

CMJ UNIVERSITY

SHILLONG, MEGHALAYA.

Recognized by UGC

DETAILED SYLLABUS

Under Graduate Diploma Program

(DRIT)

(Diploma in Radio Imaging Technician)

(YEARLY SYSTEM)

DRIT

(DIPLOMA IN RADIO IMAGING TECHNOLOGY)

COURSE TITLE : DIPLOMA IN RADIO IMAGING TECHNOLOGY

DURATION : 2 YEARS

TOTAL DIPLOMA MARKS: 2300

FIRST YEAR

<i>COURSE TITLE</i>	<i>Paper Code</i>	<i>MARKS</i>		
		THEORY	PRACTICAL	TOTAL
BASICS OF HUMAN ANATOMY	DRIT-110	100	100	200
BASICS OF MEDICAL PHYSIOLOGY	DRIT-120	100	100	200
PATHOLOGY	DRIT-130	100	100	200
COMPUTER SKILLS	DRIT-140	100	00	100
COMMUNICATION SKILLS	DRIT-210	100	100	200
BASIC PHYSICS	DRIT-220	100	100	200
MS-OFFICE	DRIT-230 DRIT-230P	50	50	100
GENERATION AND PROPERTIES OF X-RAYS	DRIT-240	100	00	100

SECOND YEAR

<i>COURSE TITLE</i>	<i>Paper Code</i>	<i>MARKS</i>		
		THEORY	PRACTICAL	TOTAL
RADIATION HAZARDS AND PROTECTION	DRIT-310	100	100	200
DARK ROOM PROCEDURES	DRIT-320	100	100	200
PATIENT AND ROLE OF RADIOGRAPHER	DRIT-330	100	00	100
CLINICAL LAB	DRIT-340 L	00	100	100
GENERAL RADIOGRAPHY	DRIT-410	100	100	200
REGIONAL RADIOGRAPHY	DRIT-420	100	100	200
CLINICAL LAB	DRIT-430 L	00	100	100
PROJECT	DRIT-440	--	--	100

6 months internship in any Hospital or Nursing Home

Note:

Theory Paper: 30% Continuous Internal Assessment and 70% University examination.

Practical Paper: 30% Continuous Internal Assessment and 70% University examination.

Continuous Internal Assessment:

- | | |
|---------------------------------------------------------------------------------------------------|----------------------------|
| 1) Two or three tests out of which minimum two
Assessment
will be considered for Assessment | 60% of Continuous Internal |
| 2) Seminars/Assignments/Quizzes
Assessment | 30% of Continuous Internal |
| 3) Attendance, class participation and behavior
Assessment | 10% of Continuous Internal |

FIRST YEAR

DRIT-110

BASICS OF HUMAN ANATOMY

Maximum Time : 3 Hrs. University Examination : 70 %
Total Marks : 100 Continuous Internal Assessment : 30 %
Minimum Pass Marks : 40%

A) Instructions for paper-setter

The question paper will be divided into two parts. Part-I will contain subjective questions. This part will carry 60% of the total marks.

Part-II will comprise of 10-15 short questions, which will cover the entire syllabus and will carry 40% of the total marks.

B) Instructions for the candidates

Candidates are required to attempt Part-I as defined in the question paper and the entire part-II.

2. Use of non-programmable scientific calculator is allowed

COURSE CONTENTS

Skeleton Structures of Bone, Vertebral Column, Upper Extremity, Lower Extremity, superior extremity, inferior extremity, ossification centers, bone of upper limb, radius and ulna, surface marker of thorax abdomen, head and neck.

DRIT-110 P

BASICS OF HUMAN ANATOMY

The laboratory course will comprise of exercises on what is learnt in the theory classes of the same course i.e. DRIT 110.

DRIT -120

BASICS OF MEDICAL PHYSIOLOGY

Maximum Time : 3 Hrs.

University Examination : 70 %

Total Marks : 100

Continuous Internal Assessment : 30 %

Minimum Pass Marks : 40%

A) Instructions for paper-setter

The question paper will be divided into two parts. Part-I will contain subjective questions. This part will carry 60% of the total marks.

Part-II will comprise of 10-15 short questions, which will cover the entire syllabus and will carry 40% of the total marks.

B) Instructions for the candidates

Candidates are required to attempt Part-I as defined in the question paper and the entire part-II.

Use of non-programmable scientific calculator is allowed

COURSE CONTENTS

General information:- The cell, membrane potential, some common terms used in physiology.

Blood:- Red blood corpuscles, hemoglobin, the leucocytes, immunity, origin and function of lymphocytes, reticulate endothelial system, the platelets, homeostasis, coagulation of blood, the plasma proteins, blood groups.

Digestive system:- introduction to digestive system. Elementary functional anatomical considerations, the salivary glands, the stomach and its secretion, pancreas, the bile, the small intestine, movement of the alimentary tract, gastrointestinal hormones, apud cells.

Respiratory system:- functional anatomy, ventilation, control of ventilation, exchange of gases between the alveoli and pulmonary capillary blood, carriage of O₂ and CO₂ by the blood and their exchange at the tissue level, applied and environment physiology. lung defense mechanism. changes with age.

DRIT –120 P

BASICS OF MEDICAL PHYSIOLOGY

The laboratory course will comprise of exercises on what is learnt in the theory classes of the same course i.e. DRIT 120.

DRIT-130

PATHOLOGY

Maximum Time : 3 Hrs.
Total Marks : 100
Minimum Pass Marks : 40%

University Examination : 70 %
Continuous Internal Assessment : 30 %

A) Instructions for paper-setter

The question paper will be divided into two parts. Part-I will contain subjective questions. This part will carry 60% of the total marks.

Part-II will comprise of 10-15 short questions, which will cover the entire syllabus and will carry 40% of the total marks.

B) Instructions for the candidates

Candidates are required to attempt Part-I as defined in the question paper and the entire part-II.

Use of non-programmable scientific calculator is allowed

COURSE CONTENTS

The Cell in Health and Disease:- Introduction to Pathology, Cellular Structure and Metabolism, Etiology and Pathogenesis of Disease, Intracellular Accumulations and Disorders of Metabolism, Amyloidosis, Degenerations and Cell Death.

Inflammation and Healing, Immunity and Hypersensitivity, Infection and infestation:- Inflammation-Acute and Chronic, Granulomatous Inflammation, Healing, immunity and Hypersensitivity, Infection and Infestation.

Fluid and Haemodynamic Derangements:- Derangements of Body Fluids and Electrolytes, Haemodynamic Disorders due to Deranged Blood Volume, Haemodynamic Disorders of Obstructive Nature, Ischaemia and Infarction.

Growth Disorders and Neoplasia:- Adaptive Disorders of Growth, General Aspects of Neoplasia, Etiology and pathogenesis of Neoplasia, Clinical Aspects of Neoplasia, Common Specific Tumours.

DRIT-130 P

PATHOLOGY

The laboratory course will comprise of exercises on what is learnt in the theory classes of the same course i.e. DRIT 130.

DRIT-140

COMPUTER SKILLS

Maximum Time : 3 Hrs. University Examination : 70 %
Total Marks : 100 Continuous Internal Assessment : 30 %
Minimum Pass Marks : 40%

A) Instructions for paper-setter

The question paper will be divided into two parts. Part-I will contain subjective questions. This part will carry 60% of the total marks.

Part-II will comprise of 10-15 short questions, which will cover the entire syllabus and will carry 40% of the total marks.

B) Instructions for the candidates

Candidates are required to attempt Part-I as defined in the question paper and the entire part-II.

Use of non-programmable scientific calculator is allowed

COURSE CONTENTS

Hardware & Software: CPU, RAM, SSD, Operating Systems, System Softwares, Application Software. Inside Computers. Computer Systems.

Input-Output devices: Monitor, Keyboard, Mouse, System Unit, Printer, Scanner.

Storage devices : Floppy disk, Hard disk, Cartridge tape, CD-ROM

Printers : Dot-Matrix, Inkjet, Laserjet, Colour printer, High speed printer, Label printer, Plotters.

PROGRAMMING LANGUAGE:-Compiler, Assembly Language, Machine Language.
Graphical user interface : Windows 3x, Program manager, Main & accessories program groups, Multiasking.

DRIT-210

COMMUNICATION SKILLS

Maximum Time : 3 Hrs.

University Examination : 70 %

Total Marks : 100

Continuous Internal Assessment : 30 %

Minimum Pass Marks : 40%

A) Instructions for paper-setter

1. The question paper will be divided into two parts. Part-I will contain subjective questions. This part will carry 60% of the total marks.
2. Part-II will comprise of 10-15 short questions, which will cover the entire syllabus and will carry 40% of the total marks.

B) Instructions for the candidates

Candidates are required to attempt Part-I as defined in the question paper and the entire part-II.

Use of non-programmable scientific calculator is allowed

COURSE CONTENTS

Basic Skills: - Listening, Speaking, Reading and Writing.

Comprehension: - Reading Comprehension, Passages, Poems.

Listening Comprehension: - Talks, Reports, Poems

Writing Skills: - Paragraph Writing, Composition Writing, Report Writing, Application & Letter Writing

Grammar: - Simple, Compound and complex sentences, Co-ordinate clause (with, but or either-or, Neither-Nor otherwise or else), Subordinate clauses-noun clauses-as subjects object and complement: Relative Clauses (restrictive and non-restrictive clauses). Adverb clauses (open and hypothetical, Comparative Clauses

Simple present, progressive and present perfect, simple past, progressive and past perfect, indication of futurity, the passive (Simple present and past, present and past perfect and 'to' infinitive structure), Reported Speech: - (I) Declarative sentences, (ii) Imperatives (iii) Interrogatives –question, Yes/No Questions, Exclamation sentences, Modals (will, shall, should, would, ought to, have to/have got to, can, could, may-might and need), Verb structures (infinitives and gerundial)

DRIT-210 P

COMMUNICATION SKILLS

The laboratory course will comprise of exercises on what is learnt in the theory classes of the same course i.e. DRIT 210.

DRIT-220

BASIC PHYSICS

Maximum Time : 3 Hrs. University Examination : 70 %
Total Marks : 100 Continuous Internal Assessment : 30 %
Minimum Pass Marks : 40%

A) Instructions for paper-setter

The question paper will be divided into two parts. Part-I will contain subjective questions. This part will carry 60% of the total marks.

Part-II will comprise of 10-15 short questions, which will cover the entire syllabus and will carry 40% of the total marks.

B) Instructions for the candidates

Candidates are required to attempt Part-I as defined in the question paper and the entire part-II.

Use of non-programmable scientific calculator is allowed

COURSE CONTENTS

Measurement, Basic Units, Derived Units, Electromagnetic Unit of current, Electrical charges, structure of Atom, etc
Magnetic Density, Magnetic line of force, Electromagnetic induction, Mutual and self Induction, AC Generator, DC Generator, Transformer, Electrical Insulation, Rectification
Characteristics of X-ray Beam, capacitor and capacitance
Transformer, Types of Transformer, Rectifier
Distribution of Electrical supply(single Phase, Three phase) Electric Insulation Earthing , High Tension cable.
Characteristics of X-ray beams, capacitor, Capacitance
Thermionic Emission, Photoelectric Emission, Diode value
Light Intensity, Quality Invisible spectrum, Electromagnetic Radiation, Theory of waves and quanta, properties of Electromagnetic radiation, radioactivity.

DRIT-220 P

BASIC PHYSICS

The laboratory course will comprise of exercises on what is learnt in the theory classes of the same course i.e. DRIT 220.

DRIT-230

MS OFFICE

Maximum Time : 3 Hrs. University Examination :30%
Total Marks : 50 Continuous Internal Assessment:20%
Minimum Pass Marks : 40%

A) Instructions for paper-setter

The question paper will be divided into two parts. Part-I will contain subjective questions. This part will carry 60% of the total marks.

Part-II will comprise of 10-15 short questions, which will cover the entire syllabus and will carry 40% of the total marks.

B) Instructions for the candidates

Candidates are required to attempt Part-I as defined in the question paper and the entire part-II.

Use of non-programmable scientific calculator is allowed

COURSE CONTENTS

MS Word : Creating documents, Formatting, Auto text, Auto correct, Tables, Page setup, Printing, Object linking & embedding, Spell check, Thesaurus, Mail merge, Word art, Clip art.
setup.

MS Excel : Creating workbooks & worksheets, Formulas & functions, Linking workbooks & worksheets, Cell references, Formatting, Creating charts, Data lists, Page setup, Printing.

MS Power Point : Creating slides with different layouts and templates, Inserting charts, Tables, Organisation charts, Pictures, Running a screen show, Presentation

DRIT-230 P

MS OFFICE

The laboratory course will comprise of exercises on what is learnt in the theory classes of the same course i.e. DRIT 230.

**DRIT- 240
RAYS**

GENERATION AND PROPERTIES OF X-

Maximum Time : 3 Hrs. University Examination : 70 %
Total Marks : 100 Continuous Internal Assessment : 30 %
Minimum Pass Marks : 40%

A) Instructions for paper-setter

The question paper will be divided into two parts. Part-I will contain subjective questions. This part will carry 60% of the total marks.

Part-II will comprise of 10-15 short questions, which will cover the entire syllabus and will carry 40% of the total marks.

B) Instructions for the candidates

Candidates are required to attempt Part-I as defined in the question paper and the entire part-II.

Use of non-programmable scientific calculator is allowed

COURSE CONTENTS

Introduction, Properties of X-rays, Productions of X-rays, Characteristics and Bremsstrahlung Radiation X-ray Spectrum, Effect of mA, kVp on shape of spectrum
X-ray Tube: cathode, anode, glass envelope, stator and rotor, tube housing
Method of heat dissipation, Tube Rating charts, cooling chart, angiography rating chart, cine radiographic rating charts,.
Basic X-Ray circuit transformers, transformer laws, autotransformer, high tension transformer and types used in X-Ray machine, rectification, self rectified circuit, half wave rectifier, full wave rectifier, limitations of single phase generator.
Three phase generator, three phase six plus six rectifier, three phase twelve plus twelve Rectifier, medium frequency generator

SECOND YEAR

DRIT-310

RADIATION HAZARDS AND PROTECTION

Maximum Time : 3 Hrs. University Examination : 70 %
Total Marks : 100 Continuous Internal Assessment : 30 %
Minimum Pass Marks : 40%

A) Instructions for paper-setter

The question paper will be divided into two parts. Part-I will contain subjective questions. This part will carry 60% of the total marks.

Part-II will comprise of 10-15 short questions, which will cover the entire syllabus and will carry 40% of the total marks.

B) Instructions for the candidates

1. Candidates are required to attempt Part-I as defined in the question paper and the entire part-II.
2. Use of non-programmable scientific calculator is allowed

COURSE CONTENTS

Introduction, Hazards, Newer radiation Units ICRP (90) Dose limit for occupational and public, principle and method of protection, Diagnostic X-ray Installation, Design location, layout, Room size, shielding, Illumination, Control Panel and Waiting Area, Choice of Equipment, Qualified and Trained staff.

Interaction of X-rays with matter, Coherent Scattering, Photoelectric and Compton, Pair production and photo Disintegration- Application of Compton, Photoelectric Effect in Diagnostic Radiology

DRIT-310 P
PROTECTION

RADIATION HAZARDS AND

The laboratory course will comprise of exercises on what is learnt in the theory classes of the same course i.e. DRIT 310.

DRIT-320

DARK ROOM PROCEDURES

Maximum Time : 3 Hrs. University Examination : 70 %
Total Marks : 100 Continuous Internal Assessment : 30 %
Minimum Pass Marks : 40%

A) Instructions for paper-setter

The question paper will be divided into two parts. Part-I will contain subjective questions. This part will carry 60% of the total marks.

Part-II will comprise of 10-15 short questions, which will cover the entire syllabus and will carry 40% of the total marks.

B) Instructions for the candidates

Candidates are required to attempt Part-I as defined in the question paper and the entire part-II.

Use of non-programmable scientific calculator is allowed

COURSE CONTENTS

Dark room- size and installation, Ventilation, Electric wiring, pass box, Entrance, Illumination, Dry and wet size.

Film Construction, Types of film, Intensifying Screens, Screen characteristics, Rare Earth Screen, Fluoroscopic Screen, Luminescence and Safety in dark Room

Manual and Automatic Processing

Fault in Radiography and Remedy

DRIT-320 P

DARK ROOM PROCEDURES

The laboratory course will comprise of exercises on what is learnt in the theory classes of the same course i.e. DRIT 320.

**DRIT-330
RADIOGRAPHER**

PATIENT & ROLE OF

Maximum Time : 3 Hrs. University Examination : 70 %
Total Marks : 100 Continuous Internal Assessment : 30 %
Minimum Pass Marks : 40%

A) Instructions for paper-setter

The question paper will be divided into two parts. Part-I will contain subjective questions. This part will carry 60% of the total marks.

Part-II will comprise of 10-15 short questions, which will cover the entire syllabus and will carry 40% of the total marks.

B) Instructions for the candidates

Candidates are required to attempt Part-I as defined in the question paper and the entire part-II.

Use of non-programmable scientific calculator is allowed

COURSE CONTENTS

Clinical, Ethical and legal responsibility, Procedure in event of Accident, Radiographer and patient, General preliminaries to Examination, Patient on Stretcher, Anaesthetised patient, Hygiene in X-ray department, Drugs in X-ray department, Preparation of patient, Purgatives, Prevention of Intestinal Gas, Diabetic Patient, Infant, Mobile X-ray Set, Precaution in Patient, Oxygen Therapy, Intravenous Infusion, Fluid Traction, Operation Theatre, Radiation Safety, Ten day rule, Protective Measures, Importance of Records.

DRIT-340 L

CLINICAL LAB

Maximum Time : 3 Hrs. University Examination : 70 %
Total Marks : 100 Continuous Internal Assessment : 30 %
Minimum Pass Marks : 40%

In this lab session students will learn the dark room procedures. Learning General preliminaries to Examination, Patient on Stretcher, Intravenous Infusion, Fluid Traction Under the guidance of supervisor.

DRIT-410

GENERAL RADIOGRAPHY

Maximum Time : 3 Hrs. University Examination : 70 %
Total Marks : 100 Continuous Internal Assessment : 30 %
Minimum Pass Marks : 40%

A) Instructions for paper-setter

1. The question paper will be divided into two parts. Part-I will contain subjective questions. This part will carry 60% of the total marks.
2. Part-II will comprise of 10-15 short questions, which will cover the entire syllabus and will carry 40% of the total marks.

B) Instructions for the candidates

Candidates are required to attempt Part-I as defined in the question paper and the entire part-II.

Use of non-programmable scientific calculator is allowed

COURSE CONTENTS

Unsharpness , Magnification, Distortion, Grids, Types of Grids, Grid Problem, Grid Movement, Air Gap technique, Image sharpness, photographic Density, Image Contrast, Intensifying Screen, Characteristic Curve, Speed of Film, Image quality, Steep range Radiography, Selective Filtration, High KV Radiography, Multiple Radiography, Subtraction.

DRIT-410 P

GENERAL RADIOGRAPHY

The laboratory course will comprise of exercises on what is learnt in the theory classes of the same course i.e. DRIT 410.

DRIT-420**REGIONAL RADIOGRAPHY**

Maximum Time : 3 Hrs. University Examination : 70 %
Total Marks : 100 Continuous Internal Assessment : 30 %
Minimum Pass Marks : 40%

Instructions for paper-setter

The question paper will be divided into two parts. Part-I will contain subjective questions. This part will carry 60% of the total marks.

Part-II will comprise of 10-15 short questions, which will cover the entire syllabus and will carry 40% of the total marks.

Instructions for the candidates

Candidates are required to attempt Part-I as defined in the question paper and the entire part-II.

Use of non-programmable scientific calculator is allowed

COURSE CONTENTS

Positioning Terminology: Upper Limb, Lower Limb, Hip Joint, Pelvis, Vertebral Column, Chest, Anatomical positions, skull, Nasal Bone, Urinary Tract, Abdomen.

DRIT-420 P**REGIONAL RADIOGRAPHY**

The laboratory course will comprise of exercises on what is learnt in the theory classes of the same course i.e. DRIT 410.

DRIT-430 L**CLINICAL LAB**

Maximum Time : 3 Hrs. University Examination : 70 %
Total Marks : 100 Continuous Internal Assessment : 30 %
Minimum Pass Marks : 40%

The students will learn in this lab session working with radiography, general and regional, both under the guidance of supervisor.

DRIT-440

PROJECT

Maximum Time : 3 Hrs. University Examination : 70 %
Total Marks : 100 Continuous Internal Assessment : 30 %
Minimum Pass Marks : 40%

A) Instructions for paper-setter

The question paper will be divided into two parts. Part-I will contain subjective questions. This part will carry 60% of the total marks.

Part-II will comprise of 10-15 short questions, which will cover the entire syllabus and will carry 40% of the total marks.

B) Instructions for the candidates

Candidates are required to attempt Part-I as defined in the question paper and the entire part-II.

Use of non-programmable scientific calculator is allowed

The Students will select a topic in their area of interest, in consultation with a supervisor, and carry out a project.