

SAURASHTRA UNIVERSITY



Accredited Grade "A"
by NAAC

**DDU Kaushal Kendra
Curriculum for
BACHELOR of VOCATION
in**

RADIATION & IMAGING TECHNOLOGY

(Under UGC-DDU Kaushal Kendra sanctioned to shree Manibhai Virani
& Smt. Navalben Virani Science College -Rajkot)

B.Voc. Semester - I

Choice Based Credit System (CBCS)
Effective From June - 2015-16

Saurashtra University
University Campus Rajkot - 360 005,
Gujarat, India

Website : www.saurashtrauniversity.edu

**Physics Board Meeting Dt. 09-09-2015,
Resolution No. 6**

SYLLABUS

Saurashtra University



DDU Kaushal Kendra Curriculum for BACHELOR of VOCATION in RADIATION & IMAGING TECHNOLOGY

(Under UGC – DDU Kaushal Kendra sanctioned to Shree Manibhai Virani & Smt. Navalben
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*B.S. Faculty
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Saurashtra University

B. Voc. Radiation & Imaging Technology

SEMESTER I

BVRIT: 101 Fundamental physics

1) Basic concepts: Basic Units, Heat, Acoustics etc. Basic concepts of power, work, force, energy - Einstein's formula - Electronics, Electricity & Magnetism, -electromagnetic waves - Units and measurements - temperature and heat-SI units of above parameters-Atomic structure- Nucleus - Atomic Number, Mass Number electron orbit and energy levels-Periodic table -Isotopes-Isobars-Ionisation and excitation.

2) Introduction to Vector Algebra :- Basics Concepts of vector, Vector addition Resolution of Vectors into component in 2 and 3 dimension Vector and Scalar products

3) Properties of Matter: -

Solid Mechanics: - Introduction to different elastic constant, Practical applications of elasticity

Fluid Mechanics: - Pascal Law and hydraulic lift, Bernoulli's equation and its applications Viscosity and Stokes's law and terminal velocity, Molecular interpretation of surface tension

4) Basics of Electricity and Electronic

Electricity :- Ohm's Law and Concept of Resistance , Series and Parallel Connections of Resistance , e.m.f. , internal resistance and terminal Voltage of cell , Wheatstone Bridge and Potentiometer circuit

Electronic: - Introduction to PN Junction Diode, LED and Photo Diode, Basics of Transistor and characteristics of transistor logic gates. – triode valves – cathode ray oscilloscopes. Self rectifying circuits

5) Fundamental of Optics

Ray optics: - Laws of reflection and mirror formula , Laws of refraction , change in height , depth , Image formation by lenses and Lens formula

Wave optics: - Interference. Young's experiment and condition of constructive and destructive interference, introduction to diffraction and polarization

Solid Mechanics: - Introduction to different elastic constant, Practical applications of elasticity

Fluid Mechanics: - Pascal Law and hydraulic lift, Viscosity and Stokes's law and terminal velocity , Molecular interpretation of surface tension

Saurashtra University
B. Voc. Radiation & Imaging Technology
SEMESTER I

BVRIT: 102 HUMAN ANATOMY & PHYSIOLOGY 1

1. General Anatomical Terms

2 Different parts of the body

3. Description of a typical animal cell: Cell mitosis; genes; sex cell; ova and spermatozoa. Fertilisation of the ovum. Broad lines of embryonic development. Cell function and differentiation of tissues.

4. Structure of General Tissues

Epithelium; simple and complex epithelia; glands skin. Connective tissue; fibrous tissue; cartilage; bone; Haversian systems; blood numbers and types of cells in blood clotting of blood. Muscle tissue; involuntary, voluntary and cardiac muscle. Nerve tissue.

5 Nature of neoplasm's : Common benign tumours. Malignant tumours and their dissemination

6 Bones, joints and locomotors system: General description of bones, their main processes and attachments

7. Thorax and Abdomen: Structure of thoracic cage, abdominal cavity; diaphragm and mediastinum.

8 Heart and Blood Vessels : Structure and function of the heart, pericardium, peripheral vascular system; names of main arteries and veins, circulation. Common terms used in connection with diseases of this system.

9. Respiratory system : Nasal passages and accessory nasal sinuses, pharynx and larynx, trachea, bronchi and lungs; pleura, nature and function of respiration. Common terms used in connection with diseases of this system.

10. Lymphnode Groups: Lymph and tissue fluid, main lymphatic gland groups and drainage areas, lymphoid tissue and tonsil.

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SEMESTER I

BVRIT: 103 Basics of X – Ray technology

- 1) Basic of X-rays : Discovery of x-rays- properties-production- x-ray spectrum-bremsstrahlung and characteristic x-rays- X-ray tube; Coolidge tube, tube design, line focus principle-space charge effect, tube cooling- Modern x-ray tubes-stationary anode, rotating anode, grid controlled x-ray tubes, heel effect, off focus radiation, tube insert and housing- Tube rating-Quality and intensity of x-rays-,factors influencing them.
- 2) X-ray generator circuits: Vacuum tube diodes-semiconductor diodes-transister-rectification, half and full wave-self rectification – X-ray generator; filament circuit-kilo voltage circuit-single phase generator-three phase generator-constant potential generator Fuses, switches and interlocks-Exposure switching and timers-HT cables-earthling
- 3) Interaction of X-and Gamma rays: Attenuation of X-ray or Gamma rays-absorption and scattering-half value layer-coherent scattering-Photo electric absorption-compton scattering-pair production and photoelectric disintegration. X-Ray transmission through medium-linear and mass attenuation coefficients. HVT - TVT and interaction of charged particle and neutrons with matter. Interaction of X-and Gamma rays in body-fat-soft-tissue-bone-contrast medium-Total attenuation coefficient. Relative important of different types of interactions.
- 4) Physics of Diagnostic Radiology : Anode & Cathode - Thermionic diode – X-ray valves and tubes –principle and practical aspects – semiconductors – triode valves – cathode ray oscilloscopes – X-ray circuits – self rectifying circuits – half wave pulsating voltage circuits – full valve pulsating voltage circuits - measurement of high voltage – control of KV circuit – mA circuit. X-ray beam quality.X-Ray generators and circuits-Filament current and voltage, X-Ray circuits -primary circuit-auto transformer-switch and timers- principle of automatic exposure control and practical operation - filament circuit -high voltage circuits
- 5) X-ray tables :- -floating top table & variable height table. X-Ray Grids /Bucky Scattered Radiation -Significance of scatter – Beam limiting devices.-Grid principle and structure – Types of Grids - vertical bucky- versatile bucky -Stationary grid, parallel grid, focused grid – crossed grid, moving grid – Potter Bucky Diaphragm- Control of scattered radiation and grids/Bucky - Methods of minimizing formation of scatter radiation, types of grids and grid ratio- use of cones – diaphragm/ light beam devices - effectiveness of collimation - limitations of the primary beam/the light beam diaphragm -Effects of scatter radiation on radiograph image quality, patient dose and occupational exposure. X-Ray Cassettes & Intensifying screens:

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SEMESTER I

BVRIT: 104 Basic Functional English

1. Grammar

Determiners

Tenses, Defining a Verb, Chief forms of a Verb, Tense and Time, Further Division of Tenses, The Present Tense, The Past Tense, The Future Tense Active – Passive Voice, Introduction, Defining the Voice, Some General rules regarding the change of voice Modals & Auxiliaries, Introduction to Auxiliaries, The Primary Auxiliaries, Introduction to Modals, The Most Commonly used Modals, Important points about the Modals, Modals and Their Uses Prepositions / Prepositional Phrases

2. Writing Comprehension

Business Letters: Introduction, Functions of a Business Letter, Inward Structure / Layout of a Business Letter, Other Important Parts of Business Letter, Outward appearance of a business letter, Arrangement Styles, Salient Features of a Business Letter, Legal Aspects of a business Letters, Kinds of Business Letter, Inquiry & Reply Order & Reply Cancellation of order Complaint / Adjustment Sales Letter

3. Report Writing:

Introduction, The Nature of a Report, The P's of an Effective Report, Functions of a Report, Preparing a Report, Types of Reports, Press report

Job Application / Resume Writing. Introduction, a Cover Letter, Curriculum Vitae / Resume

Letters of Appointment & Resignation

Conversations based on everyday situation / Dialogue Writing. Introduction, Nature of Conversations, Purpose of conversation, Guidelines for Effective

4. Conversation Skills:

Proverbs used in Everyday Conversation with their Meanings / Explanations Comparisons used in Everyday Conversation, Practical Conversations

(1) Communication – Meaning, Features & Process

(2) Verbal & Non – Verbal comm.

Verbal, Oral Communication, Written Communication, Non – Verbal, Body language, Space Para language, others Group discussion skills, Meaning, Characteristic, Do's & Don'ts, Relevance, Moderating a group discussion, Presentation skills, Meaning, Planning a presentation skills, Preparing a presentation skills Delivering a presentation skills, Presentation skills, Public Speaking, Meaning, Essential of effective public speaking Facing Interviews, Importance, Do's & Don'ts

Saurashtra University
B. Voc. Radiation & Imaging Technology

LABORATORY COURSE

SEMESTER I

BVRIT: 105 PRACTICALS

Laboratory course of B.Voc. Radiation & Imaging Technology includes practicals based on following subjects.

- **Fundamental physics**
- **Human Anatomy & Physiology 1**
- **Basics of X – Ray technology**
- **Basic Functional English**