation Hazards. 2.MRI guided procedures. 3. Bio-medical physics of MRI Scan machine & developement of MRI 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
<hr/>	
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)

<b><u>First Paper Theory</u></b>	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 MRI Scan.	100 Hrs
<b><u>Second Paper Theory</u></b>	1.Details of radiological Anatomy & surface marking.	100Hrs
	2.Basic physics, Electricity, Magnetism, Physics of MRI.	140 Hrs
	3.Hand hygiene & prevention of cross infection.	30 Hrs
	4.Basic life support (BLS) & Cardio-pulmonary resuscitation (CPR).	40 Hrs
<b><u>Third Paper Practical</u></b>	As described in curriculum	780 Hrs
<b><u>Theory: Other Subjects</u></b> (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)**

<b><u>First Paper Theory</u></b>	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
<b><u>Second Paper Theory</u></b>	1.MRI physics, MRI positioning, Various MRI techniques & Radiation Hazards.	250 Hrs
	2.MRI guided procedures.	50 Hrs
	3. Bio-medical physics of MRI Scan machine & development of MRI film etc.	110 Hrs
<b><u>Third Paper Practical</u></b>	As described in curriculum	780 Hrs

## Details of Curriculum for First Year Diploma in M.R.I. Technician

PAPER 1st Theory	Topics	Hours.
<b>1. General Anatomy &amp; Physiology (Cytology, Histology, Osteology and basics of all organ systems of body) and detailed study of skull, brain and spinal cord.</b>	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. <b>Details of all bones of skull &amp; various views.</b>	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 M.R.I. Technician

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

## Details of Curriculum for First Year Diploma in M.R.I. Technician

PAPER 1st Theory	Topics	Hours.
<b>2. Only basics of relevant Pathology, Pharmacology &amp; Microbiology &amp; drugs used during MRI Scan.</b>	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 M.R.I. Technician

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

## Details of Curriculum for First Year Diploma in M.R.I. Technician

PAPER 2nd Theory	Topics	Hours.
<b>2. Basic physics, Electricity, Magnetism, Physics of MRI.</b>	1. What is matter, anatomic structure, Isotopes, ions, specific gravity, temperature scales, heat, electro magnetic radiation.	10 Hrs
	2. What is electrostatics, inverse square law, types of bonds, electrical field and electrical potential, electrification possible, conductors and insulators, electrostatics, electroscope, static discharge.	20 Hrs
	3. Basic principles of MRI, Discovery of NMR/MRI	10 Hrs
	4. General overview of MR Physics.	20 Hrs
	5. The concept of longitudinal magnetization, Larmor equation The concept of transverse magnetization, Radio frequency pulses The concept of T1 and T2 weighted images.	10 Hrs
	6. Contrast enhanced MRI & Gadolinium.	10 Hrs
	7. MR Sequences- Fast imaging sequences, Gradient fields and gradient coils, Summary of MR process, Major components of an MRI, Magnets, self test, Helium / Superconduction & 1.5 Tesla, 3 Tesla, 8 Tesla MRI, Spin Echo, Fast Spin Echo, Inversion Recovery, Installation of MR Machine- Do' & Don't's.	50 Hrs
	8. Indications and Contraindication of MRI (Do's & Don't of MRI)----MRI SAFETY	10 Hrs

PAPER 2nd Theory	Topics	Hours.
<b>3. Hand hygiene &amp; prevention of cross infection.</b>	1. Hand hygiene & method of Hand washing.	15 Hrs
	2. Prevention of cross infection.	15 Hrs

PAPER 2nd Theory	Topics	Hours.
<b>4. Basic life support (BLS) &amp; Cardio-pulmonary resuscitation (CPR).</b>	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 M.R.I. Technician

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

## Details of Curriculum for Second Year Diploma in M.R.I. Technician

PAPER 1st Theory	Topics	Hours.
<b>1.Details of Only relevant surgical &amp; medical conditions.</b>	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 &amp; Liver &amp; 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. <u>Head injury</u> :- 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 M.R.I. Technician

<b>1.Details of Only relevant surgical &amp; medical conditions.</b>	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 Hrs

PAPER 1st Theory	Topics	Hours.
<b>2.Nursing Procedures like vital recording, IM/IV/SC injection, Oxygen therapy, Nebulization, IV infusion</b>	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 M.R.I. Technician

PAPER 2nd Theory	Topics	Hours.
<b>1.MRI physics, MRI positioning, Various MRI techniques &amp; Radiation Hazards.</b>	1.MRI SAFETY-Do's & Don't of MRI,Indications and Contraindication of MRI,Ionic and non ionic contrast,Negative and positive contrast Routes of contrast (IV, oral, rectal, vaginal),Contrast reaction and its management.	20 Hrs
	2.RADIATION-Radiation Hazards,Radiation Protection.	10 Hrs
	3.BASICS, PHYSICS AND CONCEPTS OF MR-Magnetisation Properties,Types of Magnetic characteristics of the Nucleus, Nuclear Magnetic properties of the elements.	20 Hrs
	4.Larmor Equation, Geometric Orientation,Resonance and excitation,Free induction decay: T2 Relaxation,Return of Equilibrium : T1 Relaxation,Comparison of T1 and T2,Angiography and magnetization transfer contrast,Time of flight (TOF).	30 Hrs
	5.CONCEPTS- Spin Echo, Fast Spin Echo, Parts of MRI Machine.	10 Hrs
	6.Artifacts, Machine dependent artifacts, Motion artifacts, Motion artifacts, Chemical shift artifacts,	10 Hrs
	7.Magnet, Resistive magnet, Superconductive magnet, Permanent Magnet	10 Hrs
	8.Safety and Bio-effects. Pulse sequences	10 Hrs
	9.Time of repetition and partial saturation- (i) T1 Weighting (ii) Spin (proton density) weighting (iii) T2 weighting (iv) Inversion recovery (v) Short tau inversion recovery (STIR) (vi) Fluid attenuated Inversion recovery (FLAIR)	20 Hrs
	10 .Gradient recall echo (GRE),Perfusion weighted MRI Diffusion weighted MRI, MR Spectroscopy, MR Tractography/Diffusion Tensor Imaging.	20 Hrs

**Details of Curriculum for Second Year  
Diploma in M.R.I. Technician**

<b>PAPER 2nd Theory</b>	<b>Topics</b>	<b>Hours.</b>
<b>1.MRI physics, MRI positioning, Various MRI techniques &amp; Radiation Hazards.</b>	11. Concepts of Radiographic Positioning.	05 Hrs
	12. Scaphoid & hand.	05 Hrs
	13. Elbow & shoulder joint.	05 Hrs
	14. Foot AP & oblique.	05 Hrs
	15. Hip & Knee joint AP.	05 Hrs
	16. Pelvis AP.	05 Hrs
	17. Chest AP, PA & Lat.	05 Hrs
	18. Sub Mento vertical & PNS.	05 Hrs
	19. Skull and Towne's.	05 Hrs
	20. Abdomen Erect.	05 Hrs
	21. BARIUM Studies.	05 Hrs
	22. IVP.	05 Hrs
	23. MCU/RGU/ T tube cholangiogram/ HSG.	05 Hrs
	24. Sinogram.	05 Hrs
	25. Contrast-Media,Radiographic Contrast, Density, Detail.	05 Hrs
	26. Types of film, Cassette, Intensifying Screen.	05 Hrs
	27. Safe Light,Developer and Fixer,Manual Processing.	05 Hrs
	28.Causes of film fog, Factors of X-Ray.	05 Hrs

Details of Curriculum for Second Year  
Diploma in M.R.I. Technician

PAPER 2nd Theory	Topics	Hours.
<b>2. MRI guided procedures.</b>	<b>MRI PROCEDURES</b>	
	1. MRI Myelogram /cisternogram.	05 Hrs
	2. MRI Guided FNAC / biopsy.	05 Hrs
	3. Other Special MRI Procedures & common interventions.	30 Hrs
	4. MRI Angiography, mainly brain.	10 Hrs

PAPER 2nd Theory	Topics	Hours.
<b>3. Bio-medical physics of MRI Scan machine &amp; development of MRI film etc.</b>	1. Basic Bio-medical physics of MRI Scan machine.	80 Hrs
	2. Types of film, cassette, screen, Developer, fixer etc.	30 Hrs

**Curriculum  
for  
Practical :- Second Year  
Diploma in M.R.I. Technician**

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

**Syllabus and Curriculum  
of  
Diploma in Blood Transfusion 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 **Blood Transfusion technician** who –

- Is able to make blood bank a safe place for all (Donors, recipients, doctors and technicians).
- Can carry complete process of blood donation.
- Is able to process the donated blood i.e. can screen, separate into components, store, maintain quality of stored blood.
- Can issue the stored blood/component.
- Is aware of laws and rules related to transfusion medicine and can perform all related paper work & record keeping.
- Is able to deal with common adverse reaction during donation & transfusion.
- Can motivate community for the safe blood donation.



## Diploma in Blood Transfusion Technician course

### FIRST YEAR

Paper	Name of Paper	Internal	External	Total
<b>Theory First Paper</b>	Anatomy, Physiology, Pathology, Microbiology & Pharmacology.	<b>25</b>	<b>75</b>	<b>100</b>
<b>Theory Second Paper</b>	Details of Haematological system & Equipment management.	<b>25</b>	<b>75</b>	<b>100</b>
<b>Practical</b>		<b>25</b>	<b>75</b>	<b>100</b>

### SECOND YEAR

Paper	Name of Paper	Internal	External	Total
<b>Theory First Paper</b>	Relevant medical & surgical diseases.	<b>25</b>	<b>75</b>	<b>100</b>
<b>Theory Second Paper</b>	Diseases of Haematology & process of blood banking.	<b>25</b>	<b>75</b>	<b>100</b>
<b>Practical</b>		<b>25</b>	<b>75</b>	<b>100</b>

**Outline of Curriculum  
of  
Diploma in Blood Transfusion Technician course**

**FIRST YEAR**

**THEORY ( Classes: 9 AM to 12 Noon)**

**First paper : Syllabus covers -**

1. General Anatomy & Physiology (Cytology, Histology, Osteology and only basics of all organ systems of body except haematological system).
2. Only basics of relevant Pathology, Pharmacology & Microbiology.

**Second paper : Syllabus covers -**

1. Detailed Anatomy, Physiology & Pathology of haematological system.
2. Details of Equipment management & chemicals used in blood bank.
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/ blood bank for practicals.

During first year, they should be there only as “Observers” in blood bank lab.

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 Blood Transfusion Technician course**

**SECOND YEAR**

**THEORY ( classes:9 AM to 12 Noon)**

**First paper : Syllabus covers -**

1. Only relevant surgical & medical conditions.
2. Nursing Procedures like vital recording, IM/IV/SC injection, Oxygen therapy, Nebulization, IV infusion.
3. Common laboratory tests & serology related to blood transfusion.

**Second paper : Syllabus covers -**

1. Details of diseases of haematology.
2. Details of blood donation, its processing, storage, issuance & whole blood/component transfusion & biomedical waste management.
3. Drugs used in Blood Transfusion & BLS.
4. Community involvement in transfusion..

## SECOND YEAR

### PRACTICAL ( classes:9 AM to 12 Noon)

Practical exams syllabus should cover-

- Hands on training for Screening of Donor.
- Hands on training for Safe collection of blood from donor.
- Hands on training for Cross matching.
- Hands on training for Storage of blood.
- Hands on training for Serological tests done.
- Hands on Components preparation.
- Hands on training for Quality control in blood bank.
- Hands on training for Sterilization & aseptic technics & practices used in blood bank.
- Hands on training for record maintaining for donation, issue of blood.
- Hands on training for Transfusion reactions & their management.
- Hands on training for Safe disposal of discarded blood/blood product (Biomedical waste management).

## ELIGIBILITY CRITERIA FOR ADMISSION & DURATION OF THE COURSE

### COURSE DURATION:-

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

### ELIGIBILITY:-

- Candidate must have passed 12<sup>th</sup> 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 31<sup>st</sup> 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>
<b><u>First Paper Theory</u></b>	<p>1.General Anatomy &amp; Physiology (Cytology, Histology, Osteology and only basics of all organ systems of body except haematological system).</p> <p>2.Only basics of relevant Pathology, Pharmacology &amp; Microbiology.</p>	75	25	100	50	3 Hours
<b><u>Second Paper Theory</u></b>	<p>1.Detailed Anatomy, Physiology &amp; Pathology of haematological/ system.</p> <p>2.Details of Equipment management &amp; chemicals used in blood bank.</p> <p>3.Hand hygiene &amp; prevention of cross infection.</p> <p>4.Basic life support (BLS) &amp; Cardio-pulmonary resuscitation (CPR).</p>	75	25	100	50	3 Hours
<b><u>Practical</u></b>	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>	<p>1. Only relevant surgical &amp; medical conditions.</p> <p>2. Nursing Procedures like vital recording, IM/IV/SC injection, Oxygen therapy, Nebulization, IV infusion.</p> <p>3. Common lab tests &amp; serology related to blood transfusion.</p>	75	25	100	50	3 Hours
<u>Second Paper Theory</u>	<p>1. Details of diseases of haematology.</p> <p>2. Details of blood donation, its processing, storage, issuance &amp; whole blood/component transfusion &amp; biomedical waste management.</p> <p>3. Drugs used in Blood Transfusion &amp; BLS.</p> <p>4. Community involvement in transfusion.</p>	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
<hr/>	
Total Holidays	- 105 days
<hr/>	

• **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)

<b><u>First Paper Theory</u></b>	1.General Anatomy & Physiology (Cytology, Histology, Osteology and only basics of all organ systems of body except haematological system).	160 Hrs
	2.Only basics of relevant Pathology, Pharmacology & Microbiology.	150 Hrs
<b><u>Second Paper Theory</u></b>	1.Detailed Anatomy, Physiology & Pathology of Haematological/ system.	100Hrs
	2.Details of Equipment management & chemicals used in blood bank.	230 Hrs
	3.Hand hygiene & prevention of cross infection.	30 Hrs
	4.Basic life support (BLS) & Cardio-pulmonary resuscitation (CPR).	40 Hrs
<b><u>Third Paper Practical</u></b>	As described in curriculum	780 Hrs
<b><u>Theory: Other Subjects</u></b> (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)**

<b><u>First Paper Theory</u></b>	1. Only relevant surgical & medical conditions.	130 Hrs
	2. Nursing Procedures like vital recording, IM/IV/SC injection, Oxygen therapy, Nebulization, IV infusion.	20 Hrs
	3. Common lab tests & serology related to blood transfusion.	60 Hrs
<b><u>Second Paper Theory</u></b>	1. Details of diseases of haematology.	150 Hrs
	2. Details of blood donation, its processing, storage, issuance & whole blood/component transfusion & biomedical waste management.	300 Hrs
	3. Drugs used in Blood Transfusion & BLS.	60 Hrs
	4. Community involvement in transfusion.	60 Hrs
<b><u>Third Paper Practical</u></b>	As described in curriculum	780 Hrs

## Details of Curriculum for First Year Diploma in Blood Transfusion Technician

PAPER 1st Theory	Topics	Hours.
<b>1.General Anatomy &amp; Physiology (Cytology, Histology, Osteology and only basics of all organ systems of body except haematological system).</b>	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.	06 Hrs
	2. Structure of Animal cell, Cell organelles & their functions.	06 Hrs
	3. Human tissue, types, structure & functions.	15 Hrs
	4. Osteology: Names, location, identification of all bones.	10 Hrs
	5. Skin & appendages.	02 Hrs
	6. GIT: : Location, Gross structure, various parts & their functions. (Microscopic structure is not required.)	20 Hrs
	7. Respiratory tract: Location, Gross structure, various parts & their functions. (Microscopic structure is not required.)	15 Hrs
	8. Urinary tract: Gross structure, various parts & their functions. (Microscopic structure is not required.)	05 Hrs
	9. Male reproductive system: Only gross structure & functions of different parts. (Microscopic structure is not required.)	05 Hrs
	10. Female reproductive system: Only gross structure & functions of different parts. (Microscopic structure is not required.)	05 Hrs
	11. 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
	12. Gross structure of brain & spinal cord. Functions of different parts of brain & spinal cord.(Details not required.)	10 Hrs
	13. Gross structure & functions of sensory Organs - Eye, Ear, Nose, Tongue.(Details not required).	10 Hrs
	14. Basic gross structure of heart, vessels opening into heart & Leaving the heart. Arterial & Venous tree of body.	10 Hrs
	15. Lymphatic system: Structure & Functions.	05 Hrs
	16. Immune system: Components & various mechanisms of defense.	15 Hrs

## Details of Curriculum for First Year Diploma in Blood Transfusion Technician

PAPER 1st Theory	Topics	Hours.
<b>2. Only basics of relevant Pathology, Pharmacology &amp; Microbiology.</b>	1. Basic steps of Acute & chronic inflammation.	03 Hrs
	2. Basics of Necrosis & apoptosis.	03 Hrs
	3. Basics of Shock.	03 Hrs
	4. Modes of disease transmission & prevention of infection.	05 Hrs
	5. Sterilization & methods of sterilization used in hospitals.	20 Hrs
	6. Basic idea about types of Bacteria, Virus, Fungi.	20 Hrs
	7. Routes of drug administration.	02 Hrs
	8. Adverse effects & side effects of drugs.	02 Hrs
	9. Basic idea of Analgesics : Opioid & NSAIDs.	02 Hrs
	10. Basic idea of Drugs use in Cough & expectoration.	01 Hrs
	11. Basic idea of Drugs used in B. asthma & COPD.	02 Hrs
	12. Basic idea of Drugs used in GIT.	08 Hrs
	13. Basic idea of Anti Microbials.	20 Hrs
	14. Basic idea of Anti H-1 Histaminics & Corticosteroids.	04 Hrs
	15. Drugs used in Haematological system.	25 Hrs

## Details of Curriculum for First Year Diploma in Blood Transfusion Technician

PAPER 2nd Theory	Topics	Hours.
<b>1.Detailed Anatomy, Physiology &amp; Pathology of Haematological/ system.</b>	1. Composition of blood, functions of blood.	05 Hrs
	2. Plasma : Details of Composition, Details of Plasma proteins.	10 Hrs
	3. RBCs & Hb : Detailed structure & functions.	10 Hrs
	4. WBCs : TLC,DLC, detailed structure & functions.	10 Hrs
	5. Platelets : Detailed structure & functions.	05 Hrs
	6. Details of Hemostasis : bleeding & Coagulation.	10 Hrs
	7. Internal structure (Histology) of artery, vein & capillaries.	05 Hrs
	8. Various Hypes of blood groups,details of ABO & Rh blood groups & applied aspects related to blood grouping.	10 Hrs
	9. Basic pathology of anaemia : Micro/Macrocytic, Hypo/Normochromic, Hemolytic etc.	10 Hrs
	10. Basic pathology of Polycythemia .	03 Hrs
	11. Basic pathology of Leucocytosis, leucopenia, Basic idea of leukaemia & lymphoma.	07 Hrs
	12. Basic pathology of Thrombocytopenia.	03 Hrs
	13. Basic pathology of bleeding and coagulation disorders.	12 Hrs

## Details of Curriculum for First Year Diploma in Blood Transfusion Technician

PAPER 2nd Theory	Topics	Hours.
<b>2.Details of Equipment management &amp; chemicals used in blood bank</b>	1. <u>Related to screening of patient</u> : Weighing machine, Stethoscope, Sphygmomanometer, Hb count machine.	10 Hrs
	2. <u>Related to Donation area</u> : Blood collection monitor, bag, tubesealer , kit, Needle destroyer.	30 Hrs
	3. <u>Related to Cross match area</u> :Centrifuge, Rh viewbox, Incubator, Microscope..	20 Hrs
	4. <u>Storage Unit (untested)</u> :- Deep freezer (-70° to 80° C), BB refrigerator (2°-6° C).	10 Hrs
	5. <u>Storage Unit</u> :- Platelet incubator & agitator, Deep freezer (-30° to -40° C), BB refrigerator (2°C to 6°C).	10 Hrs
	6. <u>Sterilization &amp; auto claving area</u> :- Autoclave, Hot air overs.	20 Hrs
	7. <u>Quality Control area</u> :- Laminar air flow.	10 Hrs
	8. <u>Component preparation area</u> :- BB centrifuge, Plasma expressor, Plasma thawing bath, Apheresis machine.	50 Hrs
	9. <u>Serology area</u> :- ELISA reader, ELISA washer & incubator, ELISA printer.	40 Hrs
	10. Chemicals related to blood donation, and storage.	30 Hrs.

**Details of Curriculum for First Year  
Diploma in Blood Transfusion Technician**

<b>PAPER 2nd Theory</b>	<b>Topics</b>	<b>Hours.</b>
<b>3.Hand hygiene &amp; prevention of cross infection.</b>	1. Hand hygiene & method of Hand washing.	15 Hrs
	2. Prevention of cross infection.	15 Hrs

<b>PAPER 2nd Theory</b>	<b>Topics</b>	<b>Hours.</b>
<b>4.Basic life support (BLS) &amp; Cardio-pulmonary resuscitation (CPR).</b>	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 Blood Transfusion Technician**

	Topics
	<b>Practical</b>
	1. Screening of Donor.
	2. Safe collection of blood from donor.
	3. Cross matching.
	4. Storage of blood.
	5. Serological tests done.
	6. Components preparation.
	7. Quality control in blood bank.
	8. Sterilization & aseptic technics & practices used in blood bank.
	9. record maintaining for donation, issue of blood.
	10. Transfusion reactions & their management.
	11. Safe disposal of discarded blood/blood product (Biomedical waste management).
	12. BLS and CPR.

## Details of Curriculum for Second Year Diploma in Blood Transfusion Technician

PAPER 1st Theory	Topics	Hours.
<b>1.Only relevant surgical &amp; medical conditions.</b>	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.	02 Hrs
	4. Diabetes mellitus :- Def, Causes, Pathology, Clinical features, Investigation & Management.	05 Hrs
	5. <u>Respiratory Tract</u> :- Pneumonia, Tuberculosis, B. asthma, COPD, Bronchiectasis, Collapse of lung, Pneumonitis, Pleural effusion, Pneumothorax, Empyema thoracis, Cancer lung.	20 Hrs
	6. <u>Diseases of GIT &amp; Liver &amp; GB</u> :-Reflux Oesophagitis, Peptic ulcers, Gastritis, Intestinal Obstruction, Hepatitis, Cirrhosis of liver, Cholecystitis.	15 Hrs
	7. <u>Diseases of Nervous system</u> :- Stroke, Meningo-encephalitis, Glasgow coma scale, Epilepsy, Head Injury.	20 Hrs
	8. <u>Diseases of Urinary tract</u> :- Urolithiasis, Benign prostatic hyperplasia.	08 Hrs
	9. <u>Endocrine system</u> :- Diabetes mellitus, hypo & Hyper thyroidism.	05 Hrs
	10. <u>Miscellaneous</u> :- Hypo & Hyper Natraemia, Hypo & Hyper Kalaemia, Hypo & Hyper Calcaemia.	05 Hrs
	11. <u>Infections diseases</u> :- TB, Typhoid, Malaria, Dengue fever, Leprosy, AIDS, Amoebiasis.	30 Hrs

## Details of Curriculum for Second Year Diploma in Blood Transfusion Technician

PAPER 1st Theory	Topics	Hours.
<b>2.Nursing Procedures like vital recording, IM/IV/SC injection, Oxygen therapy, Nebulization, IV infusion.</b>	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

PAPER 1st Theory	Topics	Hours.
<b>3.Common lab tests &amp; serology related to blood transfusion.</b>	1.Details of techniques of Common lab tests & serology related to blood transfusion.	20 Hrs

## Details of Curriculum for Second Year Diploma in Blood Transfusion Technician

PAPER 2nd Theory	Topics	Hours.
<b>1.Details of diseases of haematology.</b>	1. Anaemia :- Definition, Types, Causes, Clinical features & management.	20 Hrs
	2. Polycythemia :- Definition, Types, Causes, Clinical features & management.	05 Hrs
	3. Various types of leucocytosis :- Definition, Types, Causes, Clinical features & management.	15 Hrs
	4. Various types of leucopenia :-Definition, Types, Causes, Clinical features & management.	10 Hrs
	5. Basic of Platelet disorders :- Definition, Types, Causes, Clinical features & management.	10 Hrs
	6. Basic of Disorders of Bleeding & Coagulation system :- Definition, Types, Causes, Clinical features & management.	20 Hrs
	7. Basic of leukaemia :- Definition, Types, Causes, Clinical features & management.	10 Hrs
	8. Common Blood borne diseases :-AIDS, Hepatitis B, Hepatitis C,Malaria, Syphilis, & Others.	30 Hrs
	9. Details of transfusion reactions & its management.	30 Hrs

**Details of Curriculum for Second Year  
Diploma in Blood Transfusion Technician**

<b>PAPER 2nd Theory</b>	<b>Topics</b>	<b>Hours.</b>
<b>2.Details of blood donation, its processing, storage, issuance &amp; whole blood/component transfusion biomedical waste management.</b>	1. Details of Screening of Donor.	20 Hrs
	2. Details of Safe collection of blood from donor.	30 Hrs
	3. Details of Cross matching.	10 Hrs
	4. Details of Storage of blood.	30 Hrs
	5. Details of Serological tests done.	30 Hrs
	6. Details of Components preparation.	50 Hrs
	7. Details of Quality control in blood bank.	30 Hrs
	8. Details of Sterilization & aseptic technics & practices used in blood bank.	30 Hrs
	9. Details of record maintaining for donation, issue of blood.	10 Hrs
	10. Details of Transfusion reactions & their management.	30 Hrs
	11. Details of Safe disposal of discarded blood/blood product (Biomedical waste management).	30 Hrs

**Details of Curriculum for Second Year  
Diploma in Blood Transfusion Technician**

PAPER 2nd Theory	Topics	Hours.
<b>3. Drugs used in Blood Transfusion &amp; BLS.</b>	1. Details of Drugs/Chemicals used in Blood Bank.	40 Hrs
	2. Use of Adrenaline/ Nor-adrenaline, Dopamine/ Dobutamine, Atropine, Anti arrhythmic drugs.	10 Hrs
	3. Use of DC shock & Use of Defibrillator.	10 Hrs

PAPER 2nd Theory	Topics	Hours.
<b>4. Community involvement in transfusion.</b>	1. Details of Community involvement in transfusion e.g. motivation of community etc.	60 Hrs

Curriculum  
for  
Practical :- Second Year  
Diploma in Blood Transfusion Technician

	Topics
<b>Practical</b>	1. Hands on training for Screening of Donor.
	2. Hands on training for Safe collection of blood from donor.
	3. Hands on training for Cross matching.
	4. Hands on training for Storage of blood.
	5. Hands on training for Serological tests done.
	6. Hands on Components preparation.
	7. Hands on training for Quality control in blood bank.
	8. Hands on training for Sterilization & aseptic technics & practices used in blood bank.
	9. Hands on training for record maintaining for donation, issue of blood.
	10. Hands on training for Transfusion reactions & their management.
	11. Hands on training for Safe disposal of discarded blood/blood product (Biomedical waste management).

**Syllabus and Curriculum  
of  
Diploma in Emergency and Trauma Care  
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 **Emergency and Trauma Care technician** who –

- Can handle all types of medical & surgical emergencies as assistant to the doctor.
- Can give first aid or primary treatment in emergency & trauma cases.
- Is well aware of concepts of “Golden hours”, “Stay & play”, “Scoop & run”.
- Can very well perform CPR.
- Can transport patients safely to hospital.
- Can safely use emergency drugs.

## Diploma in Emergency and Trauma Care Technician course

### FIRST YEAR

Paper	Name of Paper	Internal	External	Total
<b>Theory First Paper</b>	Anatomy, Physiology, Pathology, Microbiology & Pharmacology.	<b>25</b>	<b>75</b>	<b>100</b>
<b>Theory Second Paper</b>	Basic skills for ETCT technicians.	<b>25</b>	<b>75</b>	<b>100</b>
<b>Practical</b>		<b>25</b>	<b>75</b>	<b>100</b>

### SECOND YEAR

Paper	Name of Paper	Internal	External	Total
<b>Theory First Paper</b>	Relevant medical & surgical diseases.	<b>25</b>	<b>75</b>	<b>100</b>
<b>Theory Second Paper</b>	Details of techniques used by ETCT technician.	<b>25</b>	<b>75</b>	<b>100</b>
<b>Practical</b>		<b>25</b>	<b>75</b>	<b>100</b>

**Outline of Curriculum  
of  
Diploma in Emergency and Trauma Care  
Technician course**

**FIRST YEAR**

**THEORY ( Classes: 9 AM to 12 Noon)**

**First paper : Syllabus covers -**

1. General Anatomy & Physiology (Cytology, Histology, Osteology and only basics of all organ systems of body).
2. Only basics of relevant Pathology, Pharmacology & Microbiology.

**Second paper : Syllabus covers -**

1. Detailed Osteology of human body.
2. Vital recording, first aid, bandaging & triage.
3. Hand hygiene & prevention of cross infection.
4. Basics 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 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 Emergency and Trauma Care  
Technician course**

**SECOND YEAR**

**THEORY ( classes:9 AM to 12 Noon)**

**First paper : Syllabus covers -**

1. Only relevant surgical & medical conditions (relevant to ETCT technician).
2. Basic Nursing Procedures like vital recording, IM/IV/SC injection, Oxygen therapy, Nebulization,, catheterisation, IV infusion, Ryle's tubing.

**Second paper : Syllabus covers -**

1. Various procedures done in emergency & critical units & drugs used.
2. Basics of CSSD & sterilization practices, biomedical waste management.
3. Basic biomedical engineering physics of equipment & instruments used in emergency & critical care.

## SECOND YEAR

### PRACTICAL ( classes:9 AM to 12 Noon)

Practical exams syllabus should cover-

- Hands on training of C-A-B of trauma.
- Hands on training of safe transportation of various types of emergency patients.
- Hands on training of care of a comatose patients.
- Hands on training of Various types of first aid & bandaging.
- Hands on training of Nebulization, Catheterization, O<sub>2</sub> inhalation, Nasogastric intubation, Glucometer.
- Hands on training of Dressing & help in suturing.
- Hands on training of assisting Oro-pharyngeal intubation.
- Hands on training of assisting CVP line insertion.
- Hands on training of assisting Tracheostomy.
- Hands on training of dealing with various emergencies.
- Hands on training of documentation and consents etc.

## ELIGIBILITY CRITERIA FOR ADMISSION & DURATION OF THE COURSE

### COURSE DURATION:-

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

### ELIGIBILITY:-

- Candidate must have passed 12<sup>th</sup> 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 31<sup>st</sup> 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 &amp; Physiology (Cytology, Histology, Osteology and only basics of all organ systems of body).</p> <p>2.Only basics of relevant Pathology, Pharmacology &amp; Microbiology.</p>	75	25	100	50	3 Hours
<u>Second Paper Theory</u>	<p>1. Detailed Osteology of human body.</p> <p>2.Vital recording, first aid, bandaging &amp; triage.</p> <p>3.Hand hygiene &amp; prevention of cross infection.</p> <p>4.Basics life support (BLS) &amp; 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>	<p>1. Only relevant surgical &amp; medical conditions (relevant to OT technician).</p> <p>2. Basic Nursing Procedures like vital recording, IM/IV/SC injection, Oxygen therapy, Nebulization,, catheterisation, IV infusion, Ryle's tubing.</p>	75	25	100	50	3 Hours
<u>Second Paper Theory</u>	<p>1. Various procedures done in emergency &amp; critical units &amp; drugs used.</p> <p>2. Basics of CSSD &amp; sterilization practices, biomedical waste management.</p> <p>3. Basic biomedical engineering physics of equipment &amp; instruments used in emergency &amp; critical care.</p>	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
<hr/>	
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)

<b><u>First Paper Theory</u></b>	1. General Anatomy & Physiology (Cytology, Histology, Osteology and only basics of all organ systems of body).	250 Hrs
	2. Only basics of relevant Pathology, Pharmacology & Microbiology.	140 Hrs
<b><u>Second Paper Theory</u></b>	1. Detailed Osteology of human body.	40 Hrs
	2. Vital recording, first aid, bandaging & triage.	230 Hrs
	3. Hand hygiene & prevention of cross infection.	10 Hrs
	4. Basics life support (BLS) & Cardio-pulmonary resuscitation (CPR).	40 Hrs
<b><u>Third Paper Practical</u></b>	As described in curriculum	780 Hrs
<b><u>Theory: Other Subjects</u></b> (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)**

<b><u>First Paper Theory</u></b>	1. Only relevant surgical & medical conditions (relevant to ETCT technician).	450Hrs
	2. Basic Nursing Procedures like vital recording, IM/IV/SC injection, Oxygen therapy, Nebulization,, catheterisation, IV infusion, Ryle's tubing.	20 Hrs
<b><u>Second Paper Theory</u></b>	1. Various procedures done in emergency & critical units & drugs used.	230 Hrs
	2. Basics of CSSD & sterilization practices, biomedical waste management.	20 Hrs
	3. Basic biomedical engineering physics of equipment & instruments used in emergency & critical care.	60 Hrs
<b><u>Third Paper Practical</u></b>	As described in curriculum	780 Hrs

**Details of Curriculum for First Year  
Diploma in Emergency and Trauma Care Technician**

<b>PAPER 1st Theory</b>	<b>Topics</b>	<b>Hours.</b>
<b>1.General Anatomy &amp; Physiology (Cytology, Histology, Osteology and only basics of all organ systems of body).</b>	<b>1. General Orientation about parts of human body. Various terms used in Anatomy. Total numbers of bones, their names &amp; location. Basic idea about organization of body ,from cell to organ systems.</b>	06 Hrs
	<b>2. Structure of Animal cell, Cell organelles &amp; their functions</b>	06 Hrs
	<b>3. Human tissue, types, structure &amp; functions.</b>	10 Hrs
	<b>4. Osteology: Names, location, identification and basic details of all bones. (Details of skull bones is not required).</b>	20 Hrs
	<b>5. Joints: types, basic structure &amp; examples.</b>	06 Hrs
	<b>6. Skin &amp; appendages.</b>	02 Hrs
	<b>7. GIT: : Location, Gross structure, various parts &amp; their functions. Details of process of food ingestion, digestion, absorption &amp; defaecation. (Microscopic structure is not required.)</b>	10 Hrs
	<b>8. Respiratory tract: Location, Gross structure, various parts &amp; their functions. Details of breathing mechanism, different respiratory volumes. (Microscopic structure is not required.)</b>	30 Hrs
	<b>9. Urinary tract: Gross structure, various parts &amp; their functions. (Microscopic structure is not required.) Process of urine formation &amp; voiding.</b>	20 Hrs
	<b>10. Male reproductive system: Only gross structure &amp; functions of different parts. (Microscopic structure is not required.)</b>	10 Hrs
	<b>11. Female reproductive system: Only gross structure &amp; functions of different parts. (Microscopic structure is not required.) Menstrual cycle.</b>	10 Hrs

**Details of Curriculum for First Year  
Diploma in Emergency and Trauma Care Technician**

<b>PAPER 1st Theory</b>	<b>Topics</b>	<b>Hours.</b>
<b>1.General Anatomy &amp; Physiology (Cytology, Histology, Osteology and only basics of all organ systems of body).</b>	<b>12. Endocrine system: Hormones secreted by Pituitary, Thyroid, Parathyroid, Pancreas, Adrenal cortex, Adrenal medulla, Gonads &amp; functions of different hormones. (Details of structure of these glands not required).</b>	<b>10 Hrs</b>
	<b>13. Gross structure of brain &amp; spinal cord. Functions of different parts of brain &amp; spinal cord.(Details not required.)</b>	<b>10 Hrs</b>
	<b>14. Blood: Composition &amp; Functions. Details about Plasma, RBCs, WBCs, Platelets, Clotting system.</b>	<b>10 Hrs</b>
	<b>15. Gross structure &amp; functions of sensory Organs - Eye, Ear, Nose, Tongue.(Details not required).</b>	<b>20 Hrs</b>
	<b>16. Basic gross structure of heart, vessels opening into heart &amp; Leaving the heart. Arterial &amp; Venous tree of body.</b>	<b>20 Hrs</b>
	<b>17. Lymphatic system: Structure &amp; Functions.</b>	<b>10 Hrs</b>
	<b>18. Inumune system: Components &amp; various mechanisms of defense.</b>	<b>10 Hrs</b>

**Details of Curriculum for First Year  
Diploma in Emergency and Trauma Care Technician**

<b>PAPER 1st Theory</b>	<b>Topics</b>	<b>Hours.</b>
<b>2. Only basics of relevant Pathology, Pharmacology &amp; Microbiology.</b>	1. Basic steps of Acute & chronic inflammation and Healing of wound.	05 Hrs
	2. Basics of Necrosis & apoptosis.	02 Hrs
	3. Basics of Shock.	02 Hrs
	4. Basics of Disorders of blood coagulation system.	08 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.	20 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.	03 Hrs
	15. Basic idea of Anti Microbials.	20 Hrs
	16. Basic idea of Anti H-1 Histaminics & Corticosteroids.	01 Hrs
	17. Drugs used in anaemia.	02 Hrs
	18. Anaesthetic agents(LA&GA).	10 Hrs
	19. Muscle relaxants.	05 Hrs
	20. Drugs used in emergency & critical care.	20 Hrs
	21. IV fluids.	10 Hrs



**Details of Curriculum for First Year  
Diploma in Emergency and Trauma Care Technician**

<b>PAPER 2nd Theory</b>	<b>Topics</b>	<b>Hours.</b>
<b>1.Detailed Osteology of human body.</b>	1. Skull bones.	10 Hrs
	2. Vertebral Column.	03 Hrs
	3. Ribs.	02 Hrs
	4. Sternum & hyoid.	01 Hrs
	5. Scapula	02 Hrs
	6. Humerus.	02 Hrs
	7. Radius	02 Hrs
	8. Ulna	02Hrs
	9. Carpals, metacarpals & phalanges.	03Hrs
	10. Hip bone.	03Hrs
	11. Femur.	02Hrs
	12. Patella	01Hrs
	13. Tibia	02Hrs
	14. Fibula	02Hrs
	15. Tarsals, metatarsals & phalanges	03Hrs

**Details of Curriculum for First Year  
Diploma in Emergency and Trauma Care Technician**

PAPER 2nd Theory	Topics	Hours.
<b>2. Vital recording, first aid, bandaging &amp; triage.</b>	1. Vitals recording :- Manual & with multipara monitors.	10 Hrs
	2. Concept of Golden hours and C-A-B.	05 Hrs
	3. Safe Transportation of patients of various types of trauma & emergencies.	35 Hrs
	4. How to record ECG.	15 Hrs
	5. Use of defibrillator.	5 Hrs
	6. First aid & Management of C/o Fractures.	25 Hrs
	7. First aid & Management of C/o Snake bite / insect bite.	05 Hrs
	8. First aid & Management of C/o Poisonings of different types.	15 Hrs
	9. First aid & Management of C/o bleeding (External).	10 Hrs
	10. First aid & Management of C/o bleeding (Internal).	05 Hrs
	11. First aid & Management of C/o Cardiac arrest/Angina / MI.	05 Hrs
	12. First aid & Management of C/o Stroke.	05 Hrs
	13. First aid & Management of C/o Epilepsy / Seizures.	05 Hrs
	14. First aid & Management of C/o Burn.	05 Hrs
	15. First aid & Management of C/o Electric Shock.	05 Hrs
	16. First aid & Management of C/o Asphyxia.	05 Hrs
	17. First aid & Management of C/o Heat stroke /frost bite.	05 Hrs
	18. First aid & Management of C/o Head injury.	05 Hrs
	19. Concept of TRIAGE.	10 Hrs
	20. Common types of bandaging.	50 Hrs

**Details of Curriculum for First Year  
Diploma in Emergency and Trauma Care Technician**

<b>PAPER 2nd Theory</b>	<b>Topics</b>	<b>Hours.</b>
<b>3.Hand hygiene &amp; prevention of cross infection.</b>	1. Hand hygiene & method of Hand washing.	05 Hrs
	2. Prevention of cross infection.	05 Hrs

<b>PAPER 2nd Theory</b>	<b>Topics</b>	<b>Hours.</b>
<b>4.Basic life support (BLS) &amp; Cardio-pulmonary resuscitation (CPR).</b>	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 Emergency and Trauma Care Technician**

	Topics
<b>Practical</b>	<b>Hands on training of:-</b>
	1. Vitals recording (Manual & with multipara monitors).
	2. Working as Nursing assistant.
	3. Safe transportation of various types of emergency patients.
	4. Nursing procedures like Nebulization Urinary Catheterization, Ryle's tube insertion.
	5. Observership for different types of first aid, bandaging & management.
	6. C-A-B in case of trauma and emergency.

**Details of Curriculum for Second Year  
Diploma in Emergency and Trauma Care Technician**

PAPER 1st Theory	Topics	Hours.
<b>1. Only relevant surgical &amp; medical conditions (relevant to ETCT technician).</b>	1. History taking. General examination of the patient. Filling Case-sheet. Common clinical words. Glas Gow coma scale.	15 Hrs
	2. Hypertension:- Def, Causes, Pathology, Clinical features, Investigation & Management.	05 Hrs
	3. Hypotension :- Def, Causes, Pathology, Clinical features, Investigation & Management.	02 Hrs
	4. Diabetes mellitus :- Def, Causes, Pathology, Clinical features, Investigation & Management.	05 Hrs
	5. <u>Diseases of blood</u> :- Anaemia, Basics of coagulation Bleeding disorders & Haemophilia.	10 Hrs
	6. <u>Respiratory Tract</u> :- Pneumonia, Tuberculosis, B. asthma, COPD, Bronchiectasis, Collapse of lung, Pneumonitis, Pleural effusion, Pneumothorax, Empyema thoracis, Cancer lung.	30 Hrs
	7. <u>Diseases of GIT &amp; Liver &amp; GB</u> :-Reflux Oesophagitis, Peptic ulcers, Gastritis, Intestinal Obstruction, Hepatitis, Cirrhosis of liver, Cholecystitis, appendicitis, Hernia, Piles, Fissure, Fistula, Pancreatitis, Pancreatic Cancer.	40 Hrs
	8. <u>Diseases of Nervous system</u> :- Stroke, Meningo-encephalitis, Glasgow coma scale, Epilepsy, Facial n. palsy.	30 Hrs
	9. <u>Diseases of Urinary tract</u> :- Urolithiasis, Benign prostatic hyperplasia, Hydrocoele, Cancer prostate, urethral stricture, Hypo & epi-spadias.	30 Hrs
	10. <u>Endocrine system</u> :- Diabetes mellitus, hypo & Hyper thyroidism.	10 Hrs
	11. <u>Miscellaneous</u> :- Hypo & Hyper Natraemia, Hypo & Hyper Kalaemia, Hypo & Hyper Calcaemia.	10 Hrs
	12. <u>Infections diseases</u> :- TB, Typhoid, Malaria, Dengue fever, Leprosy, AIDS, Amoebiasis.	30 Hrs

**Details of Curriculum for Second Year  
Diploma in Emergency and Trauma Care Technician**

PAPER 1st Theory	Topics	Hours.
<b>1.Only relevant surgical &amp; medical conditions (relevant to ETCT technician).</b>	13. Head injury & Intracranial bleed.	30 Hrs
	14. D's of G& O: Caesarian section, fibroid uterus, Cancer uterus, prolapse uterus, PID, Emergency delivery.	20 Hrs
	15. Basics about fracture & management.	50 Hrs
	16. PIVD,Potts spine.	10 Hrs
	17. Eye d's : Cataract, Glaucoma, chemical injuries.	15 Hrs
	18. ENT:. CSOM, ASOM, Laryngeal tumor, Nasal polyp, DNS.	15 Hrs
	19. Basic idea of Thoracic injury.	13 Hrs
	20. Basic idea of Blunt & penetration abdominal injuries.	20 Hrs
	21. Over all approach to & care of multi trauma patient.	20 Hrs
	22. Poisoning (Common ones)	30 Hrs
	23. Hanging and strangulation.	
	24. Documentation aspects in case of emergency patients.	10 Hrs

**Details of Curriculum for Second Year  
Diploma in Emergency and Trauma Care Technician**

PAPER 1st Theory	Topics	Hours.
<b>2. Basic Nursing Procedures like vital recording, IM/IV/SC injection, Oxygen therapy, Nebulization,, catheterisation, IV infusion, Ryle's tubing.</b>	1. Temperature monitoring & Fever.	02 Hrs
	2. Pulse monitoring.	01 Hr
	3. BP monitoring.	01 Hr
	4. Respiration monitoring.	01 Hr
	5. Types of Injection routes.	01 Hr
	6. IM Injection.	01 Hr
	7. IV Injection.	01Hr
	8. SC Injection.	01 Hr
	9. Oxygen Therapy.	03 Hrs
	10. Nebulization	01 Hr
	11. IV Infusion (Also with infusion pump).	01 Hr
	12. Care of Unconscious patient.	02 Hrs
	13. Urinary Catheterization.	03 Hrs
	14. Nasogastric Intubation.	03 Hrs

**Details of Curriculum for Second Year  
Diploma in Emergency and Trauma Care Technician**

PAPER 2nd Theory	Topics	Hours.
<b>1. Various procedures done in emergency &amp; critical units &amp; drugs used.</b>	1. C-A-B in case of trauma/emergency.	40 Hrs
	2. Transport & shifting of patient.	30 Hrs
	3. Use of multipara-monitors, ECG machine, Glucometers.	20 Hrs
	4. Care of an unconscious patient	20 Hrs
	5. Thoracocentesis.	10 Hr
	6. Abdominal tapping.	10 Hrs
	7. CVP line insertion.	10 Hrs
	8. Oropharyngeal intubation.	10 Hrs
	9. Tracheostomy.	10 Hrs
	10. Oxygen therapy: Tools and technics.	15 Hrs
	11. Use of Bag & mask ventilltion.	05 Hrs
	12. Use of Bi-PAP, C-PAP.	10 Hrs
	13. Use of ventillators.	10 Hrs
	14. Use of Defibrillator.	03 Hrs
	15. Common instruments(sutures and needles) used in stitching.	05 Hrs
	16. Sponging of patient.	02 Hrs
	17. Use of air/water mattress.	05 Hrs
	18. Lumbar puncture.	05 Hrs
	19. Various types of record keeping/consents etc.	10 Hrs



**Details of Curriculum for Second Year  
Diploma in Emergency and Trauma Care Technician**

<b>PAPER 2nd Theory</b>	<b>Topics</b>	<b>Hours.</b>
<b>2. Basics of CSSD &amp; sterilization practices, biomedical waste management.</b>	1. Various methods of Sterilization.	10 Hrs
	2. Aseptic practices.	05 Hrs
	3. Basics of Bio-medical waste management.	05 Hrs

<b>PAPER 2nd Theory</b>	<b>Topics</b>	<b>Hours.</b>
<b>3. Basic biomedical engineering physics of equipment &amp; instruments used in emergency &amp; critical care.</b>	1. Multipara monitors.	05 Hrs
	2. Ventilators.	05 Hrs
	3. Bi-PAP, C-PAP	05 Hrs
	4. Infusion pump	05 Hrs
	5. Nebulizers.	03 Hrs
	6. Dialysis machine	07 Hrs
	7. Pulse Oxymeter	03 Hrs
	8. Cardiac monitor	02 Hrs
	9. Defibrillator	05 Hrs
	10. Glucometer	03 Hrs
	11. Oxygen concentrator	07 Hrs
	12. Medical Gas supply	10 Hrs

**Curriculum  
for  
Practical :- Second Year  
Diploma in Emergency and Trauma Care Technician**

	Topics
<b>Practical</b>	1. Hands on training of C-A-B of trauma.
	2. Hands on training of safe transportation of various types of emergency patients.
	3. Hands on training of care of a comatose patients.
	4. Hands on training of Various types of first aid & bandaging.
	5. Hands on training of Nebulization, Catheterization, O <sub>2</sub> inhalation, Nasogastric intubation, Glucometer.
	6. Hands on training of Dressing & help in suturing.
	7. Hands on training of assisting Oro-pharyngeal intubation.
	8. Hands on training of assisting CVP line insertion.
	9. Hands on training of assisting Tracheostomy.
	10. Hands on training of dealing with various emergencies.
	11. Hands on training of documentation and consents etc.

**Syllabus and Curriculum  
of  
Diploma in Sanitation 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 Sanitary Technician who Is well trained for –

- General sanitation.
- Minor Sanitary engineering.
- Preventive aspects related to public health.

## Diploma in Sanitation course

### FIRST YEAR

Paper	Name of Paper	Internal	External	Total
<b>Theory First Paper</b>	General Anatomy & Pathology.	25	75	100
<b>Theory Second Paper</b>	General Sanitation.	25	75	100
<b>Theory Third Paper</b>	Minor sanitary engineering.	25	75	100
<b>Theory Forth Paper</b>	Preventive medicine & Public health administration.	25	75	100
<b>Practical</b>		25	75	100

# Outline of Curriculum of Diploma in Sanitation course

## FIRST YEAR

### THEORY ( Classes: 9 AM to 12 Noon)

(Total 4 papers)

#### First paper : Syllabus covers –Anatomy and Physiology

1. General Anatomy & Physiology (Cytology, Histology, Osteology and only basics of all organ systems of body).

#### Second paper : General Sanitation

1. Climatology.
2. Nutrition.
3. Entomology.
4. Disinfection and disinfestations.
5. Hygiene inspection.
6. Hygiene of movement.
7. Personal hygiene and snake bite and its first aid.

#### Third paper : Minor sanitary engineering

1. Water supply
2. Disposal of waste products
3. Disposal of non-excremental refuse
4. Ventilation, lighting and heating

## FIRST YEAR

### THEORY ( Classes: 9 AM to 12 Noon)

#### **Forth paper : Preventive medicine and public health administration**

1. Communicable diseases.
2. Non-communicable diseases and conditions.
3. Contact diseases.
4. Mental health.
5. Occupational health.
6. Insect borne diseases and animal borne diseases.
7. Immunology.
8. Health education.
9. Vital statistics.
10. Elementary bacteriology.
11. Family planning.
12. Rural or village sanitation, fair & festivals.

### PRACTICAL ( Classes: 1 PM to 4 PM)

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

Students must present in the field / Lab for practicals.

#### **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.



## ELIGIBILITY CRITERIA FOR ADMISSION & DURATION OF THE COURSE

### **COURSE DURATION:-**

- It is 1 year. **full time** Diploma Course.

### **ELIGIBILITY:-**

- Candidate must have passed 12<sup>th</sup> 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 31<sup>st</sup> 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>	General Anatomy & Physiology (Cytology, Histology, Osteology and only basics of all organ systems of body).	75	25	100	50	3 Hours
<u>Second Paper Theory</u>	General Sanitation.	75	25	100	50	3 Hours
<u>Third paper Theory</u>	Minor sanitary engineering.	75	25	100	50	3 Hours
<u>Forth paper Theory</u>	Preventive medicine and public health administration.	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
<hr/>	
Total Holidays	- 105 days
<hr/>	

- **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>1st Paper</u> <u>Theory</u>  General Anatomy & Physiology (Cytology, Histology, Osteology and only basics of all organ systems of body).	1.General Anatomy & Physiology (Cytology, Histology, Osteology and only basics of all organ systems of body).	100 Hrs
<u>2nd Paper</u> <u>Theory</u>  General Sanitation.	1.Climatology. 2.Nutrition. 3.Entomology. 4.Disinfection and disinfestations. 5.Hygiene inspection. 6.Hygiene of movement. 7.Personal hygiene and snake bite and its first aid.	210 Hrs
<u>3rd Paper</u> <u>Theory</u>  Minor sanitary engineering.	1.Water supply. 2.Disposal of waste products. 3.Disposal of non-excremental refuse. 4.Ventilation, lighting and heating.	200 Hrs
<u>4th paper</u> <u>Theory</u>  Preventive medicine and public health administration.	1.Communicable diseases. 2.Non-communicable diseases and conditions. 3.Contact diseases. 4.Mental health. 5.Occupational health. 6.Insect borne diseases and animal borne diseases. 7.Immunology. 8.Health education. 9.Vital statistics. 10.Elementary bacteriology. 11.Family planning. 12.Rural or village sanitation, fair & festivals.	200 Hrs
<u>5th Paper Practical</u>	As described in curriculum	780 Hrs
<u>Theory:</u> <u>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

**Details of Curriculum for First Year  
Diploma in Sanitation Technician**

<b>PAPER 1st Theory</b>	<b>Topics</b>	<b>Hours.</b>
<b>1.General Anatomy &amp; Physiology (Cytology, Histology, Osteology and only basics of all organ systems of body).</b>	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.	05 Hrs
	2. Structure of Animal cell. Cell organelles & their functions .	02 Hrs
	3. Human tissue, types, structure & functions.	05 Hrs
	4. Osteology: Names, location, identification and basic details of all bones.	05 Hrs
	5. Skin & appendages.	02 Hrs
	6. GIT: : Location, Gross structure, various parts & their functions. Details of process of food ingestion, digestion, absorption & defaecation. (Microscopic structure is not required.)	10 Hrs
	7. Respiratory tract: Location, Gross structure. various parts & their functions. Details of breathing mechanism, different respiratory volumes. (Microscopic structure is not required.)	10 Hrs
	8. Urinary tract: Gross structure, various parts & their functions. (Microscopic structure is not required.) Process of urine formation & voiding.	05 Hrs
	9. Male reproductive system: Only gross structure & functions of different parts. (Microscopic structure is not required.)	03 Hrs
	10. Female reproductive system: Only gross structure & functions of different parts. (Microscopic structure is not required.) Menstrual cycl.	03 Hrs

**Details of Curriculum for First Year  
Diploma in Sanitation Technician**

<b>PAPER 1st Theory</b>	<b>Topics</b>	<b>Hours.</b>
<b>1.General Anatomy &amp; Physiology (Cytology, Histology, Osteology and only basics of all organ systems of body).</b>	<b>11. Endocrine system: Hormones secreted by Pituitary, Thyroid, Parathyroid, Pancreas, Adrenal cortex, Adrenal medulla, Gonads &amp; functions of different hormones. (Details of structure of these glands not required).</b>	10 Hrs
	<b>12. Gross structure of brain &amp; spinal cord. Functions of different parts of brain &amp; spinal cord.(Details not required.)</b>	10 Hrs
	<b>13. Blood: Composition &amp; Functions. Details about Plasma. RBCs, WBCs, Platelets. Clotting system.</b>	10 Hrs
	<b>14. Gross structure &amp; functions of sensory Organs - Eye, Ear, Nose, Tongue.(Details not required).</b>	05 Hrs
	<b>15. Basic gross structure of heart, vessels opening into heart &amp; Leaving the heart. Arterial &amp; Venous tree of body.</b>	05 Hrs
	<b>16. Lymphatic system: Structure &amp; Functions.</b>	05 Hrs
	<b>17. Inumune system: Components &amp; various mechanisms of defense.</b>	05 Hrs

**Details of Curriculum for First Year  
Diploma in Sanitation Technician**

PAPER 2nd Theory General Sanitation.	Topics	Hours.
<b>1.Climatology.</b>	1.Causes of environmental Diseases & effect of climate on health.	02 Hrs
	2.Effects of Heat & Prevention.	02 Hrs
	3.Effects of cold , High Altitude & Prevention.	02 Hrs
	4.Museum – climate section.	02 Hrs
	5.Meteorological instruments and their uses.	02 Hrs
	6..Elementary physiology of the digestive system.	02 Hrs
	7.Food constituents, function and requirements.	02 Hrs
	8.Balanced diet.	02 Hrs
	9.Museum- Food section.	02 Hrs
	10.Vitamins and deficiency diseases.	02 Hrs
<b>2.Nutrition.</b>	11.Malnutrition and its prevention.	02 Hrs
	12.Food adulteration and food adulteration act.	02 Hrs
	13.Inspection of food stuff, dry, fresh and tinned.	02 Hrs
	14.Storage, transportation and cooking of food.	02 Hrs
	15.Food poisoning- Investigation and control.	02 Hrs
	16.Hygiene inspection of Bakery .	02 Hrs
	17.Hygiene inspection of Butchery .	01 Hr
	18.Milk supplies and pasteurization of milk.	01 Hr
	19.Hygiene inspection of dairy farm.	01 Hr
	20.Visit to Dairy Farm,	-
	21.Taking of milk sample and analysis of milk.	02 Hrs
	22.Museum – Milk and food section.	-

**Details of Curriculum for First Year  
Diploma in Sanitation Technician**

<b>PAPER 2nd Theory General Sanitation.</b>	<b>Topics</b>	<b>Hours.</b>
<b>3.Entomology</b>	23.House fly life history ,habits and its relation to the spread of diseases.	02 Hrs
	24.Antifly measures – fly survey.	02 Hrs
	25.Museum study –fly section.	02 Hrs
	26. Ticks – Biomics , morphology ,diseases transmitted and control.	02 Hrs
	27.Rat flea– Biomics , morphology ,diseases transmitted and control..	02 Hrs
	28.Louse – Biomics , morphology ,diseases transmitted and control.	02 Hrs
	29.Sand fly – Biomics , morphology ,diseases transmitted and control.	02 Hrs
	30.Dimdam fly – Biomics , morphology ,diseases transmitted and control.	02 Hrs
	31.Trombicula mite ticks – Biomics , morphology ,diseases transmitted and control.	02 Hrs
	32.Bed bugs – Biomics , morphology ,diseases transmitted and control.	02 Hrs
	33.Leeches- life history and control.	02 Hrs
	34.Museum – Insect section.	-
	35.Field work – Sand fly survey.	-
	36.Delousing – (Lecture/Demonstration).	01 Hr
	37.De-bugging.	01 Hr



**Details of Curriculum for First Year  
Diploma in Sanitation Technician**

<b>PAPER 2nd Theory General Sanitation.</b>	<b>Topics</b>	<b>Hours.</b>
<b>3.Entomology</b>	38.Importance of Malaria.	02 Hrs
	39.Life cycle of Anopheline and Culicine mosquitoes.	01 Hr
	40.Differentiation of Anopheline and Culicine mosquitoes in all stages.	02 Hrs
	41.Habits of mosquitoes .	01 Hrs
	42.Museum mosquito section .	-
	43.Malaria parasites –life cycle , species and characteristics (Lecture/Demonstration) .	01 Hr
	45.Museum malaria parasites section.	-
	46.Dissection of adult mosquitoes.	-
	47.Field work- Adult mosquitoes collection.	-
	48.Preservation of collected specimens.	01 Hr
	49.Vectors of major importance in India.	01 Hr
	50.Malaria survey and spot map making .	01 Hr
	51.Field work - Malaria survey and spot map making .	-
	52.Malaria control in general.	01 Hr
	53.Suppressive treatment and anti malaria drugs.	01 Hr

## Details of Curriculum for First Year Diploma in Sanitation Technician

PAPER 2nd Theory General Sanitation.	Topics	Hours.
<b>3.Entomology</b>	54.Personal protective measures . camp siting and malaria curfew.	01 Hr
	55.Anti malarial discipline and orders regarding stores and .equipment	01 Hr
	56..Anti adult measures.	01 Hr
	57.DDT , BHC as insecticides and their formulation .	01 Hr
	58.Preparation of DDT solution /suspension.	01 Hr
	59.Spraying equipments , their working and maintenance.	-
	60.Preparation of DDT solution (practical).	-
	61.Techniques of DDT spraying.	01 Hr
	62.DDT spraying.	01 Hr
	63.Pyrethrum formulation and use.	01 Hr
	64.Anti larval measures.	01 Hr
	65.Chemical larvicide.	01 Hr
	66.Oiling and DDT spraying for anti larval measures .	01 Hr
	67.Anti malaria drainage and dry day.	01 Hr
	68.Anti Malaria drainage and dry day.	01 Hr
	69.Field work – mosquito larval collection.	-
	70.Museum- Insecticides section.	-
71.NMEP.	01 Hr	

**Details of Curriculum for First Year  
Diploma in Sanitation Technician**

<b>PAPER 2nd Theory General Sanitation.</b>	<b>Topics</b>	<b>Hours.</b>
<b>4. Disinfection and disinfectations.</b>	72.Object of disinfection and disinfectations .	02 Hrs
	73.Physical methods of disinfection.	02 Hrs
	74.TOT disinfectant –Demo area.	03 Hrs
	75.Field portable disinfectant MIL III .	03 Hrs
	76.Practical work of TOT disinfectant by trainees.	-
	77.Various methods of improvised disinfectants.	03 Hrs
	78.Chemical and gaseous disinfectants.	03 Hrs
	79.Methods of disinfecting virus infected articles.	03 Hrs
	80.Methods of carrying local and complete disinfection.	03 Hrs
	81.Practice in conducting local and complete disinfection.	03 Hrs
<b>5.Hygiene inspection.</b>	82.General principles of carrying out hygiene inspection and method of writing hygiene report on sanitary inspection .	07 Hrs
	83.Hygiene inspections of living accommodation ,recreation and information room, cook houses , dining hall ,messes , ration stores ,canteen.	08 Hrs
	84.Hygiene inspection of latrines , urinals ,bathrooms & barber shops.	07 Hrs
	84.Hygiene inspection of married quarters and unit institutions.	07 Hrs
	85.Hygiene inspection of mineral water and ice factory.	07 Hrs
	86.Hygiene inspection of restaurant.	07 Hrs
	87.Hygiene inspection of school.	07 Hrs
	88.Sanitary inspection and submission of report (practical).	-

**Details of Curriculum for First Year  
Diploma in Sanitation Technician**

<b>PAPER 2nd Theory General Sanitation.</b>	<b>Topics</b>	<b>Hours.</b>
<b>6.Hygiene of movement.</b>	89.Hygiene of movement.	02 Hrs
	90.Hygiene of the movement by Rail ,Ship & Air.	03 Hrs
<b>7.Personal hygiene and snake bite and its first aid.</b>	91.Personal hygiene /museum / film-personal hygiene.	05 Hrs
	92.The important poisonous snakes of India and how to distinguish a poisonous from non-poisonous snakes.	03 Hrs
	93.First aid of snake bite.	02 Hrs

**Details of Curriculum for First Year  
Diploma in Sanitation Technician**

<b>PAPER 3rd Theory</b>	<b>Topics</b>	<b>Hours.</b>
<b>Minor Sanitary Engineering</b>		
<b>1. Water supply.</b>	1.Sources and protection of water supply.	04 Hrs
	2.Requirement and distribution .	04 Hrs
	3.Purification of water.	04 Hrs
	4.Sedimentation of water (Lecture/Demonstration).	04 Hrs
	5.Filtration of water.	04 Hrs
	6.Horrock's test.	04 Hrs
	7.Sterilization of water by chlorine.	04 Hrs
	8.Water purification in the field (Two tank method).	04 Hrs
	9.Sterilization of water in containers.	04 Hrs
	10.Museum- Water section.	-
	11.Water Tank/ Trucks and filters.	04 Hrs
	12.Establishment of water point.	04 Hrs
	13.Demo area- water point.	-
	14.Estimation of Chlorine in bleaching powder.	04 Hrs
	15.Preparation of cadmium iodide and starch solution.	04 Hrs
	16.Individual water sterilizing out fit.	04 Hrs
	17.Sampling of water for chemical and bacteriological examination.	04 Hrs
	18.Visit- Civil water works.	-

## Details of Curriculum for First Year Diploma in Sanitation Technician

PAPER 3rd Theory	Topics	Hours.
<b>Minor Sanitary Engineering</b>		
<b>2.Disposal of waste products.</b>	19.Disposal of waste products, General principles and methods employed.	04 Hrs
	20.Disposal of human feaces .	02 Hrs
	21. Water carriage system, house drainage, various sanitary appliances used.	04 Hrs
	22. Testing of house drains.	02 Hrs
	23. Disposal of sewage (Sewage works).	02 Hrs
	24. Visit to sewage disposal plant.	-
	25. Septic tanks, designs, construction and disposal of effluent.	02 Hrs
	26. Aqua privy.	02 Hrs
	27. Removal system, pan type, collection and disposal by trenching composting and incineration.	02 Hrs
	28. Visit trenching ground.	-
	29. Nitrogen cycle.	02 Hrs
	30. Disposal of human feaces in semi permanent camp.	02 Hrs
	31. Deep trench latrine- construction, maintenance.	02 Hrs
	32. Bore hole and built up deep trench latrine.	02 Hrs
	33. Disposal of human urine in semi permanent camp. funnel urinal, urinal through urinal.	02 Hrs
	34. Disposal of human excreta in camp.	02 Hrs
	35. Shallow trench latrine, incinerator latrine.	02 Hrs
	18. Demo area- excreta disposal section.	-
	19. Rural latrine	02 Hrs
	20. Improvised sanitary appliances used in the field (Demo area).	02 Hrs
	21. Disposal of animal excreta, tight pack.	02 Hrs

**Details of Curriculum for First Year  
Diploma in Sanitation Technician**

<b>PAPER 3rd Theory Minor Sanitary Engineering</b>	<b>Topics</b>	<b>Hours.</b>
<b>3.Disposal of non-excremental refuse.</b>	22.Disposal of solid refuse-collection, removal and disposal.	05 Hrs
	23. Various incineration used in the field construction maintenance.	05 Hrs
	24.Beehive incinerator.	05 Hrs
	25.Demo area- Incinerator section.	-
	26.Disposal of liquid waste.	05 Hrs
	27.Cold water grease trap and working principle construction and maintenance.	05 Hrs
	28.Soakage pit- construction and maintenance.	05 Hrs
	29.Demo area liquid waste collection.	-
	30.Improvised grease trap.	05 Hrs
	31.Museum- disposal of refuse section.	-
<b>4.Ventilation, lighting and heating.</b>	32.Disposal of dead bodies and carcasses.	05 Hrs
	33.Air composition , pollution of air and their effects on health , temperature.	15 Hrs
	34.The principles of ventilation , type of ventilation and simple methods of warming ,lighting and ventilation.	20 Hrs

**Details of Curriculum for First Year  
Diploma in Sanitation Technician**

<b>PAPER 4th Theory Preventive medicine and public health administration</b>	<b>Topics</b>	<b>Hours.</b>
<b>1.Communicable diseases.</b>	1.Epidemiology	02 Hrs
	2.Classification of diseases – chain of infection .	02 Hrs
	3.Definitions –patients ,missed cases ,carriers ,contacts , incubation period, isolation, quarantine ad surveillance, epidemics ,endemics, pandemics.	03 Hrs
	4.Excremental diseases and general control measures.	02 Hrs
	5.Cholera –prevention and control.	02 Hrs
	6.Dysentery and diarrhea–prevention and control.	02 Hrs
	7.Infectious hepatitis–prevention and control.	02 Hrs
	8.Poliomyelitis –prevention and control.	02 Hrs
	9.Intestinal worm diseases( Helmenthiasis ) –prevention and control.	02 Hrs
	10.Air borne diseases and general control measures.	02 Hrs
	11.Tuberculosis –prevention and control.	01 Hr
	12.B. C. G.	01 Hr
	13.Small pox –prevention and control.	01 Hr
	14.Chicken pox –prevention and control.	01 Hr
	15.Measles –prevention and control.	01 Hr
	16.Mumps –prevention and control.	01 Hr
	17.Influenza –prevention and control.	01 Hr
	18.Whooping cough –prevention and control.	01 Hr
	19.Diphtheria –prevention and control.	01 Hr



**Details of Curriculum for First Year  
Diploma in Sanitation Technician**

<b>PAPER 4th Theory Preventive medicine and public health administration</b>	<b>Topics</b>	<b>Hours.</b>	
<b>2.Non-communicable diseases and conditions.</b>	20.Cancer –prevention and control.	04 Hrs	
	21.Cardiovascular diseases.	04 Hrs	
	22.Diabetes	04 Hrs	
	23.Blindness	04 Hrs	
	24.Accidents	04 Hrs	
	<b>3.Contact diseases.</b>	25.STD –prevention and control.	03 Hrs
		26.Scabies –prevention and control.	03 Hrs
		27.Other skin diseases.	02 Hrs
		28.Leprosy.	02 Hrs
	<b>4.Mental health.</b>	29.Warning signals of poor mental health and causes of mental health.	02 Hrs
		30.Mental health services , alcoholism and drug dependency.	03 Hrs
	<b>5.Occupational health.</b>	31.Occupational health and diseases.	05 Hrs
32.Measures for the general health protection of workers ,prevention of occupational diseases.		10 Hrs	

**Details of Curriculum for First Year  
Diploma in Sanitation Technician**

<b>PAPER 4th Theory Preventive medicine and public health administration</b>	<b>Topics</b>	<b>Hours.</b>
<b>6. Insect borne diseases and animal borne diseases.</b>	33. Filariasis –prevention and control.	02 Hrs
	34. Dengue –prevention and control.	02 Hrs
	35. Yellow fever –prevention and control.	02 Hrs
	36. Other viral diseases –prevention and control.	02 Hrs
	37. Relapsing fever –prevention and control.	02 Hrs
	38. Sand fly fever –prevention and control.	02 Hrs
	39. Plague –prevention and control.	02 Hrs
	40. Scrub typhus –prevention and control.	02 Hrs
	41. Louse borne diseases.	01 Hr
	42. Murine typhus.	01 Hr
	43. DBP application drill(demo/pract).	-
	44. Rabies –prevention and control.	01 Hr
	45. Tetanus –prevention and control.	01 Hr
	46. Anthrax –prevention and control.	01 Hr
	47. Undulant fever –prevention and control.	01 Hr
	48. Leishmaniasis –prevention and control.	01 Hr
	49. Rat bite fever –prevention and control.	01 Hr
	50. Rodent control.	01 Hr
51. Laboratory work.	-	
52. Museum/ film- Scrub typhus.	-	

**Details of Curriculum for First Year  
Diploma in Sanitation Technician**

PAPER 4th Theory Preventive medicine and public health administration	Topics	Hours.
<b>7.Immunology.</b>	53.Elementary immunology.	02 Hrs
	54.Inoculation and vaccination.	04 Hrs
	55.Techniques of vaccination.	04 Hrs
	56..Importance of health education in relation to environmental sanitation.	03 Hrs
<b>8.Health education.</b>	57.Tools and techniques in health education.	04 Hrs
	58.Preparing charts, demonstration of audiovisual aids, posters and film etc.	04 Hrs
	59.Organization meetings and how to deliver on health.	04 Hrs
	60.Importance and use of vital statistics collection, compilation and presentation.	03 Hrs
	61.Calculation of rates.	03 Hrs
	62.Other statistic related to health.	03 Hrs
<b>9.Vital statistics.</b>	63.Population statistics.	03 Hrs
	64.Charts and diagrams.	03 Hrs
	65.Micro-Organisms, their structure.	03 Hrs
	66.Disease producing organisms, Pathogenicity, Virulence and growth in culture media.	07 Hrs
<b>10.Elementary bacteriology.</b>	67.Family planning and necessity.	03 Hrs
	68.General out lines of the methods:- Non surgical methods-use of contraception and safe period etc Surgical methods and MTP.	07 Hrs
<b>11.Family planning.</b>	69.Rural or village sanitation.	05 Hrs
<b>12.Rural or Village sanitation, fair &amp; festivals.</b>	70.Fair and Festivals.	05 Hrs

Curriculum  
for  
Practical :- First Year  
Diploma in Sanitation Technician

	Topics
<b>Practical</b>	1. Anatomy and Physiology.
	2. General Sanitation.
	3. Minor Sanitary Engineering.
	4. Preventive Medicine & Public Health Administration.

**CERTIFICATE IN  
EMERGENCY  
& TRAUMA CARE  
ASSISTANT**

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## SYLLABUS FOR

### EMERGENCY & TRAUMA CARE ASSISTANT

**Duration of training:**

**24 wks**

**Total No of periods available for training:**

**1152 pds**

S.No.	CODE	SUBJECT	PHASE-I	PHASE-II	PHASE-III	TOTAL
			12 WKS	06WKS	07WKS	24WKS
1.	EN	Elementary Nursing	25			25
2.	AP	Anatomy & Physiology	17			17
3.	ME	Medical Equipment	25			25
4.	FA	First Aid	35			35
5.	ADM	Administration	14	18		32
6.	OE	Organization & Employment		12		12
7.	NBC	NBC Warfare	08			08
8.	DM	Disaster Management			14	14
9.	IT	IT Training	10		10	20
10	CC	Carriage of casualty	72	36	42	150
11	CM	Community Medicine			18	18
12	DR	Drill	72	36	42	150
13	PRACTICAL			636		636
14	DEMO		05		05	10

- 1 WK TERM BREAK AFTER COMPLETION OF PHASE-I
- Evening classes for ADM & OE FROM 1600hrs to 1700hrs during hospital phase.

**SYLLABUS FOR E.T.C.A.**

Duration of training - 24 WKS  
 No of Periods per Week - 48pds  
 Total No of periods Available for Training - 1152 pds

S No	LESSON CODE	SUBJECT	PHASE I (12 WKS)	PHASE II (6 WKS)	PHASE III (7 WKS)	Total
1.	DR	Drill	72	36	42	150
2.	CC	Carriage of Casualties	72	36	42	159
3.	EN	Elementary Nursing	25	-	-	25
4.	AP	Anatomy and Physiology	17	-	-	17
5.	ME	Medical equipment	25	-	-	25
6.	FA	First Aid	35	-	-	35
7.	ADM	Administration	14	18	-	32
8.	OE	Organisation & Employment	-	12	-	12
9.	NBC	NBC Warfare	08	-	-	08
10	DM	Disaster Management	-	-	14	14
11	IT	IT Training	10	-	-	10
12	CM	Community Medicine	-	-	18	18
13	DEMO	NBC Warfare	01	-	01	02
14	DEMO	Man Pack ADS	01	-	01	02
15	DEMO	Cas Evac	01	-	-	01
16	PRACTICAL		-	636	-	636
		Total Periods				1152



### CARRIAGE OF CASUALTIES

S. No.	Lesson code	Lesson	Lecture	Practical	Demo
1.	CC-1	Introduction to carriage of casualties	01		
2.	CC-2	Principles of evacuation of casualties	01		
3.	CC-2	Different methods of carriage of casualties	01		
4.	CC-3	Carriage of casualties by one bearer		01	
5.	CC-4	Carriage of casualties by back to back position		01	
6.	CC-5	Carriage of casualties by human crutch and neck draw		01	
7.	CC-6	Carriage of casualties by fireman lift and carry position		01	
8.	CC-7	Carriage of casualties by two bearers		01	
9.	CC-8	Carriage of casualties by three hand seat		01	
10	CC-9	Carriage of casualties by four hand seat position		01	
11	CC -10	Carriage of casualties by four and half lift carry & human stretcher position		01	
12	CC -11	Introduction to stretcher		01	
13	CC -12	Sizing & Forming of stretcher Squad		01	
14				01	
15	CC -13	Collection piling and Carriage of stretcher and Blanket		01	
16	CC -14	Use of one Blanket for wrapping the Injured/ casualties		01	
17	CC -15	Use of Two Blanket for wrapping the casualties.		01	
18	CC -16	Use of three Blanket for wrapping the casualties.		01	
19	CC -17	Introduction to Improvisation of stretchers		01	
20	CC -18	Improvisation of stretcher by two poles and one blanket		01	
21	CC -19	Improvisation of stretcher by two pole and one ground sheet.		01	
22	CC -20	Improvisation of stretcher by two pole and shirts		01	
23	CC -21	Improvisation of stretcher by two pole and shirts.		01	
24	CC -22	Improvisation of stretcher by two pole and two empty sacks.		01	
25	CC -23	Improvisation of stretcher by two pole and		01	

		two line beddings/ ropes		
26	CC -24	Improvisation of stretcher by two poles and five web belts/nine web Anklets.	01	
27	CC -25	Improvisation of stretcher by two poles and split Bamboo pieces.	01	
28	CC -26	Loading stretcher and shoulder Carriage.	01	
29	CC -27	Changing bearers to shoulder carriage.	01	
30	CC -28	Loading stretcher and hand carriage.	01	
31	CC -29	Changing bearers to hand carriage.	01	
32	CC -30	Introduction to Mechanical transport used in Indian Army	01	
33	CC -31	Loading and unloading of casualties in Tata sumo Light Ambulance	01	
34	CC -32	Loading and unloading casualties in Mahindra light Ambulance	01	
35	CC -33	Loading and unloading of casualties in Swaraj Mazda 2.5 ton Ambulance.	01	
36	CC -34	Loading and unloading of casualties in TATA 2.5 ton Ambulance	01	
37	CC -35	Loading and unloading of casualties in 2 in ton G S (Truck)	01	
38	CC -36	Loading and unloading of casualties in 7.5 ton ALS (Truck)	01	
39	CC -37	Loading and unloading of casualties in Air Craft	01	
40	CC -38	Loading and unloading of casualties in ship	01	
41	CC-39	Evacuation of casualties from tank	01	
42	CC -40	Evacuation of casualties by Rail/Air/Sea.	01	
43	CC -41	Uses of stretcher sling	01	
44	CC -42	Introduction to Animal Transports	01	
45	CC -43	Introduction to Animal Carriage.	01	
46	CC -44	Care of Animals, Common Injuries and their prevention.	01	
47	CC -45	Loading and unloading drill on mules GS	01	
48	CC -46	Method of packing for Blanket pack	01	
49	CC -47	Loading of Oxygen(O <sub>2</sub> ) Cylinder and PTG Boxes	01	
50	CC -48	Loading of Pakhal, Cooking utensils and oil cooker	01	
51	CC -49	Loading of Dry ration	01	
52	CC -50	Loading of Med store	01	
53	CC -51	Loading of regular and Irregular Sized Items	01	
54	CC -52	Loading of Thomas Splint	01	

55	CC -53	Loading of Day and Night Sign post.		01	
56	CC -54	Collection of wounded by squad of four bearers		01	
57	CC -55	Collection of wounded by squad of Two bearers		01	
58	CC -56	Collection of wounded by one bearers		01	
59	CC -57	Carriage of the wounded over wall or fence obstacles		01	
60	CC -58	Crossing a ditch with casualties		01	
61	CC -59	Evacuation of casualties over snow		01	
62	CC -60	Use of Basket stretcher		01	
63	CC -61	Uses of Orthopaedic/scoop stretcher		01	
64	CC -62	Carriage of cervical spine injury Casualties		01	
65	CC -63	Carriage of Abdominal Wound casualties		01	
66	CC-64	Carriage of chest injury casualties		01	
67	CC -65	Carriage of face wound casualties		01	
68	Cc -66	Carriage of Head injury casualties		01	
69	CC -67	Carriage of Femur bone fracture casualties		01	
70	CC -68	Use of Thomas Splint		01	
71	CC -69	Improvised Splint		01	
72	CC -70	Introduction to Improvised Raft		01	
73	CC -71	Improvisation of raft by eight stretcher and one Tarpaulin size16'X 16'		01	
74	CC -72	Improvisation of raft by three empty Bard and two Bamboos.		01	
75	CC -73	Improvisation of raft by eight jurricane and two Bamboos.		01	
76	CC -74	Crossing a water obstacle by Burma Bridge		01	
77	CC -75	Crossing a water obstacle by Flying Fox		01	
78	CC -76	Crossing a small River /Canal with casualties by basket stretcher		01	
79	CC -77	Carriage of casualties over a steep slope		01	
80	CC - 78	Carriage of casualties through a narrow mountain Path.		01	
81	CC -79	Carriage of casualties from FDL to RAP		01	
82	CC -80	Carriage of casualties from RAP to ADS		01	
83	CC -81	Carriage of casualties from ADS to FSC		01	
84	CC -82	Carriage of casualties from FSC to MH		01	
85	CC -83	Carriage of casualties from MH to Specialised centre		01	

**ELEMENTARY NURSING**

<b>S No</b>	<b>Lesson code</b>	<b>Lesson</b>	<b>Lecture</b>	<b>Practical</b>	<b>Demo</b>
1.	EN-1	Introduction to Nursing	01		
2.	EN-2	Hospital Admission, Discharge and Transfer Procedure	01		
3.	EN-3	Hospital Diets	01		
4.	EN-4	Hospital diets	01		
5.	EN-5	Feeding of Bed Patients	01	01	01
6.	EN-6	Bed Making : Summer bed		01	01
7.	EN-7	Bed Making : Winter bed		01	01
8.	EN-8	Bed Making : Post-operative		01	01
9.	EN- 9	Bed Making : Occupied		01	01
10.	EN-10	Positions		01	01
11.	EN-11	Recording of Temperature, Pulse, Respiration		01	01
12.	EN-12	Recording of Blood Pressure		01	01
13.	EN-13	Personal, Hygiene : Sponge bath & Oral Care		01	01
14.	EN-14	Sterilization & Disinfection	01		
15.	EN-15	Nursing care of a Febrile Patient		01	
16.	EN-16	Medical and Surgical Hand washing		01	01
17.	EN-17	Ward Administration		01	
18.	EN-18	Nursing care of an Unconscious Patient		01	
19.	EN-19	Aseptic Procedure & Precaution	01		
20.	EN-20	Universal Safety Precaution	01		
21.	EN-23	Handling of Psychiatric/Disoriented Patient	01		
22.	EN-24	Nursing care of pediatric case		01	
23.	EN-25	Nursing care of geriatric case		01	
		Tests	03	03	

**ANATOMY AND PHYSIOLOGY**

S No	Lesson code	Lesson	Lecture	Practical	Demo
1.	AP-1	Introduction to anatomy	01		
2.	AP-2	Special sensory organs	01		
3.	AP-3	Skin: composition and function	01		
4.	AP-4	Water and electrolyte balance	01		
5.	AP-5	Visit to museum	01		01
6.	AP-6	Musculoskeletal System : Anatomy	01		
7.	AP-7	Musculoskeletal System : Applied Physiology	01		
8.	AP-8	Respiratory System : Anatomy	01		
9.	AP-9	Respiratory System : Applied Physiology	01		
10.	AP-10	Cardiovascular System : Anatomy	01		
11.	AP-11	Cardiovascular System : Applied Physiology	01		
12.	AP-12	Central Nervous System : Anatomy	01		
13.	AP-13	Central Nervous System : Applied Physiology	01		
14.	AP-14	Digestive System : Anatomy	01		
15.	AP-15	Digestive System : Applied Physiology	01		
16.	AP-16	Genitourinary System : Anatomy	01		
17.	AP-17	Genitourinary System : Applied Physiology	01		
18.		Test	01		

**MEDICAL EQUIPMENT**

S No	Lesson code	Lesson	Lecture	Practical	Demo
1.	ME-01	Introduction to Hospital Equipment	01		
2.	ME-02	Care and maintenance of equipment	01		

3.	ME-03	Introduction to Equipment Management	01		
4.	ME-04	Types of Equipments : Diagnostic and Therapeutic	01		
5.	ME-05	Diagnostic Equipment : ECG Machine	01		
6.	ME-06	Diagnostic Equipment : Thermometer	01		
7.	ME-07	Diagnostic Equipment : BP Apparatus	01		
8.	ME-08	Therapeutic Equipment : Oxygen Cylinder and Crash Cart	01		
9.	ME-09	Therapeutic Equipment : Nebulizer	01		
10.	ME-10	Hospital beds for patients	01		
11.	ME-11	Stores : Ordinance and Medical	01		
12.	ME-12	Repair of Equipments	01		
13.		Test	01		

### FIRST AID

S No	Lesson code	Lesson	Lecture	Practical	Demo
1.	FA-01	Introduction to First Aid	01		
2.	FA-02	Definition and principles of first aid	01		
3.	FA-03	Golden rules of first aid	01		
4.	FA-04	Qualities of a first aider	01		
5.	FA-05	First aid kit contents and its uses	01		
6.	FA-06	First Field dressing and its application	01		
7.	FA-07	Shell dressing and its application	01		
8.	FA-08	Basic principles of first aid emergency care and first aid	01		
9.	FA-09	Introduction to bandages and splints	01		
10.	FA-10	Bandaging fingers.		01	
11.	FA-11	Bandaging arm, forearm, hand		01	
12.	FA-12	Bandaging thigh, leg		01	
13.	FA-13	Bandaging jaws		01	
14.	FA-14	Bandaging head, Capelints bandage	01	01	
15.	FA-15	Bandaging of joints (Figure of 8 bandages)		01	
16.	FA-16	Triangular Bandages uses	01	01	
8.	FA-08	Basic principles of first aid emergency care and first aid	01		
9.	FA-09	introduction to bandages	01		

17.	FA-17	Shock	01		
18.	FA-18	CPR		06	
19.	FA-19	Wounds and their Classification	01		
20.	FA-20	Chest wound and their first aid	01		
21.	FA-21	Abdominal wounds and their first aid.	01		
22.	FA-22	Sepsis and its control	01		
23.	FA-23	Hemorrhage: Causes, Effects and arrest of Hemorrhage	01	01	
24.	FA-24	First Aid During Emergency : Asphyxia, Electrocution, Drowning	01		
25.	FA-25	Smoke inhalation and carbon-monoxide poisoning	01		
26.	FA-26	Blast and Crush injuries	01		
27.	FA-27	Poisoning and its first aid.	01		
28.	FA-28	Fractures : Classification, First Aid	01		
29.	FA-29	First Aid of Dog bite, insects bite	01		
30.	FA-30	First Aid for common skin problems	01		
31.	FA-31	Burns and Scalds: Classification, First Aid	01		
32.	FA-32	Foreign Bodies	01	01	
33.	FA-33	Effects of Heat and Preventive measures	01		
34.	FA-34	Effects of Cold and Preventive measures	01		
35.	FA-35	Effects of High Altitude : First Aid and Preventive measures	01		
36.		Tests	03		

**COMMUNITY MEDICINE**

S No	Lesson code	Lesson	Lecture	Practical	Demo
1.	CM-1	Introduction to Community Medicine	01		
2.	CM-2	Personal Hygiene : Body bath	01		
3.	CM-3	Personal Hygiene : Oral Hygiene	01		
4.	CM-4	Personal Hygiene : Nails, Hair & Foot	01		
5.	CM-5	Hygiene & Sanitation of personnel line	01		
6.	CM-6	Hygiene & Sanitation of cook house	01		
7.	CM-7	Hygiene & Sanitation of Camp area	01		
8.	CM-8	Waste Disposal	01		
9.	CM-9	Water Sanitation	01		
10.	CM-10	Safe Water Supply	01		
11.	CM-11	Water Borne Diseases	01		
12.	CM-12	Air Borne Diseases	01		
13.	CM-13	Food Borne Diseases	01		
14.	CM-14	Fly Borne Diseases	01		
15.	CM-15	Malaria : Causes, Effects & Prevention	01		
16.	CM-16	Introduction to Communicable Diseases	01		
17.	CM-17	Measles & Mumps: Causes, Effects & Prevention	01		
18.	CM-18	Diphtheria: Causes, Effects & Prevention	01		
19.	CM-19	Tetanus: Causes, Effects & Prevention	01		
20.	CM-20	Tuberculosis: Causes, Effects, Prevention & Treatment	01		
21.	CM-21	Immunization	01		
22.	CM-22	STD : Causes, Effects & Prevention	01		
23.	CM-23	AIDS : Causes, Effects & Prevention	01		
24.	CM-24	Hepatitis : Causes, Effects & Prevention	01		
25.	CM-25	Maternal & Child Health	01		
26.	CM-26	WHO	01		
27.	CM-27	Geneva Convention	01		



28.	CM-28	Sanitation in Unit Lines Camp Demo Area	01		
29.	CM-29	Disinfection of Common Items in Hospital Use	01		
30.	CM-30	Composition of Food and Balance Diet	01		
31.	CM-31	Hygiene and Sanitation at High Altitude	01		
32.	CM-32	Demography of Population Explosion in India and Its Effects	01		
33.		Test	01		

**ADMINISTRATION**

S No	Lesson code	Lesson	Lecture	Practical	Demo
1.	ADM-1	Introduction to Administrative Duties	01		
2.	ADM-2	Red Cross	01		
3.	ADM-3	Red Cross	01		
4.	ADM-4	Office Administration	01		
5.	ADM-5	Office Administration	01		
6.	ADM-6	Types of Ration : Ors and JCOs	01		
7.	ADM-7	Types of Ration : Ors and JCOs	01		
8.	ADM-8	Duties of Night Sentries	01		
9.	ADM-9	Duties of Night Sentries	01		
10.	ADM-10	Duties of Office Runners	01		
11.	ADM-11	Fire Fighting	01		
12.	ADM-12	Fire Fighting	01		
13.	ADM-13	Pay and Allowances	01		
14.	ADM-14	Pay and Allowances	01		
15.	ADM-15	Hospital Staff-Patient relationship	01		
16.	ADM-16	Part - II Orders	01		
17.	ADM-17	FRW & CV	01		
18.	ADM-18	Clothing and entitlements	01		
19.	ADM-19	Clothing and entitlements	01		
20.	ADM-20	Free Orderly Room Procedure	01		
21.	ADM-21	Types of Court Martial	01		
22.	ADM-22	Types of Court Martial	01		
23.	ADM-23	Prospectus in Army	01		
24.	ADM-24	Grants (ATG, I&M and, Amenity)	01		
25.	ADM-25	Grants (ATG, I&M and, Amenity)	01		
26.	ADM-26	Introduction to Security	01		
27.	ADM-27	Security of Personnel	01		
28.	ADM-28	Security of Material	01		
29.	ADM-29	Security of Information	01		
30.	ADM-30	Cyber Security	01		
31.	ADM-31	Telephone Security	01		
32.		Test	01		

**ORGANISATION AND EMPLOYMENT**

S No	Lesson code	Lesson	Lecture	Practical	Demo
1.	OE-1	History, Organization & Functions of Medical Units	01		
2.	OE-2	History, Organization & Functions of Medical Units	01		
3.	OE-3	Medical Units in PE	01		
4.	OE-4	Medical Units in PE	01		
5.	OE-5	Medical Units in WE	01		
6.	OE-6	Medical Units in WE	01		
7.	OE-7	Field Hospitals	01		
8.	OE-8	Para Field Hospitals	01		
9.	OE-9	Standard Field Hospitals	01		
10.	OE-10	Corps Field Hospitals	01		
11.	OE-11	Military Hospital, General Hospital, Base Hospitals	01		
12.	OE-12	RAP Sitting and Layout	01		
13.	OE-13	ADS Sitting and Layout	01		
14.	OE-14	FSC Sitting and Layout	01		
15.	OE-15	Chain of Evacuation of Casualties]	01		
16.	OE-16	Combat Stress Management	01		
17.	OE-17	Motivation and Team Work	01		
18.	OE-18	Human Rights and aid to civil (IS duties)	01		
19.	OE-19	Hospital Waste management	01		
20.	OE-20	Carrier Prospects in Army Medical Corps	01		
21.	OE-21	ECHS	01		
22.	OE-22	Resettlement Courses	01		
23.	OE-23	Entitlements of Pensioners	01		
24.		Test	01		

**NBC**

S No	Lesson code	Lesson	Lecture	Practical	Demo
1.	NBC-1	Introduction to NBC	01		
2.	NBC-2	Phenomenon of Nuclear	01		

		Explosion			
3.	NBC-3	Types of Bursts and Its Effects	01		
4.	NBC-4	Thermal and Radiation effects	01		
5.	NBC-5	Different agents in Biological Warfare	01		
6.	NBC-6	Med Aspects Of Biological Warfare	01		
7.	NBC-7	Detection, Sample and identification	01		
8.	NBC-8	Chemical agents classification	01		
9.	NBC-9	Effects of Different Chemical agents	01		
10.	NBC-10	NBC Presentation			01
11.		Test	01		

### DISASTER MANAGEMENT

S No	Lesson code	Lesson	Lecture	Practical	Demo
1.	DM-1	Introduction to Disaster Management	01		
2.	DM-2	Principles of Emergency Management of Casualties	01		
3.	DM-3	Health Care at Disaster site	01		
4.	DM-4	Principles of transportation and evacuation of casualties	01		
5.	DM-5	Documentation	01		
6.	DM-6	Concept of Triage	01		
7.	DM-7	Disaster aftermath and rehabilitation	01		
8.	DM-8	Universal precautions	01		
9.	DM-9	Role of other agencies in disaster	01		
10.	DM-10	Role specific to trade	01		
11.	DM-11	Communication and public relations	01		
12.	DM-12	Security aspects	01		
13.	DM-13	NBC Component of Disaster Management	01		
14.	DM-14	NBC Component of Disaster Management	01		
15.		Test	01		

IT TRG.

S No	Lesson code	Lesson	Lecture	Practical	Demo
1.	IT-1	Introduction to Computer	01		
2.	IT-2	Types of Computers	01		
3.	IT-3	Protection of Computers : Virus & Anti-Virus	01		
4.	IT-4	Software & Hardware	01		
5.	IT-5	Input & Output Devices	01		
6.	IT-6	Keyboard Shortcuts & its Applications	01		
7.	IT-7	MS Office : Introduction	01		
8.	IT-8	MS Word	01	01	
9.	IT-9	MS Excel	01	01	
10.	IT-10	MS PowerPoint	01	01	
11.	IT-11	Installation of Printers & Printing of Documents	01		01
12.	IT-12	Storage devices	01		
13.	IT-13	Networking : Introduction	01		
14.	IT-14	Networking : Types and Functions	01		
15.	IT-15	Common Trouble shooting of Computer	01		
16.		Test	01		

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