SENIOR SCHOOL

CURRICULUM

2016-17

VOLUME-IV
(PART-3)

Health and
Wellness Based Courses

CENTRAL BOARD OF SECONDARY EDUCATION
"SHIKSHA KENDRA", 2, COMMUNITY CENTRE, PREET VIHAR, DELHI – 110 301"

HEALTH AND WELLNESS BASED COURSES

1. Ophthalmic Techniques
2. Medical Laboratory Technology
3. Auxiliary Nursing & Midwifery
4. X–Ray Technician
5. Health Care Science
6. Health And Beauty Studies
7. Beauty Services
8. Medical Diagnostics

OPHTHALMIC TECHNIQUES

CLASS–XI
ELECTIVE
OPTICS (658)
THEORY

Time: 2 Hours ***Marks: 30***

1. The Propagation of Light Introductory 3

Rectilinear propagation of light, Pencils and Beams, Vergence, Pin-hole Camera, Shadow & Eclipse, the nature of White Light.

2. The Behaviour of Light on Reaching a New Medium 3

Reflection, Regular & Diffused, Laws of Reflection, Absorption & Transmission, Refractive.

Index, Laws of Refraction, Principle of Least Time, The Fundamental Laws of Geometrical Optics.

3. Reflection of Light of Plane Surfaces 3

Reflection, diffusion, regular reflection, experimental verification, principle of reversibility of light, Image due to a plane mirror, Image of finite object, optical image, location of images formed by a plane mirror, experimental verification, Image formed by inclined mirrors, parallel mirrors, Multiple images formed by a thick plane mirror, Application of inclined mirrors.

4. Reflection of Light on Spherical Surfaces 4

Spherical mirrors, definition of some important terms to show that focal length is half of the radius of curvature, Focal plane rule for sights, Images as any point object on the Principal axes, concave mirror, convex mirror, graphical construction of images, Relation between v.f. for a concave mirror and a convex mirror, Magnification, Images produced by a concave mirror when the object is placed in different position, Images produced by a convex mirror, when the object is placed on any point between its pole and infinity, summary of the result, parallax optical bench, Determination, of focal length of concave and convex mirrors, Distinction between the three types of mirrors, practical uses of mirrors, spherical alternation, parabolic mirror.

5. Refraction of Light on Plane Surfaces 5

Refraction experiment to show the bending of light rays on entering medium of different densities some simple experiments to show refraction of light, laws of refraction, courses of refraction, Experimental verification of the laws of refraction of lights, lateral displacement, refraction through several media of different refractive indices. Formation of image due to refraction of a plane surface, Determination of refractive index by travelling microscope, Determination of refractive index of a liquid by a concave mirror, some natural phenomenal due to refraction, Total internal Reflection, Reflection, Refraction indices of some substances with respect to air sodium-D line (589×10^{-8}) cm, Refraction of light through a prism, Angle of minimum deviation, Determination of the refractive index of the material of the prism.

6. Refraction of Light at Spherical (Lenses) 3

Spherical refraction surface, refraction at a convex surface and a concave surface, lenses, radii of curvature, principal axis, optical centre, principal focus, Focal length, principal section, Aperture, Focal, length of single spherical surface, refraction at the low surfaces of lens, Graphical constructions of images, conventions of sight, relation between object distance, images distance and focal length, Magnification, combination of lenses, power of a lens, Images produces by a concave lens when the objects is placed on any point between the optical centre and infinity, summary of results, conjugate focal length of lens, Determination of focal length of convex lens, Determination of focal length of concave lens, Distinction between the two types of lenses.

7. Optical Instruments 3

Photographic camera, the human eye, Comparison between the eye and photographic camera, defect of vision, the advantage of two eyes (Binocular vision), Three dimentional pictures (Steroscope), Three dimensional Motion pictures, Persistance of vision, Microscope, Astronomical and the Galilian telescope, the opera glass as simple binoculars, prism binoculars, Reflecting telescope, Advantages of refracting telescopes, periscope, projection lantern, Film strip projector, photographic enlarger, the episcope and apidiscope, cinematography.

8. Analysis and Synthesis of Light-Colour 3

Analysis of light by prism, synthesis of light, pure spectrum by spectrometer, the base of spectrometer, Emission and absorption spectores substances, Fraunhofer lincs, Spectrum Analysis, Invisible Spectra, Dispersive power of a prism glass, dispersion without deviation, Directive, Spectroscope, Chromatic aberration lenses an dits correction, Primary, Secondary and Complementary colours, Colours of transparent bodies, Colour of opaque bodies, colour mixed pigment, colour phenomenon in nature, the rainbow.

9. Nature of Light Interference 3

Early theories of light, objection of wave theory, the phenomenon of reflection as explained by Corpuscular theory of light the phenomenon of refraction as explained by wave theory of light.

PRACTICAL

Time: 3 Hours ***Marks: 70***

1.	To study the position and nature of images formed by a concave mirror as the object distance is changed.	**3**
2.	To study the position and nature of images formed by a lens as the object distance is changed.	**3**
3.	To determine the focal length of the concave mirror by two pin method.	**5**
4.	To determine the focal length of the convex lens by two pin method.	**3**
5.	To verify the laws of refraction and find out the refractive Index of the glass.	**5**
6.	To draw the ray diagram through prism and to prove (A+D) = (i+e).	**5**
7.	To determine the angle of prism by spectrometer.	**3**
8.	To determine the refractive index of prism by spectrometer.	**3**
9.	To determine the wave length of light using diffraction grating by Spectrometer.	**5**
10.	To compare the intensities of two sources by photometer.	**5**
11.	To determine the mechanical advantage and efficiency of an inclined plane and pulley system.	**5**
12.	To determine the unknown weight of a body using principle of moments.	**5**
13.	To determine the Specific gravity of a liquid by Specific gravity bottle.	**5**
14.	To determine the Specific gravity of a lead shots with the help of a specific gravity bottle.	**5**
15.	To determine the Specific heat of a solid (lead shots) by the method of mixture.	**5**
16.	To determine the latent heat of fusion of ice.	**5**

CLASS–XI
ELECTIVE
OPHTHALMIC TECHNIQUES (659)
THEORY

Time: 2 Hours ***Marks: 30***

1. Prism — 2

Path of light through a prism, Total reflection on a prism, Minimum deviation, normal incidence & emergence, Opthalmic prism, Images seen through prism, Refractometer.

2. Curvature Refraction at a Curved Surface — 2

Curvature: Measurement of curvature, Spherical aberration, paraxial rays, Refraction at a spherical surface (change of vergence) conjugate foci, focal length, images of object when point is not on axis, Image of a distant object.

3. Thin Lenses — 2

Form of lenses, Refraction by lenses, Focal power Conjugate foci & principal foci, Focal length, Chromatic aberrations, Image of extra-axial points, Object of finite size, Lateral magnification, Magnification of imgages in direction of axis, prismatic effects of a lens, Systems of two or more lenses, Effective power of a lens, Measurement of focal length & power with different methods.

4. Reflection at Curved Surfaces — 2

Introduction, Focal power, Measurement of focal power & focal length, Measurement of curvature of surfaces of lens.

5. Cylindrical & Sphero Cylindrical lenses — 2

Introduction, cylindrical surface, Refraction by cylindrical lens, Rotation test, Spherocylindrical lences, Refraction by spherocylindrical lens, Astigmatic beam (Sturm's conoid), Image of object to finite size.

6. Toric Lenses — 2

Transposition of toric lenses, Neutralization & marking of spherocylindrical lenses, Manufacturing limits, Baslicurve, Choice of lens form, Axis rotation, Optical prescription, Axis setting.

7. Ophthalmic Prism — 2

Vision through a prism, prism action, Measurement of prism deviation, the tangent a scale, Prism dioptre & degree of deviation, Prism power, Testing of prism, Effect of prisms on the eye, Meter angle, Compounding and resolving of prisms, Rotary prisms, Aberration of prism.

8. Decentration — 2

Lens as a series of prism, Power & prismatic effect, Marking of decentered spherical lenses, Decentration of a pair of spherical lenses, Decentration of a planocylinder, Prismocylinders, Decentration sph. Cyl. & teric, Effect on the eyes of lens decentration.

9. Bifocal Lenses — 2

Introduction, size & shapes of near portion, Requirements of bifocal lenses, Type of bifocal lenses, Multifocal lenses.

10. Photometry — 5

Photometry, Intensity of illumination of a surface, illuminating power of a source of light, candle power, luxmetre candle, luminous flux, inverse square law, verification of inverse square law, principal of photometry, Bunsen’s photometer, Rumford’s photometer.

11. Nature of Light — 2

Dual nature of light, Historical development, Wave motion, Simple Harmonic Motion (elementary idea), wave fronts, the electromagnetic theory, stimulated emission & optical pumping.

12. Dispersion & Colour — 5

Dispersion & Production of, pure spectrum, Spectrometer, Spectra & types of spectra (elementary concepts), Dispersive power, Achromatic lenses, Ultra-violet, Biological effects & Application of V.v., the infrared Biological effect, application of I.R.

PRACTICAL

Time: 3 Hours ***Marks: 70***

1.	Introduction to glass, material for grinding and machinery.	**5**
2.	Spherical grinding, low medium and high medium.	**5**
3.	Spherical grinding, low medium & high plus.	**5**
4.	Cylindrical & Sphere-cylindrical, grinding.	**5**
5.	Bifocal grinding.	**10**
6.	Prism with prescription.	**5**
7.	Verification of fabricated lens surfaces & power.	**5**
8.	Lens orientation, marking and cutting.	**5**
9.	Lens' edging and fitting.	**5**
10.	Verification of prescription and adjustment.	**10**
11.	Fitting of glasses on face and post fitting possible adjustments.	**10**

CLASS–XI
OPTIONAL
BIOLOGY OPHTHALMIC (657)
THEORY

Time: 2 Hours ***Marks: 30***

1. Anatomy and Physiology of Animals — 15

Introduction

Elucidation of life processes common to both plants and animals. Microscopic structure of tissues and organs of a mammal. Tissues, connective and epithelial tissues (all types), bone blood and lymph. A brief mention of haemobolesis, muscular tissue and nervous tissue, Organs, Stomach, small intestine, liver, pancreas, lung, spleen, kidney, skin, testis and ovary.

Fundamental anatomy and physiology of the Digestive system, (with reference to immunity), Excretory system, Nervous system with special reference to transmission of the nerve impulse, endocrine glands with a brief reference to the physiology of reproduction and fertility control.

2. Anatomy and Physiology of Plants (Only at Elementary Level) — 15

Meristems, Xylem and phylum, their cell elements and functions, Transport and storage of organic substances, transport of water and minerals. Internal structures of root, stem and leaves, secondary growth in dicot root and stem.

Photosynthesis, mechanism and important fators affecting the process, stomatal mechanism, Importance of macro and micro nutrients. Transpiration, Respiration, plant growth and development, Internal and External regulation of growth and development of plants, Tropic and turger movements.

PRACTICAL

Time: 3 Hours ***Marks: 70***

1. Preparation of temporary stained mounts of cheek squamous, epithelial cells of man, skin, squamous epithemlial cells of frog to study simple animal cells. **5**
2. Preparation of slides of frog buccal epithelium/gut ciliates of frog to study ciliary movement. **5**
3. Observation and making of labelled diagrams of microscopic structures of the following mammalian tissues, certilage bone, muscle (Unstriated, stiated and cardial) spinal card. 5
4. Dissection of rat and study of the general viscera and digestive systems. **5**
5. Study of human skeletal system. **5**
6. (a) Preparation of stained temporary slides of free and transverse section of root and stem and monocots and dicots, Observation and sketching. **5**

   (b) Study of monocot and dicot leaves from permanent slides.
7. Preparation of temporary stained slides for the study of secondary growth in dicot stem. **5**
8. Staining and observing microscopically the cell wall, components, Cellulose and lignum. **5**
9. To show ascent of sap through xylem tissues in plants. **5**
10. (a) Study of the stomata through temporary slide preparation and effect of light and darkness, and dehydration of the opening and closing of stomata. **5**
11. Study of the effect of carbon dioxide concentration on the rate of photosynthesis using an aquatic plant. **5**
12. (a) Study of rate of aerobic respiration in flower buds/leaf tissue/germinating seeds. **5**

    (b) Study of the anaerobic respiration of yeast and testing of the product (Alcohol and CO_2).
13. Identification (upto class) of amoeba, paramecium, hydra liver fluke, bug, shark or scoliodon, anaba, frog or toad calotes or house gecko, house sparrow, pigeon, guinea pig, or rabbit. **5**
14. Collection of Plants and Animal. **5**

CLASS–XII
ELECTIVE
OPTICS (658)

THEORY

Time: 2 Hours ***Marks: 30***

1. Selected-Ray optical imagery in mirrors. **1**
2. Selected-Ray optical imagery in lenses. **1**
3. Cardinal points and planes, thick lenses, and single refracting surfaces. **1**
4. Magnification, magnifying power and optical system. **1**
5. Power of lens. **1**
6. Transposition of spectabcle lenses, shapes and sizes. **1**
7. Grinding machincs. **1**
8. Grinding materials. **1**

9.	Tool and gauge and their testing.	**1**
10.	Spherical lenses.	**1**
11.	Cylindrical lenses.	**1**
12.	Bifocals and Multifocals.	**1**
13.	Ophthalmic prisms.	**1**
14.	Prisms effects.	**1**
15.	Obliques cylinders.	**1**
16.	Protective lenses.	**1**
17.	A spherical lenses.	**1**
18.	Special lenses-miscellaneous lenses and appliances.	**1**
19.	Nomenclature of prism and their uses.	**1**
20.	Opthalmic glass and physically form of lenses and ophthalmic lenses.	**1**
21.	Transmission density and opacity of a refracting glass and glass coatings.	**1**
22.	Cylinderical lenses, strum's coniod.	**1**
23.	Lens combinations.	**1**
24.	Aberration of lenses.	**1**
25.	Principle of fabricating various types of spectable lenses.	**1**
26.	Ophthalmic plastic lenses.	**1**
27.	Refractive media of eye and principle of visual imagery and corneal system and reticular system.	**1**
28.	Reduced eye and images formation including Guass Theorem.	**1.5**
29.	Aberration of eye.	**1.5**

PRACTICAL

Time: 3 Hours ***Marks: 70***

1.	Making of low minus sphere.	–3	**14**
2.	Making of low plus sphere.	+3	**14**
3.	Making of spheric cylindrical.	4	**14**
4.	Making of high minus spherical.	–2	**14**
5.	Making of plus spherocylinder +7 to +14 spheres + 1 to +6 cylinders.		**14**

CLASS–XII
ELECTIVE
OPHTHALMIC TECHNIQUES (659)
THEORY

Time: 2 Hours ***Marks: 30***

1.	**Errors of Refraction**	**1**
2.	**Subjective Examination**	**1**
3.	**Hypermetropin**	**2**
	(i) Aetiology.	

(ii) Optical condition.

(iii) Normal age variation.

(iv) Clinical pathology.

(v) Clinical symptoms.

(vi) Treatment.

4. Myporia **2**

(i) Aetiology.

(ii) Optical condition.

(iii) Clinical pathology.

(iv) Clinical symptoms.

(v) Prognosis.

(vi) Prophylaxis.

(vii) Treatment.

5. Astigmatism **2**

(i) Aetiology.

(ii) Optical condition.

(iii) Types of astigmatism.

(iv) Regular and irregular astigmatism.

6. Theoretical Basis of Optical Correction **1**

7. Anisometropia and Aniseikonia **2**

Anisometropia

(i) Vision .

(ii) Treatment.

Aniseikonia

(i) Aetiology.

(ii) Types.

(iii) Symptoms.

(iv) Investigation.

(v) Treatment.

8. Spectacle Lenses and Binocular Vision **1**

9. Aphakia **1**

(i) Diagnosis.

(ii) Optical condition.

(iii) Treatment.

10. Accommodation **1**

(i) The nature and mechanism of accommodation.

(ii) Physical and Physiological accommodation.

(iii) The range, amplitude and availability of accommodation.

(iv) Associated phenomenon.

(v) Fatigue of accommodation.

11. Convergence **1**

(i) Volumtary and reflex convergence.

(ii) Measurment of convergence.

(iii) Relation with accommodation.

(iv) Binocular accommodation.

(v) Fatigue of convergence.

12. Anomalies of Accommodation and Convergence **1**

Presbyopia

(i) Ill sustained accommodation.

(ii) Spasm insufficiency.

(iii) Ill sustained accommodation.

(iv) Inertia and paralysis.

(v) Cycloplegia.

13. (a) Anomalies of Convergence **1**

(i) Convergence insufficiency.

(ii) Errors of Refraction: Anomalies of Refraction.

14. Frames **1**

(a) Introduction.

(b) Metals.

(c) Tortoise shell.

(d) Plastic and synthetic materials.

(e) Types of spectacles.

(f) System of measurement and frame measurements.

(g) Lectures on combination of lenses.

– Principal of Ophthalmoscope.

– Retinoscopes and other ophthalmic equipment, microscopy, telescopes etc. For which the lense manufacture is required.

15. System of Measurement of Frame Measures **1**

(a) Datum system.

(b) Boxing system.

(c) Gomac system.

(d) Frame measurement.

16. Frame Measurement **1**

17. Lens Shape **1**

Definition of lens shapes.

(i) Standardization of lens size measurement.

(ii) Major minor relationship.

(iii) Measurement of angles.

18. Joints **1**

(i) Position of joints, angles of joints.

(ii) Frontal width and tempal width.

19. Contact Lens **1**

20. Causes of Visual Impairment and Blindness **1**

21. Classification of Low Vision Aids and Special Features of Groups and their Mode of Motion **1**

22. Visual Requirement in Industries **1**

Ophthalmic lens

(a) Optical machineries.

(i) Grinding machinery.

(ii) Edging and fitting machinery.

(b) Grinding material.

(c) Tools and gauges and their testing.

(d) Fusing of bifocal lenses.

(e) Coating of Ophthalmic lenses.

(f) Making of different types of lenses.

(g) Plastics lenses.

23. Prevention of Industrial Injury and Special Service to Aid this **1**

24. Protective Lenses **1**

Radiant energy: Effects of radiations on eyes, Absorption of radiations by glasses, Some protective glasses available, Further effects of tinted- glasses, metalic eye protectors, protection against mechanical injury, globular lenses, reinforced (safety) glasses.

25. Thick Lenses **1**

26. Lens Form and Thickness, Effective, Equivalent and Vertex Power **1**

PRACTICAL

Time: 3 Hours ***Marks: 70***

1. Fitting round in Metal Frame. **5**
2. Fitting round in Plastic Frame. **5**
3. Fitting shaped in Metal Frame. **5**
4. Fitting shaped in Plastic Frame. **5**
5. Heating of frames for fitting. **5**
6. Making of one piece bifocal. **5**
7. Fitting for biofocal. **10**
   (a) Kryotoic.
   (b) Executive.
   (c) One piece bifocal.
   (d) D-shaped bifocal.
8. Making of kryptoic bifocal. **5**
9. Making of plane prisms. **5**
10. Making of prism with cylindrical lens. **5**
11. Making of prisms with spherical lens. **5**

12. Fitting with decentration. **5**

13. Making of bifocal with prism. **5**

CLASS–XII
OPTIONAL
BIOLOGY OPHTHALMIC (657)
THEORY

Time: 2 Hours ***Marks: 30***

1. Cell Biology **5**

Introduction: Cell theory, Cell as a unit of life, Tools and techniques of cell studies, Microscopy (use of microscope and calibration), Elements of microscopes, Electron Microscopy elementary knowledge of principles. Biomembranes – Transport mechanism, cellular respiration, Cell organelles structure and their functions enzymes, and hormones-their chemical and physical structure, mode of action, Role of regulation of cellular activities, Nucleus chromosomes, DNA structure including events in replication and transcription, Genetic code, protein synthesis.

2. Genetics **5**

Mitosis, and details of meiosis, and meiosis compared and constrasted, significance of meiosis, Monohybrid and bi-hybri crosses, Mendel's laws of inheritance, Linkage and Crossing over, discovery of linkage, stage at which crossing over occurs, Non-mendelian Inheritance, Reasons for the success of Mendal in his experiments, Sex-linked inheritance, Neurospora genetics, Gene interaction and expression.

Mutations

Discovery, types of mutation, mutations in, diploids and haploids, physical and chemical mutagens, Continuous and discontinuous variation, Role of mutations in evolution, Role in Agriculture and Animal husbandry.

Mendelism as the basis of genetics, Factor from gene to cistron, One Gene, One enzyme and the cistron-one poly peptide chain.

Quantitative inheritance, example of quantitive inheritance. e.g. colour of wheat kernel, colour of skin in man etc. Monogenic vs. Polygenic inheritance.

Human genetics, Human chromosomes, Numerical changes, Polygenic inheritance, Blood grinning Isomatic cell genetics, Protoplast fusion, Manmads hybrids, sex-linked characters, Genetic disorders-Genetics and society, Improvement of Plants and animals, conservation of gene pool, Genetic counselling, Genetic engineering.

3. Basic Features of Development in Animals **5**

Formation of genes, Structure of ovum, types of eggs, example of insect, frog chick and mammalian eggs, structure of sperm motility and number of sperms.

Fertilization - Aspect, sites and types, cleavage, significance, types, difference from ordinary mitosis, Gastrulation - Process and results.

4. Significance of Life Cycles with Special Reference **5**

To alternation of generation as exemplified in spirogyra: Funaria, Dryopteris, Pinus and angiosperms (No structural details), Elements of tissue and Organ culture, Differentiation, concept of cellular totipostency, normal growth in plants.

5. Human Diseases **4**

Definition of diseases, classification, general account of causes and control, immunity and chemotherapy, Diseases of Man: Typhoid, Tuberclulosis, Plague, Cholera, Polio, Rabies, measles, Ring worm, dandruff worms and dysentery.

(Different types of pathogens such as bacteria, viruses and virus like organisms, fungi, helminthes, protozoa.)

Sources of infections, infection and contagion, economic importance of diseases, methods of prevention and biological control).

6. Forestry **3**

Elementary idea of forest wealth and conservation.

7. Industrial use of Microorganisms

Fermentation, Alcohol and Antibiotics. **3**

PRACTICAL

Time: 3 Hours ***Marks: 70***

1. To show cytoplasmic streaming movement in Plant Cell (Hydrilla) villisnerial (Rhoco) and factors affecting the same Temperature (hot and cold). **4**
2. To study the function of plasma membrane: Hasmolysis and plosmolysis. **4**
3. Demonstration of the factors affecting the selective permeability of the cell membrane. **6**
   (a) Effect of temperature.
   (b) Effect of chemicals, benzene, formalin.
   (c) Effect of concentration of solute.
4. (a) Enzymatic hydrolysis of protein and starch. **4**
   (b) Factors affecting enzymatic activity, Temperature, Chemicals, Formaline, Benzene, Chloroform.
5. Demonstration of dehydrogenises using methyline blue as electron acceptor. **4**
   (a) Study of various stages of mitosis from permanent slides.
   (b) To study the various stages of mitosis from squack preparation of onion/ Garlic root tips.
6. Study of various stages of meiosis from permanent slides. **4**
7. To study the above from squack preparation of flower buds of grass hopper's testis. **2**
8. Preparation of model of DNA molecule to show double helical organization. **5**
9. To demonstrate sex-chromation from buccal smear. **2**
10. Practical exercise on data supplied to show dihybrid ration. **4**
11. Practical survey of human genetic factors-such as rolling of tongue: tasters and non-tasters, colour blindness, attached earlobes, texture of hair, close data to be pooled and interpreted on the basis of statistics. **3**
12. Study and sketch the development of angiosperms from permanent slies. **5**
13. Dissection and display of the following systems in Rat: **5**
    (a) Digestive system.
    (b) Arterial system.
    (c) Venous system.
    (d) Reproductive system (male/female).
    (e) Urinary system (male/female).
14. Preparation of Seman slides from male rat's testis to show the motility of sperms. **3**
15. Study and sketch the development of Mammals from permanent slides at least. **4**
16. Study and sketch of ecto and endo parasites e.g. Entemoeba, Liver fluke, Tapeworm, Ascaris, Bed bug, and louse. **2**

17. Separation of the chlorophyll pigments by simple paper chromatography. **4**

18. Projects/investigatory experiments. **5**

LIST OF RECOMMENDED BOOKS

1. **Optics and Refraction** by Prof. L.P. Aggarwal.
2. **Optics** by Finchis.
3. **Emsley's and Swaine's Opthaimic Lenses** by AG. Bannet. Vol. I & II London (The Hallon Press Ltd. Columbia House, 69, Aldwyeb, W.C. 2, 1968).
4. **Practice of Refraction** by Dubsley.
5. **Anatomy of Eye** by Wolf.

SUGGESTED LIST OF EQUIPMENT

(for a batch of 16 students)

1. **NWI-51**

   One set of 2 Nose Hand Edging Machine 12th size fitted with 12th dia. India stone of fine grains with steel table with elect, motor of ½ H.P. Single phase (Crompton) and switch (Stone is Grindwel Norton Ltd.).

   DATA **Table Size 42" 24" 30"**

   Top plywood and covered with G.I. Sheet. Heavy duty steel angle iron frame. Approx. Weight 60 kgs.

   POWER **½ H.P. Elect. Motor of Single phase AC. Voltage (Crompton) used in each set**.

2. **NWI-52**

   2 Sets of 4 singles Sph. Machine each with elect, motor of 10 HP. (Crompton) single phase AC. And switch with gun metal bushes and aluminium tubs.

   DATA **Table size 90" 33" 33"**

   POWER **1 H.P.Elect Motor of single phase AC. Voltage (Crompton) used in one set.**

3. **NWI-53**

   2 Sets of 4 singles Cyl. Machine each with Elect. Motor of 1 H.P. (Crompton) single phase AC. And switch with gun metal bushes and aluminium tubes."

   DATA **Table size 78" 33" 30"**

   Heavy duty steel angle iron frame. Top plywood and covered with G.I. sheet (approx. Wt. 4½ quintal each set.

   POWER **1 H.P. Elect, motor of single phase AC. Voltage, (Crompton) use in one set.**

4. Spherical Tools (plus and Minus).

   One set of 81 pairs Sph. Tools from 0.00 to 20.00.

5. Cylindrical tools (plus and Minus).

   (i) One set of 24 pairs Cyl. Tools Tone base (6.00) from 0.25 to 6.00 Cyl.

   (ii) One set of 24 pairs Cyl. Tools Flat base (6.00) from 0.25 to 6.00 Cyl.

6. Set of Gauge (Brass).
7. One set of Tools (Bifocal).
8. One Focimeter.
9. 12 Doz. Buttons sph.
10. 12 Doz Buttons cyl.

11. Misc. consumable articles.
12. Geneva lens Measure.
13 Ophtalmoscope and Retinoscope.
14. Fissing Oven.
15. Low vision aids, hand stand magnifier.
16. Loupes.
17. Edging Machine Diamond.
18. Trial Box.

MEDICAL LABORATORY TECHNOLOGY

CLASS–XI
ELECTIVE
LABORATORY MEDICINE (660)
(CLINICAL PATHOLOGY, HEMATOLOGY & HISTOPATHOLOGY) (MLT)
THEORY

Time: 2.5 Hours ***Marks: 50***

1. Clinical Pathology **12**

- General Principles of Laboratory Organisation.
- Components and function of Laboratory.
- Staffing of Laboratory, job description.
- Specimen handling, transport, preservation and disposal.
- Laboratory Safety and Laboratory hazard.
- Care of instruments, equipment maintenance.
- Basic principles of quality control.
- Ethics, Code of conduct and interrelationship.

2. Haematology 13

- Introduction to Haematology, Significance and composition of blood.
- Collection of blood samples.
- Haemopoises.
- Red blood cells (RBC)

  Functions, normal values RBC counting, interpretation, significance in health and diseases.
- White blood cells (WBC)

  Leucocyte normal values, WBC total count, different count, Romanowsky stains, staining procedures, normal values interpretation in health and diseases.
- Haemoglobin (Hb)

  Normal and abnormal haemoglobin, various methods of estimation, including automation procedures, clinical importance.
- Packed Cell Volume (PCW)

  Hematocrit, Micro and Macro methods, clinical importance.
- Absolute Values

  MCV, MCH, NCHC, definition, calculations, clinical importance.
- Anemias

  Morphologic anemias.

  Iron deficiency anemia.

  Clinical significance.

  Erythrocyte sedimentation rate (ESR)

  Westergren's method, Wintrobe's method, Factors affecting ESR, Corrected ESR. Clinical importances.

3. Urine Fluids and Stool 12

- Urine Analysis: Formation of urine, composition of urine, normal and pathological constituents.
- Sputum: Collection methods, AFB stains.
- Peritoneal and Pleural fluids: Physical and microscopic examination, Clinical importances.
- Semen: Methods of collection, Physical, chemical and microscopic examination, Sperm count and clinical importance.
- Gastric Analysis: Composition of Gastric juice, Methods of collection, Gastric analysis, Tubeless gastric analysis, Clinical significance.
- Stool: Methods of collection, Concentration, Preparation methods, Physical, chemical, and mircroscopic examination, Morphology of various and cyst in stool.
- Histopathology and Cytology

4. Histotechnology (Elementary) 13

- Introduction of subject, Cell, tissue and their function.
- Methods of examination of tissues and cells.
- Fixation of Tissues: Classification of fixatives, simple fixatives and their properties, cytological fixatives, Histochemical fixatives.
- Tissue Processing: Collection of specimen, Labelling and processing, Dehydration, Impregnation, Embedding.
- Quality control and automation in Histotechnology.

- Section Cutting: Microtomes and microtome knives, techniques of section cutting.
- Staining: Use of various routine stains in histotechnology, staining technique of haematoxylin and eosin, mounting of section.
- Cytology: Cytotechniques, elementary knowledge, preparation of cytology slides, FNZC (Fine Needle Aspiration Cytology), Papanicolaou staining. Giemsa staining, Sex chromatin staining.

PRACTICAL

Time: 2.5 Hours ***Marks: 50***

1. Clinical Pathology 25

(a) Practice of drawing of blood from finger and from vein under expert guidance. **5**

(b) Demonstration of prepration of anticoagulants, RBC fluid, WBC fluid, fluid for eosinophil count and platelet counts. **5**

(c) Demonstration of PCV and ESR measurement by wintrobe and westergrene methods. **5**

(d) Practicals-RBC Count. Total WBC Count Hb-Estimation, Different Count. **5**

(e) Urine Examination: Routine examination, Physical, Chemical, Microscopic examination. **2.5**

(f) Stool Examination: Demonstration of ova and cyst of nematodes and cystodes. **2.5**

2. Histopathology and Cytology 25

(a) Demonstration of use of various microtomes. **5**

(b) Demonstration of section cutting and preparation of slides, demonstration of use of automatic tissue, changer, tissue processing procedures. **5**

(c) Demonstration of or preparation of formal saline and various fixatives of common use and decalcifying fluids. **5**

(d) Demonstration for sharpening of knives. **5**

(e) Practical: Staining of slides, using. **5**

(i) Haematoxylin and eosin stains and examination under microscope.

(ii) Preparation and fixation of cytology smears, staining, smears by Papanicolaou's/ Giemsa technique.

CLASS–XI
ELECTIVE
CLINICAL BIOCHEMISTRY, MICROBIOLOGY (MLT) (661)
THEORY

Time: 2.5 Hours ***Marks: 50***

Biochemistry 25

1. **Introduction to Biochemistry:** Definition, aim and scope of biochemistry.
2. **Fundamentals of Organic Chemistry, Organic Compound Definition.**
   - Amines, Aldehydes, Acids, Phenols, Esters, Ketones, Colloids.
3. **Elementary Knowledge of Analytical Biochemistry.**

   Definition, principles, functions and uses of instruments & elementary colorimetry, balance centrifuge: colorimeter photoelectric colorimeter; Visual colorimeter, flame photometry, spectrophotometer,

Electrophoresis, Standard Calibration Curve, Lambert Beer's Law, Principles of Chromatography, Thin Layer Chromatography.

Definition of solution, Normal Standard solution, Buffer solution, Molar solution.

Methods of expressing concentration (percent, molar, normal).

4. **Elementary Knowledge of Inorganic Biochemistry.**
   - õ Structure of atom, atomic weight, molecular weight, gram molecular weight: equivalent weight, gram equivalent, acids, bases and salts.
   - õ Hydrogen ion concentration and measurement, indicators and buffer preparation.
5. **Elementary Knowledge of Enzymes and Coenzymes.**
   - õ Vitamin and Vitamin deficiency diseases.
6. **Non Protein Nitrogenous Compounds.**
   - õ Definition, Elementary knowledge of formation and functions; Estimation of urea, creatinine and uric acid.
7. **Serum Electrolytes and Ions.**
   - õ Determination of Sodium & Potassium Chloride, Serum Calcium, Phosphorus, Clinical importance, (Interpretation).

Microbiology **25**

1. Introduction to Microbiology: Historical aspects, relationship of microorganism to man, Microorganism in diseases and health.
2. Sterilisation and Disinfection, Physical, chemical and mechanical methods.
3. Disposal contaminated media, Sterilisation of media, syringes, glass wares apparatus.
4. Classifiaction and morphology of bacteria, Structure of a cell, capsule, flagella, spore, Bacterial pathogenesity.
5. Staining of bacteria: Gram, Zeihl-Neelson, Albert Stain, Spore Stains.
6. Bacterial metabolism, growth requirement of bacterial, cultivation of microorganism.
7. Identification of bacteria and preparation of culture media, General types of media: common use in laboratories, methods of making film/smears preparation.
8. Stains: Simple Stains, Grain's Staining method, Ziehl-Neelson method, modification of Ziehl-Neelson method, Albert stain, wet film-India ink, Stains spore, Stains capsule, Demonstration of flagella by modified Leif Son's method, Romanowsky Stains (Leishman's Stain, Giemsa stain) tests and reactions.
9. Cultural characteristics and Biochemical of common gram positive and Gram negative micrograms.
10. Principles of microbiological diagnosis: Diagnosis of diseases, direct indirect evidence, Morphological classification of Bacteria, Identification of Bacteria (Gram positive Coeeicolonies in blood agar, Gram negative Cocci Oxidase positive colonies on Bloodagar/Chocleteagar; identification of Gram negative Bacilli-growth in Mac Conkeys agar/DCA.
11. Anaerobic culture - general principles.
12. Classification and general properties of pathogenic fungi.
13. Immunology: Immunoelectrophoresis apparatus, Immunoglobins, immunologic Laboratory tests, Immunodiffusion, Immunoelectrophoresis, CIEP (Counter Immuno electro Osmophoresis, Precipitation, agglutination).

PRACTICAL

Time: 2.5 Hours ***Marks: 50***

Biochemistry **25**

Demonstration

1. Cleaning of glass ware.
2. Preparation of various solutions, Chromic acid was solution, Saturated solutions, various molar solutions, Buffer solutions.
3. Single pan balance, operation and maintenance.
4. pH-meter; components, maintenance.
5. Titration– Acid and Normal solution.
6. Use and Practice of various types of colorimeters and their maintenance.
7. Distillation of water, single distillation, double and triple distillation: all glass distillation.
8. Serum electrolytes Na^+, K^+ and CI', Ca^+, PO^+_4

Practical

1. Estimation of Blood Urea. **8**
2. Estimation of Serum Creatinine. **8**
3. Estimation of Serum Uric Acid. **9**

Microbiology **25**

Only one exercise to be given.

Demonstration

1. Care and Cleaning of glass wares, Syringes, and preparation of Pasteur pipette.
2. Operation and Maintenance of autoclave incubator, water bath, pH meter, vacuum pump.
3. Collection of clinical meterials - blood, urine, stool, swab etc. for bacterial examination.

Practical

(i) Hanging drop preparation. **8**

(ii) Gram's Stain. **8**

(iii) Giemsa's Stain/Leishman. **9**

CLASS–XI
OPTIONAL
ANATOMY AND PHYSIOLOGY (MLT) (662)
THEORY

Time: 2.5 Hours ***Marks: 50***

Human Anatomy

Elements of Anatomy can be dealt with as following.

The Human Body **1**

Its different parts, Common anatomical terms, Anatomical positions and important planes.

The Cell **2**

Structure, organelles and their functions.

Primary Tissues **2**

Primary tissues of human body, their classification, structure and functions.

Skeletal System 2

Its joints and movements.

Mouth and Pharynx 2

With special reference to Salivary glands and tonsils.

Thoracic Cavity 2

The Respiratory system: Pleura and the organs in site, Gross structure of the organs of respiration.

Heart and Pericardium 2

Gross structure of the heart and the pericardium, the artereal venous and the Lymphatic Systems.

Abdomen 1

Structure of Alimentary Canal, Oesophagus and Stomach, Planes and Regions of the Abdomen Abdominal Cavity and Peritoneum, Locations of Different organs in the Abdomen of site.

Gross structure of Stomach, Intestine, Mesentery Spleen, Liver, Gall Bladdar and Pancreas.

Urinary Tract 1

The Urinary tract, Gross Structure of Kidney, Ureter Bladder and urethra.

Genital Tract 1

The genital system, structure and functions of male and female genital organs.

Brain 5

Gross structure of brain, spinal cord and nerves, meanings and cerebrospinal fluid.

Surface Marking of Important Organs 4

Heart and Lungs.

Stomach, Liver, Kidney, Urinary Bladder and Vertebrae.

Parts of Upper Limb, Bones, Bony Landmarks and Important Vessels like Median Cubital Vein, Radial and Bronchial Artery, Parts of the Lower Limb, Bones, Bony Landmarks and Important Blood Vessels and Muscles for Injections Site.

Note: The lectures given should be aided with charts, models and by drawing diagrams emphasising on the site, size functions and relationships of the neighbouring internal organs.

Physiology

Blood 5

- Composition, classification and function.
- Description of blood cells, normal counts and functions.
- Normal value of specific gravity, viscosity etc.
- Cerebrospinal Fluid: Formation, composition and function.
- Composition and functions of lymph.
- Haemopoiesis, Haemopoietic tissues.

Clinical Aspects 2

- Blood group, ABO and RH Basis for classification determination.
- Importance of Blood Group, Anemia.

Cardio Vascular System 4

- Functions of Heart and Blood Vessels.
- Circulation: Systemic circulation, Pulmonary circulation.
- Cardiac Cycle: A brief knowledge of events.
- Nerve supply to heart and blood vessels.
- Definitions like: Cardiac output, pulse, blood pressure, electrocardiogram.

Respiratory System 3

- Naming the structures involved in respiration and their functions.
- External and internal respiration, mechanism of respiration.
- Respiratory centres to be mentioned.
- Transport of O_2 and CO_2 in Blood.
- Definition of respiratory rate, tidal volume, vital capacity, cyanosis.
- Artificial respiration, Hypoxia.

Excretory System 2

- Functions of Glomerulus and tubules, Composition of urine-normal and abnormal.
- Skin, Functions of skin.

Digestive System 3

- Composition and functions of saliva mastication and deglutition.
- Functions of stomach, composition of gastric juice, bilc, panereatic juice and succus entericus.
- Digestion of food by different enzymes, absorption and defecation.
- Nutrition, constituents of food.

Endocrine Glands 2

- Definition of endocrine glands, Naming the endocrine glands and the hormones secreted by them and briefly their functions.

Reproductive System 4

- Naming the primary and accessory sex organs in male and female.
- Naming the secondary sexual characters in male and female.
- Functions of ovary, formation of ova, actions of testosterons.
- Clinical Aspects: Vasectomy and Tubectomy, IUCD, Contraceptives.

PRACTICAL

Time: 2.5 Hours ***Marks: 50***

Anatomy 5

- Demonstration of parts of body and (body) Landmarks on the surface.
- Identification of Cells and Basic Tissues.
- The Skeletal system.
- Head and Neck.

- Identification of Important Organs and Muscles within Head and Neck.

Thorax 5

- Demonstration of Interior of Throax with Organs in site.
- Respiratory System and Picurace.
- Heart and Great Vessels.

Abdomen 5

- Identification and Demonstration of various organs within Abdomen.
- Liver and Gall Bladder.
- Peritoneum, Stomach and Intestines.
- Spleen, Pancreas and parts of Urinary System.

Central Nervous System 5

- Spinal Level and Site of Lumber Puncture.
- Surface Anatomy of important organs and Blood Vessels.
- Demonstration of Limbs with special reference to important Vessels and Muscles.
- Identification of certain models like those of: Brain, Heart, Embryology, Kindney.
- Guidance and demonstration of Museum Techniques.
- Fixing, Labeling and Storage of Specimens, Mounting, Labeling of Specimens.
- Arrangement of specimen systematically.

Note: Demonstration of Practical by

- Drawing Diagrams and Labelling. **1**
- Demonstration of Specimens. **1**
- Demonstration of models and skeleton. **1**
- The Microscope: Its usage, clearing, maintenance. **1**
- Identification of Blood Cells under the microscope, RBC, various types of WBC Platelets, Reticulocytes. **1**
- RBC behaviour in Isotonic, hypertonic and hypertonic, Sodium chloride solution. **1**
- Preparation of anticoagulants, double oxalate and sodium citrate. **2**
- Collection of Blood to obtain plasma and serum samples. **2**
- Haematocrit Estimation of various haematological parameters. **2**
- Identification of ruling area in Neubaures chamber. **2**
- Demonstration of usage of RBC and WBC pipette and westergrens pipette, Wintrobe tube. **2**
- Hemoglobin estimation. **2**
- Preparation of blood smears, Staining by Giemsa/leishman. **2**
- Demonstration of blood pressure recording and pulse. **2**
- Demonstration of normal and abnormal constituents of urine (e.g. glucose, protein, ketone bodies, bilesalts, bile pigments and blood). **2**
- Preparation of various stains. **2**
- Estimation of coagulation parameters like Bleeding time, clotting and prothrombin time. **2**

- Demonstration Practicals-Use and Practice of Haematological Parameters on Semi automated/and Fully automated haematological analyser to be shown. **2**

CLASS–XII
ELECTIVE
LABORATORY MEDICINE (660)
(CLINICAL PATHOLOGY, HEMATOLOGY AND HISTOPATHOLOGY) (MLT)
THEORY

Time: 2.5 Hours ***Marks: 50***

Immuno Haematology and Blood Banking **14**

Basic Principles of Blood Banking. Immuno haematology and Transfusion Medicine. Human Blood Group system-ABO Rh and other blood groups.

ABO Blood group system-Genetics and Biochemistry, Clinical significance of ABO system. Principles of ABO group determination. Bombay group, Blood group and disease.

Rhesus Blood group system-Genetics, Rh D positive and Rh D negative groups, D variagnt, clinical significance of Rh blood group system.

Other blood systems and their clinical significance. Blood group serology-Principle of Techniques. Antiglobulin (Coombs) test-Principles. Reagent, Utility of Direct and Indirect Coombs' test. Specificity, Sources of Blood for Transfusion-Voluntary, Replacement and Professional Blood Donors, Donor Panel and its utilisation.

Guidelines for Transfusion Practice: Selection of Blood and its components, Compatibility testing-Rationale, Major and Minor cross-matching, Design of the compability.

Haemaphoresis (Apharesis).

Blood Transfusion-Whole Blood Indication, Selection of Different Components for their uses.

Complications of Blood Transfusion and their prevention.

Investigation of Transfusion reaction.

Alternatives to Homologous Blood Transfusion and concept of Autologous Blood Transfusion.

Haemolytic diseases of Newborns.

Blood Banks and transfusion services – Standards, Organization and Planning.

Clinical Pathology **14**

Cerebral Spinal Fluid (CSF)- Composition, collection of the fluids physical, chemical, bectological & cell count, clinical significance.

Pericardial, Pleural, Peritoneal, Amniotic and Synovial fluids-Physical, chemical, cytological, bectological examination.

Exfoliative Cytology on sputum.

Quantitative Cytology on sputum.

Quantitative urine test for proteins, Bence Jones protein, Acetone body, urebilinogen Bilepigment & Porphobilinogen, Porphyrins & Porphyuria.

Evaluation of renal functions.

Normal and abnormal Haemopoiesis.

Anemia – Mechanism of production, Megaloblastic and Haemolytic anemias. Osmotic fragility, screening tests, clinical significance, Haemoglobinopathies normal and abnormal Hibsickle cell anemia-thalassemia, Bone Marrow smear-indications and significance, Leukemias acute and chronic leukemia, Aleukemic Leukemia and Leukemoid reaction.

Diagnostic significance of peripheral smears.

G6PD tests – Qualitative, clinical significance of G6PD – deficiericy.

LE – Cell phenomenon.

Platelets1- morphology, platelet count platelet deficiencies.

Coagulation: Factors of coagulation, mechanism, Preanrembin time, Bleeding time, Coagulation time.

Histopathology **12**

Frozen Section - use of crystal/freezing microtone, indications, uses, Staining procedures frozen sections, Decalcification - section of tissue techniques, assessment chelating agents, decalcifying solution, surface decalcification.

Specialised Techniques and Procedure of tissue processing, Plastic embedded sections and electron microscopy, Elementary knowledge Morphometry.

Special stains – Reticular stain, Anyloid, PAS, Pigments, Stains for connective tissues, cytoplasmic granules, nerve cells and nerve fibre.

Museum techniques – Preparation of specimen, fixation, restoration, colour preservation and presentation.

Cytology **10**

Vaginal smears: Hormone effects, changes, cervical smear inflammatory and neoplastic.

Sex chromtin buccal smear FNAC (fine needle aspiration cytology).

PRACTICAL

Time: 2.5 Hours ***Marks: 50***

(2 sessions of 1½ hr. each)

Laboratory Medicine **30**

õ	Immuno haematology and Blood Banking.	**10**
õ	Viva and record.	**5**
õ	Clinical Pathology.	**10**
õ	Viva and record.	**5**

Determination of blood group (ABO) Slide and tube techniques.

Cross matching–Methods of major and minor matching (Demonstration).

Rh–typing Slide technique, Demonstration of tube technique, Rapid tube test.

Saline and D. one stage Albumin technique, two stage albumin technique.

Coomb's antihuman globulin technique.

Coomb's test–Direct. Indirect test.

Donor Screening and selections (Observations).

Blood storage and maintenance (Demonstration's).

Demonstrations: Platelet count, Reticulocyte count, Absolute eosinophil count.

Clotting and Bleeding time.

Histotechnology and Cytology **(10+10)**

õ	Histotechnology.	**10**
õ	Cytology.	**5**

- Viva & Records. **5**

Histotechnology **10**

- Demonstration (i) Section cutting.
  (ii) PAS stain, Reticulin stain, Mucin stain.
  (iii) Museum technique.
- H & E Stain and Reporting under microscope for staining characterisation.
- Sex Chromatins stains.

Cytology **10**

- Demonstration (i) FNAC.
  (ii) Collection of cervical and vaginal smear.
- Staining smears Giemsas, papanicolau.

Note: Certification of class record and maintenance of each practical record to be submitted to external examiners.

CLASS–XII
ELECTIVE
CLINICAL BIOCHEMISTRY (MLT) (661)
THEORY

Time: 2.5 Hours ***Marks: 50***

1. Metabolism **18**

Carbohydrates: Definition, functions, classification, Metabolism of carbohydrates, Digestion and absorption of carbohydrates, Citric acid cycle, Hexose Monophosphate shunt, Glycogenolysis, Glycogenesis, Gluconeogenesis, Regulation of Blood Sugar, Diabetes Mellitus, Glycosylated Haemoglobin.

Lipids: Definition, Classification, Importance, General Lipid Metabolism, Digestion Absorption of Fat, Oxidation of Fatty acids, Ketosis, Lipoprotein metabolism classification of lipoprotein, Important lipid profile tests.

Proteins: Aminoacids, peptides and proteins: classification of proteins: Digestion and absorption of proteins, Formation of Urea, Transamination, Deamination, Plasma Protein, Liprotropic factors.

Nucleic Acid Nucleon Proteins: Definitions, Biological role of nucleic acid, nucleoproteins, Purnies and pyrimidines, Formation of Uric Acid.

2. Organ Functions and Enzymology **18**

(a) **Organ Functions.**

Kidney Functions Test (KFT): General consideration, Evaluation of KFT.

Liver Functions Tests (LFT): Liver functions, investigations of liver functions, uses of liver functions tests.

Pancreatic Function Test: Function of pancreas, pancreatic juice, pancreatic function tests.

Test for Gastric Function: General consideration: Chemical analysis of gastric contents, Clinical Significance, Tubeless gastric analysis.

Tests for Thyroid: Thyroid functions, importance of thyroid functions tests.

Cardiac Profile Test: General consideration, cardiac functions, Ischemic heart diseases, cardiac profile tests.

(b) **Enzymes:** Definition and Importance, Nomenclature and classification of enzymes. Specific enzymes, factors influencing enzyme activity; coenzymes, clinical enzymology, definition and importance of alkaline phosphatases, acid phosphatases, amylases, Transaminases (GOT, GPT) Lactic dehydrogenase.

3. Applied Clinical Chemistry **14**

- Importance of trace elements.
- Iron Metabolism/General consideration of Importance of Na+, K+, Cl,
- Ca+ fluoride, magnesium.
- Balanced diet.
- In born errors of metabolism, General Consideration & Clinical importance, Carbohydrate, Protein, Lipid, Nucleic acid Matabolisms, Acid base balance and disturbance of acid base balance, clinical importance.
- Vitamins: General consideration, clinical importance, vitamin deficiencies.

Hormones

- Introduction, General Mechanism of actions, Hormones of Thyroid Function, Pituitary Functions, Adrenal Functions, Male and Female hormones, function, clinical importance.

Jaundice

- Bile pigment derangements, Clinical Significance, Prehepatic, hepatic and post hepatic jaundice, applications of clinical Laboratory tests to differentiative types of Jaundice.
- Normal and abnormal value of clinical chemistry in relation of human diseases.
- General consideration and interpretations.

PRACTICAL

Time: 2.5 Hours ***Marks: 50***

Demonstrations

1. Analysis of gastric juice. **4**
2. Pancreatic functions tests (Serum Amylase). **4**
3. Glucose tolerance tests. **4**
4. Total Serum Proteins, Album globulin ratio. **4**
5. SGOT/SGPT, Alkaline phosphates tests. **4**
6. Hormone Assays: T_3, T_4, TSH. Oestrogen, Progestrone, Prolactin. **4**
7. Lipid Profile. **4**
8. CPK–MB. **4**
9. Paper and agar gel electrophoresis. **4**
10. Serum Electrolytes Na+Cl'. **4**
11. Demonstratino of Semiautomated/Fully automated biochemical analysers, Blood gas Analysers ELISA Beaders. **2**
12. Demonstration of disposal of Laboratory waste products and infected material. **2**
13. **Estimations of** **6**
    1. Blood Urea.
    2. Blood Sugar
    3. Serum Creatinine.

4. Serum Uric Acid.
5. Serum Cholestrol.
6. Serum Bilirubin.

Marking Scheme **50**

Practical (One exercise only). **30**

Class Record. **10**

Viva.

Note: Certification of Class Record and maintenance of each practical record to be submitted to external examiner.

CLASS–XII
OPTIONAL
MICROBIOLOGY (MLT) (662)
THEORY

Time: 2.5 Hours ***Marks: 50***

A. Bacteriology **25**

1. Normal flora of microorganisms in human body.
2. Gram positive and Gram Negative Cocci

   (a) Staphylococci: Morphology, classification, pigment production, coagulase test, Laboratory diagnosis.

   (b) Streptococci: Morphology, staining, cultural characteristics, pathogenicity and laboratory diagnosis.

   (c) Pneumococci: Morphology, staining characteristics, biochemical reactions, pathogenicity and laboratory diagnosis.

   (d) Meningococci: Morphology, staining characteristics biochemical reactions, pathogenicity, laboratory diagnosis.

   (e) Gonococci: Morphology, staining characteristics, biochemical reactions, pathogenicity, laboratory diagnosis.
3. Corynebacterium Diphtheriae: Morphology, staining characteristics, biochemical reactions, Diphtherical toxin shick test, laboratory diagnosis.
4. Mycobacterium tuberulosis and leprae: Morphology, cultural characteristics, diagnosis of amoebiosis Tuberculim test, Lab dianosis: a typical myobactorium, lepromin test.
5. Gram Negative bacilli (aerobic): morphology, cultural characteristics, pathogenicity and laboratory diagnosis of Salmonella, Shigella, E. coli, Klebsiella, Proteus, Psudomonas, Vibrio, EL TOR Vibrio.
6. Gram Positive bacilli (anaerobic): Morphology, cultural characteristics, pathogenicity clostradum, welchii, & lab diagnoisis of clostradium Tetani.
7. Methods: Laboratory Diagnosis of common bacterial infections:

   (a) Respiratory tract.

   (b) Urinary tract.

   (c) Urogenital.

   (d) Gastrointestinal tract.

B. Virology and Immunology **15**

Virology: Basic Fundamentals of Viruses: General properties of virus, classification, Cultivation and clinical importance of pathogenic viruses, General information: HIV (Human Immuno Deficiency Virus), Hepatitis B Virus, Non A and Non B Virus).

Immunology: General Principles and Fundamentals of Antigen, Antibodies, Immunoglobulins Apparatus, Immunoresponses, Antigen Antibody reactions and their application in diagnosis of diseases.

C. Parasitology **10**

Diagnosis of Protozoology: Morphology, Identification.

1. Phylum Protozoa

(a) Entamoeba Histolytica: Laboratory diagnosis of amaebiosis.

(b) Giardia Lambia.

(c) Blood and tissue flagellates – leishmaniasis.

(d) Plasmodium (genus) Cerebral malaria, Black water fever.

Helmenthology

2. **Phylum Nemathelminthes:** General characteristics, identification and Diagnosis of:

(a) Oviparous: Ascaris humbricoids, Trichuris Trichura, Ancylostoma Duodenale, Entrobius, Vermicularis.

(b) Viviparus: Dracunculus medinesnsis, Wucheria bancrofti, Brugia malayi, Trichenella Spiralls.

3. **Phylum Platyhelminthes:** General Characteristics, identification and diagnosis of:

(a) Cestodes, (Tape worms) Genus (a) Taenia, T. Saginita, T. Sodium (b) Hymenolepis H. Nana.

(b) Tremetodes: Schistosome.

PRACTICAL

Time: 2.5 Hours ***Marks: 50***

A. Bacteriology **30**

Demonstrations

(a) Preparation of various, simple, basic enriched and selective media.

(b) Procedure of sterilization and disinfections in Microbiology Laboratory.

(c) Disposal of infected and wastes product of Laboratory.

(d) Procedure of Registration, Receipt and processing of specimen of: Urine, Sputum, Stool, Various body fluids, Throat Swabs, etc. for identification and isolation of microorganisms.

(e) Investigation of 'hospital infection' materials, routine procedures for identification and isolation of microorganism.

(f) Bacteriological examination of water, milk, air.

(g) Anaerobic culture, identification and process of various materials.

(h) Demonstration of various biochemical reactions including sugar fermentations.

(i) Antibiotic disc preparations and reporting of sensitivity of organisms.

(j) Concentrations of techniques of stool preparation for identification of various Ova and Cysts, Record of morphology of each one of them.

(k) ELISA Tests for antigen and antibody detections.

Practicals

1. Identification of morphology of various bacteria, growth on:
   (a) Nutrient Agar.
   (b) Blood Agar.
   (c) Mc-Media.
   (d) DCA (Desoxy Cholate Citrate Agar).
   (e) Potassium tellurite Media.
   (f) L.J. (Lowen's in Jenson's) Media.
2. Preparation and record of staining characters of bacteria from growth agar media.
3. Hanging drop preparation and reporting of motility from broth (media).

B. Immunology **20**

1. Preparation of gel slides for agar gel diffusion, Counter current Immuno electrophoresis.
2. Widal test.
3. VDRL test.
4. Rheumatoid Arthritis (RA) test.
5. C–Reactive Proteins (CRP) test.

Marking Scheme

Section wise distribution

A.	Bacteriology (One exercise only).	30	
B.	Immunology (-do-).	10	
C.	Class record.		10*
D.	Viva.	10	

One–the–Job (OJT)

Full time working experience to be gained in any approved laboratory having facilities as per recognised curriculum. OJT should be held in Hospitals/Nursing Homes approved by Director Health Services/Director Medical Services/Director Medial Education (DME). Later on subject to approval of Para Medical Council of India whenever it come into existence.

(i) One month (4 weeks) at the end of class XI preferably after annual examination.

(ii) One month (4 weeks) before completion of class XII preferably during December January.

The training imparted by recognised teacher as per the norms, to be supervised and certified by Course Director. A Certificate of satisfactory completion of OJT will be issued by recognised hospital authorities in prescribed format to be finally countersigned by Course Director before the candidate appears for XII examination. The students of both the years during the OJT will maintain a workbook (as per appendix).

On–the–Job Training Phase–I (4 weeks duration)

Essential

1. Use and Practice of microscopes, calorimeters, water bath, incubators and autoclave, Centrifuge, analytical balance and maintain then for daily use.
2. Collection of venous and capillary blood samples from patients (at least 10 patients).

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* Certification of Class Records and Maintenance if each Practical record demonstrations and practicals to be submitted to external examiner.

3. Preparation of anti coagulants at least once.
   (a) Double Oxalate (b) EDTA
   (c) Sodium Citrate (d) Flouride
4. Cleaning of glass wares at least once: Wintrobe tubes, ESR–Westergren's tube, pipetters, glass slides, vials.
5. Hb Estimation by Sahli's cyanamethahemoglobin methods (6 sample by each candidate).
6. Urine routine qualitative Examination, (5 sample by each candidate).
7. Stining of Slides by Giemsa/Leishman Stains, (5 sample by each candidates).
8. Staining of Slides by Gram's method, (5 sample by each candidates).
9. Staining of slides by ZN Stains, (5 sample by each candidates).
10. HE Staining of Tissue sections (5 slides).

Desirable

1. Exposure to hospital environment various specialities, visit to various laboratories and organisation system.
2. Complete understanding of Registration & Receipt system of samples, flow system of sample till report of samples of various kind.
3. Disposal of waste material of laboratories visit to insinuators.
4. Knowledge of Hospital Hazard and Safety Procedures.
5. Exposure to Semi Automation and Automation techniques.
   (a) Haematology Analysers.
   (b) Biochemistry Analysers.
   (c) ELISA Readers.

On–the–Job Training (Phase–II) (4 week duration)

Essential

(At least 5 samples of each estimations)

1. Haemogram Estimation (Hb, TLC, DLC, ESR, PEV).
2. BT, CT, Platelet count.
3. Blood Grouping (ABO, Rh typing).
4. Cross Matching.
5. Complete Routine Urine Examination and reporting results.
6. Stoll Examination and reporting of at least 4 different types of Ova and Cyst in the sample (2).
7. Urine Examination for Pregnancy Test.
8. Semen Examination and reporting of sample.
9. Estimation of Blood Sugar, Blood Urea.
10. Serum Chemistry: (5 sample each). Serum Creatimine, Serum Cholestorl, SGOT/SGPT, Alkaline Phosphate.
11. Preparation and staining of smears sputum for AFB, Pus Smears for Gram's Staining.
12. Processing of Urine, Blood for Culture and Sensitivity.
13. Widal test.
14. VORL test.
15. Agar get preparation of slides for CIEOP.AGD.
16. H & E Staining of tissue.

17. Vaginal Smear preparation for screening of Trichomonas Vaginals and Momliasis.

Desirable (At least once)

1. Observation of working of Haematology Analysers, Semi automated/Fully automated Biochemistry analysers, ELISA reader–Use for HIV, Hormone Assays.
2. Blood Donor Selection, Blood donation camp/donation procedure, preservation storage and issue of blood to recipient.
3. Demonstration of Lipid Profile and cardiac Profile investigations using kits.
4. Demonstration of Coagulation Profile PT, PTTK, Anti–III etc.
5. Stock culture maintenance of various micro–organism.
6. Scrotyping of various entcrobactcriacc grou. Specifically Esch, Colo, Vibrio;, Salmonalla, Shigella Organisms.
7. Special Staining of Histopathology–Reticutin, PAS, Mucin.
8. Fine Needle Aspiration Cytology (FNAC) at various tissues (observation of at least 5 patients).

CERTIFICATE OF ON JOB TRAINING

Certified that Miss/Shri .....
D/o/S/o..... Roll No. ..... of school .....
..... has satisfactorily complete the On–the–Job Training of 8 weeks from dated ..... to ..... in Phase–I and from dated ..... to ..... in Phase–II at ..... under supervision of recognised expert(s) as per norms laid down.

Name of Supervising Teachers(s) .....

Subject.....

Signature

Head of the Department .....

Head of the Institute .....

COUNTERSIGNED
COURSE DIRECTOR
VOCATIONS (MLT COURSE)

ANNEXURE

On Job Training
Worksheet (Day–to–day Work)

Name of the student ..... Roll No. .....

School ..... Class .....

Day/Date of Practical	Name of the Practical/ Demonstration Performed/ seen	Number of Practical completed in each category record of patients, date, name, OPD no(s).	Name of the Laboratory/ hospital/ institution with date(s)	Name and signature of Supervisor/ tutor	Remark

LIST OF RECOMMENDED BOOKS

A Medical Laboratories for Developing Countries.

M. King, ELBS Series, Oxford University Press, Reprint 1990.

A Hand Book of Laboratory Technology.

V.H. Talib WHO Sponsored, CBS Publishers, 1994, 2nd Edn.

Naidainik Chikitsa Vigyan Prayogshala Taknik Pustika.

V.H. Talib, WHO Sponsored, Inter Print Publishers, 1992 Edn.

A Text Book of Biochemistry.

S.P. Singh, 1993, Edn. CBS. Publishers, New Delhi.

Anatomical. Atlas of the Human Body.

MAH Siddiqui, 1989 Edn.

A Text Book of Histology – Colour atlas and test 2nd End.

Krishna Garg. Mohini Kant 1991, Reprint.

Chaurasia's A Hand Book of General Anatomy 2nd End. Sixth Reprint 1994.

Biochemistry and Clinical Pathology (Theory & Practical).

K.K. Pollai, J.S. Qadry, Ist Edn. 1994.

Haematology for Students.

V.H. Talib, S. K. Khurana, CBS Publishers, New Delhi. 1994, Edn.

Blood Banking & Transfusion Medicine.

V.H. Talib, A.B. Dutta, First Edn, 1994 (Under Print).

Clinical Biochemistry Principles and Practice.

Praful. B. Godkar, Ehalani Publishing House, Bombay, 1994, Edn.

Laboratory Medicine (Clinical Pathology) for Students and applications.

V.H. Talib, S.K. Khurana, 1st Edn. 1994, (Under Print).

A Hand Book of Microbiology for Students.

P.S. Bisen, Kavita Verma, 1st, Edn. 1994.

Medical Parasitology.

K.D. Chatterjee, 1990, Edn.

Paracitology (Protozoology & Halminthology).

Sood, Fourth Edn. 1993.

Medical Parasitology for Students.

V.H. Tablid, 1st Edn. 1994 (Under Print).

Anatomy and Physiology for Nurses (Edn).

E.C. Pearce 16th Edn. Oxford University Press.

Medical Laboratory Technology (Edn.)

Manual L. Mukherjee, 1988, Tata, Mc Graw Hill (3 Volumes).

Practical Biochemistry 3rd Edn.

S.B. Singh, 3rd Edn. 1994.

A Hand Book of Histological and Histochemical Techniques.

S.K. David, Fourth Edn. 1991.

Population Dynamics.

Dr. C.V. Prasad, & Prof. P. Raja Ram.

LIST OF REFERENCE BOOKS FOR FURTHER READING

Books	Author's Name
Clinical & Diagnosis Management.	Laboratory Methods, Todd and Sandford Henry, 10th Edn. 1991. H.B. Saunder's Company, Philadelphia–London.
Anatomy and Physiology for Nurses.	TWA Gleniser, Jean RW Ross 1991 Edn. 3rd Edn.
Human Physiology Systemic and Applied.	Shalya, CBS Publishers, 1st End. 1994.
Text Book of Microbiology.	Anant Narayan, 1992, Edn.
Practical Clinical Biochemistry.	Harold Varley, 4th Edn. 1969.
Medical Laboratory Technology.	Lynch, GSM, 1990, Edn.
Medical Microphilogy.	Maekie & Mckartney, 13th Edn. ELBS, Services, 1989.
Basic Medical Laboratory Technology.	Ed. Kirk, Peel, James, Lewis, & Waft, 3rd Edn. 1988, Pitman.
Gel Immuno–diffusion Techniques in Research & Laboratory Medicine.	S.S. Kelkar. P.M. Khare, 1984, Edn. Popular Prakashan Bombay.
Laboratory Diagnosis in Medicine.	Asmt Hossian, Reprint Edu. 1994.
N.M.S. Haematology.	Emmanel. C. Besa,PM Cato Lano, Jaffery A. Kant. L.C. Jefereis, Harwal Publishing Philadelphia-London, Sydney, Tokyo, 1922, Edn.
A Text Book of Biochemsitry.	A. S. Saini, First Edn. 1994.
Immunology.	Ivan Rolt, Jonathan Brastaff, David Male, C.V. Mosby Company, St. Lonis, Toronto, 1992, Edn.
AIDS-Diagnosis Treatment and Prevention.	Anita Kotia, Govind Srivastava, First Edn. 1994.
Practical and Clinical Immunology.	Volume I, II, Second Edn. G.R. Talwar, S.K. Gupta, 1992.

LIST OF EQUIPMENTS REQUIRED TO IMPART TRAINING AT MEDICAL COLLEGE HOSPITAL, INSTITUTES

Minimum Requirements: (for a batch of 30 students).

A. Basic Instruments.

B. Instruments for Demonstrations.

C. Reagents & Chemicals, Glassware.

A. Basic Instruments (Approx. Cost 5 lacs)

1. Microscope with built in illumination. Monocular – 6

Binocular – 2

2. Calorimeter. – 1
3. Photoelectric colourimeter. – 1
4. Incubator – 1.
5. Hot Air Oven. – 1
6. Autoclave – 1.
7. Simple Balance. – 1
8. Haemoglobin meter Colorimetric. – 1
9. Single Pan Balance. – 1
10. Haemocytometer (Hellige). – 10
11. Water bath (Serological). – 2
12. Centrifuge Machine angle rotator with win tube adaptor, time & speed regulator. – 2
13. Inoculation Chamber Rotary. – 1
14. Microtome. – 1
15. ELISA Reader & Washer. – 1
16. Distillation Plant All Glass Double. – 1
17. Single Distillation. – 1

B. Instruments for Demonstrations (Approx. Cost 6 lacs)

1. Haematology Analyser (semi automated). – 1
2. Haematology Analyser (fully automated). – 1
3. Biochemistry Analysers (semi automated). – 1
4. Biochemistry (fully automated). – 1
5. ELISA Reader (automated). – 1
6. Electrophrasis Apparatus. – 1
7. Histo Kinett. – 1
8. Densitometer. – 1
9. Freezing Microtome. – 1
10. Tissue Processor. – 1
11. Mclntosch Apparatus for Anaerobic Culture. – 1
12. Laminar flow System. – 1

C. Reagents/Chemicals, Glass Wares

As per requirements of Diagnostic Laboratories for 40–50 samples per day.

CLASS–XI
ELECTIVE
CHILD HEALTH NURSING (731)

Learning Objectives

On completion of the course the student will be able to:

1. Assess growth and development of a child at different ages.
2. Describe nutritional needs of different age group of children.
3. Provide care to sick children during their common illness.

THEORY

Time: 2.5 Hours ***Marks: 50***

1. Growth & Development — 15

- Introduction to Growth and development.
- Factors affecting growth and development.
- Growth and development in infants and children: Assessment.
- Physical psychological and social development of children.
- Monitoring and recording of growth and development of infants and children.
- Care of infants and children – Play hygiene, emotional needs training for bowel and urination.
- Accidents: causes, precautions and prevention.
- Congenital anomalies.

2. Nutrition of Infants and Children — 15

- Exclusive Breast feeding.
- Nutritional requirements.
- Complementary feeding.
- Problems of feeding.
- Breast feeding counselling.
- Infant feeding and HIV.
- Baby friendly hospital initiative.

3. Care of the Sick Child — 20

- Common childhood disorders.
- Signs, symptoms and management.
- Vaccine for preventable diseases.
- Acute Respiratory tract infections.
- Diarrhoea vomiting constipation.
- Tonsillitis and mumps.

- Ear infection.
- Worm infestation.
- Accidents and injuries.
- Skin infections.
- Fever- malaria, measles.
- IMNCI strategy.

PRACTICAL

Time: 2.5 Hours ***Marks: 50***

Suggested Activities for Evaluation

Case Studies

- Brest feeding techniques.
- Preparation of ORS.
- Preparation of complementary feeds.
- Assessment of growth and development of children.

CLASS–XI
ELECTIVE
COMMUNITY HEALTH NURSING AND HEALTH PROMOTION (732)

Time: 2.5+2.5 Hours ***Mar***

Learning Objectives

On Completion of the Course the Student will be able to

1. Describe the concept of community health primary health care.
2. Understand health policies, plans and programme of the country.
3. Understand the concept of community.
4. Appreciate the role of the health team.
5. Demonstrate home visit techniques and practices in the community.
6. Describe structure, function, characteristics and administrative set up of a community.
7. Identify teacher, resources persons, community-based organizations, NGOs, and local resources.
8. Identify community health needs and problems.
9. Describe concepts and methods of communication for health information.
10. Describe the purpose, principles and methods of health counseling.

I. COMMUNITY HEALTH NURSING
THEORY **24**

1. Concept of Health

- Health and its changing concepts.
- Determinants of health.

- õ Determinants of health.
- õ Primary health care, definition components significance community application.

2. Community Health Practices

- õ Health concept of people and health care providers.
- õ Health behaviours beliefs and cultural practices of community.
- õ Ethics and behaciour related to community practices.
- õ Method of home visiting.

3. Health Problem and Policies

- õ Overview of health problem of communities in India.
- õ Trends and development to national health programmes and policies.
- õ National health programmes and its implementation at community level.
- õ Role and functions of Accredited social health Activists (ASH) Anganwadi worker Dai etc.

4. Health Organization

- õ Organization of SC PHC, CHC and district hospital.
- õ Organization of health care delivery system at different levels.
- õ Referral system.
- õ Health agencies international WHO, UNICEF, UNFPA, UNDPA World Bank, FAO, DANIDA, European Commission Red Cross, US aid, UNESCO, Colombo Plan, ILO CARE etc.
- õ National Indian Red Cross Indian Council for Child welfare, family planning association of India etc.
- õ Non-Governmental organizations.

5. Role of Health Team

- õ Team concept and functions of the health team.
- õ Role and Responsibilities of ANM/FHW.
- õ Code of ethics for ANM.

6. Structure of Community

- õ Rural community characteristics, development major rural problem.
- õ Urban community characteristics change and adjustments to urban environment major urban problem.
- õ= Administrative set up.
- õ Function of panchayat.
- õ 73rd and 74th amendments to constitution.
- õ Role of panchyat in health.
- õ Structure of an urban community slum.
- õ Social group organizations leaders.
- õ Community resources.

7. Dynamics of Community

- õ Social processes individual and process of socialisation.

- Interaction between different social group in the village.
- Traditions and customs and their influence on health.
- Social stratification influence of class caste and race on health and health practices.
- Family and marriage type.
- Changes & legislation on family and marriage in India marriage acts.

8. Community need an Assessment

- Scope and methods of community need assessment.
- Survey planning preparation of tools questionnaires. Interview schedules check list etc.
- Community survey principles and methods data collection conducting interviews focus group discussions (FGD) and case studies.
- Participatory learning for action (PLA).
- Analysis of data preparation of report.

9. Communication Methods & Media

- Principles methods of communication.
- Inter personal relationship (IPR) communication.
- Inter personal relationship (IPR) communication Contents.

10. With Different Groups and Health Team Member

- Types and use of AV aids.
- Use of local folk methods and media for disseminating health messages.
- BCCI (Behavioural change communication) IEC (information education and communication) Aims, Scope concept and approaches.
- Teaching learning process concept characteristic steps of learning process concept characteristic steps of leaning characteristic of learner.
- Principal methods of teaching.
- Planning of health education activities.
- Role and responsibilities of ANM's/Health workers in BCC.

11. Counseling

- Concept, principles and Techniques of counseling.
- Identifying needs and areas for counseling in the community.
- Role of ANM/ Female Health worker as counselor.

12. Community Based Rehabilitation

- Health conditions meeting rehabilitation.
- Community Resource available.
- Educate individuals family and community.

PRACTICAL **10**

Suggested Activities for Evaluation

- Health organizational chart.

- Return demonstration of home visit.
- Field visits.
- Preparation of IEC material.
- Demonstration of counseling technique.
- Village mapping .
- Community survey.

II. HEALTH PROMOTION THEORY

26

Learning Objectives

On Completion of the Course the Student will be able to

1. Explain importance of nutrition in health and sickness.
2. Promote nutrition of a individual family and community.
3. Explain principles of hygiene and its effect on health.
4. Describe hygiene for self and individuals.
5. Describe importance of environmental sanitation and waste management.
6. Promote mental health of individual family and community.

A. Nutrition

1. Essential Nutrients

- Importance of nutrition in health and sickness.
- Essential nutrients, function, sources and requirements.
- Classification of foods and their nutritive value.
- Normal requirements at different ages.
- Balanced diet for different diet for different age group.

2. Nutritional Problems / Nutritional Deficiencies

- Deficiencies correction, treatment and referral protein energy malnutrition.
- Vitamin and mineral deficiencies. Nutritional anemic in women.
- Under five nutrition.
- The role of ANM's/FHW/AWWs in supplementary food.
- Special diets of individuals for different age group.

3. Nutritional Assessment

- Methods of nutritional assessment of individual and family mother and child.
- Identification of local food sources and their value in enriching diet.
- Food fads, taboos, customs and their influence on health.

4. Promotion of Nutrition

- Planning diets and special diets for a family.
- Methods of using locally available foods for special diet.

- õ Principle and methods of cooking.
- õ Promotion of kitchen gardens.
- õ Food hygiene and safe reparation.
- õ Storage and preservation.
- õ Food adulteration.
- õ Precautions during festivals and melas.

PRACTICAL 10

Suggested Activities for Evaluation

- õ Cooking of special diet.
- õ Nutrition educating to a group.
- õ Planning diet of a family assigned.

B. Human Body and Hygiene

1. The Human Body

- õ Structure and functions of human body.
- õ Body systems and their functions digestive system respiratory system genitor urinary system cardiovascular system, nervous system muscular system, endocrine system, special sensory organs.

2. Hygiene of the Body

- õ Personal and individual hygienic.
- õ Care of mouth skin, hair and nails.
- õ Sexual hygienic.
- õ Menstrual hygiene.
- õ Hygiene and comforts needs of the Sick care of skin bath sponging back care, care of Contents.
- õ Pressure points position changing.
- õ Care of hair: hair wash.
- õ Care of hand and nails: hand washing.
- õ Care of eyes: eye wash.
- õ Mouth care.
- õ Elimination care of bowels and bladder.

3. Optimal Functioning of the Body

- õ Basic human needs.
- õ Rest, sleep, activity , exercise, posture etc.
- õ Food, eating and drinking habits.
- õ Participation in social activates.
- õ Self- actualization and spiritual need.
- õ Interpersonal and human relations.
- õ Lifestyle and healthy habits.

PRACTICAL 10

Suggested Activities for Evaluation

- Preparation of anatomy practical book.
- Return demonstration of personal hygiene including care of various organ of body.

C. Environmental Sanitation

1. Environmental Sanitation

- Environment and ecology for healthy living basic sanitary needs.
- Air, sunlight and ventilation.
- Home environment smoke, animals water drains and toilets etc.

2. Safe Water

- Source of water & characteristic of safe water sources of contamination and prevention.
- Purification of water for drinking methods small and large scale.
- Disinfections of well tube well tank and pond in a village.
- Waterborne diseases and prevention.

3. Disposal of Excreta and Waste

- Methods of excreta disposal type of latrine.
- Handling animal excreta.
- Methods of waste disposal.
- Hazards due to waste.

4. Community Participation

- Drainage and preparation of soak pits.
- Maintaining healthy environment within and around village cleaning and maintenance of village drains ponds and wells.
- Common waste excreta and animals waste disposal in the village.

PRACTICAL 10

Suggested Activities for Evaluation

- Purification of water at home, community.
- Disinfections of a well/tube well.
- Construction of a small scale soak pit.
- Health education for use of sanitary latrine.

D. Mental Health

1. Mental Health

- Concept of mental health.
- Body mind relationship.
- Factors influencing mental health.
- Characteristics of a mentally healthy person.

- Developmental tasks of different age groups.
- Different defense mechanisms.

2. **Maladjustment**
   - Features of a maladjusted individual.
   - Common causes of maladjustment.
   - Counseling an individual family and community.

3. **Mental Illness**

   Identify abnormal behaviour.
   - Types of mental illnesses and treatments.
   - Early detection and referral of mentally ill.
   - Prevention of mental illness.
   - Home care and counseling.
   - Refer psychiatric emergencies.

4. **Old Age Care**
   - Process of ageing – physical psychological changes.
   - Needs and problems.
   - Care of elderly at home.
   - Rehabilitation and agencies of caring elderly.

PRACTICAL 10

Suggested Activities for Evaluation

- Assessment of mental health status of individual.
- Care plan for an elderly person at home.

CLASS–XI
ELECTIVE
PRIMARY HEALTH CARE NURSING (733)

Time: 2.5+2.5 Hours ***Mar***

Learning Objectives

On Completion of the Course Student will be able to

1. Explain concept of infection and causation of disease.
2. Describe body defense mechanisms and development of immunity against diseases.
3. Perform immunization effectively.
4. Describe different methods of disinfections and sterilization.
5. Describe common communicable diseases and their management.
6. Explain prevention of common communicable diseases and their control.
7. Describe care of the sick in community with common ailments and refer if required.

8. Explain recognition of conditions related to different body systems.
9. Describe and demonstrate routes of administration of drugs.
10. List common drugs used for emergencies and minor ailment, their indications, dosage and actions.

THEORY 10

A. Concept of Disease

- õ Concept and definition of illness.
- õ Disease causation.
- õ Classification of diseases.

1. Infection

- õ Meaning and types of infection.
- õ Causes of infection.
- õ Classification and characteristics of micro organisms: Pathogenic and Non-pathogenic.
- õ Incubation period and spread of infection.
- õ Transmission.
- õ Factors affecting growth and destruction of microbes.

2. Immunity and Body Defense Mechanisms

- õ Body's defense mechanism.
- õ Immunity – concept.
- õ Hypersensitivity: Antigen antibody reaction.
- õ Types of immunity.
- õ Types of vaccines.
- õ Storage and care– cold chain maintenance.

3. Immunization

- õ Immunization against different infections – immunization schedule.
- õ Injection safety.
- õ Methods of administering vaccine.
- õ Sterilization of syringes and needles.
- õ Immunization in the community.
- õ Immunization Hazards.
- õ Precautions while giving vaccines.
- õ Special immunization drives and programmes.

4. Collection of Specimen

- õ Principles and methods of collection of specimens and handling body discharges.
- õ Collection of specimens of blood, sputum, urine, stool.
- õ Safe disposal of body discharges. Records and reports.

5. Disinfection and Sterilization

- Principles and methods of antisepsis, disinfection and sterilization.
- Methods of disinfecting different equipment's.
- Methods of sterilizing different equipments.

6. **Waste Disposal**
   - Waste disposals- infectious and non- infection: concepts, principles, and methods at different levels.

PRACTICAL 10

Suggested Activities for Evaluation

- Demonstration of sterilization of syringes and needles / using pressure cooker / small autoclave.
- Demonstration of preparation of Malaria slides.
- Techniques of vaccination.
- Assignment on cold chain system.
- Prepare poster / chart on immunization schedule.
- Demonstrate different methods of waste disposable.

B. Communicable Diseases

THEORY 10

1. **Introduction to Communicable Diseases**
   - Common communicable diseases; Epidemiological concepts- incidence and prevalence, mortality and morbidity.
   - Levels of prevention.
   - Control and prevention of communicable diseases General measures.
   - Surveillance, isolation, notification, reporting.

2. **Communicable Diseases**
   - Signs, Symptoms, care and prevention of the following:
     - Diptheria, pertussis, tetanus, poliomyelitis, measles and tuberculosis.
   - Chicken pox, mumps, rubella, enteric fever, hepatitis, rabies, malaria, dengue, filarial, Kala-azar trachoma, conjunctivitis, scabies, STDs and HIV / AIDS.
   - Encephalitis.
   - Leptospirosis.
   - Acute respiratory infection.
   - Diarrhoeal diseases.
   - Worm infestations.
   - Leprosy.
   - Role and responsibilities of health worker / ANM.

3. **Care in Communicable Diseases**
   - Care of patients with communicable diseases.
   - Isolation methods.

- Standard safety measures (Universal precautions).
- Health education and messages for different communicable diseases.
- Role and responsibilities of health worker / ANM.

4. **Epidemic Management**
   - Definitions and causes of epidemics.
   - Epidemic enquiry in a community and epidemic mapping.
   - Relief work and role of health worker / ANM.

PRACTICAL 10

Suggested Activities of Evaluation

- Preparation of surveillance report.
- Conduct Health education.
- Demonstration on:
  - Standard safety measures in nursing Practice.

C. Community Health Problems

THEORY 10

1. **Care of the Sick in the Community**
   - Common health conditions in the community – danger signs of illnesses.
   - Health assessment: Taking history, physical examination: vital signs, weight, height:
     - recognition of abnormalities.
   - Identification of health problems.
   - Management of the sick: home and community nursing procedures, care of the sick, referral.
   - Health education: individual and family.

2. **Fever**
   - Vital signs; Temperature, pulse, respiration, blood pressure.
   - Temperature maintenance and the physiology of fever.
   - Fever: Types and stages.
   - Causes of fever – common conditions causing fever, malaria, typhoid, acute respiratory infection (ARI) etc.
   - Nursing management of patient with fever.
   - Alternate system of medicine.

3. **Respiratory Problems**
   - Common respiratory problems: types, classifications- cold and cough, ARI, asphyxia, tonsillitis, asthma, bronchitis pneumonia and tuberculosis.
   - Causes, sign and symptoms, treatment of respiratory problems.
   - Management: Role and responsibilities of ANM/health workers in care of patients with respiratory problems including Home care remedies.

- Integrate accepted practices of AYUSH.

4. **Aches and Pains**
   - Causes and nursing management of: tooth, ache, ear ache, abdominal pain, headache, joint pains.
   - Management as per the standing orders and protocols.
   - Role of ANM/health worker in the community including home care remedies.
   - Integrate accepted practices of AYUSH.

5. **Digestive Problems.**
   - Indigestion, anorexia, vomiting, distension and Constipation.
   - Hemorrhoids, hernia, ulcer and intestinal obstruction.
   - Role of ANM/health worker in the community including home care remedies.
   - Integrate accepted practices of AYUSH.

6. **Urinary Problems**
   - Signs and symptoms of renal conditions.
   - Retention of urine, renal colic, edema.
   - Role of ANM/health worker in the community including home care remedies.
   - Integrate accepted practices of AYUSH.

7. **Cardiovascular Problem**
   - Signs and symptoms of cardiac conditions and blood related problem: heart attack, chest pain, anemia, hypertension and leukemia.
   - Care of a cardiac patient at home.
   - Role of ANM/ health worker in the community including Home care remedies.
   - Integrate accepted practices of AYUSH.

8. **Diseases of the Nervous System**
   - Signs and symptoms of neurological problem – headache, backache and paralysis.
   - Care of a patient with stroke at home.
   - Care of pressure points, back care changing of positions, active and passive exercises, body support to prevent contractures.
   - Role of ANM/ health worker in the community including home care remedies.
   - Integrate accepted practices of AYUSH.

9. **Metabolic Disease**
   - Diabetes – signs and symptoms, complications diet and medications.
   - Skin care, foot care.
   - Urine testing and administration of insulin injection.
   - Integrate accepted practices of AYUSH.

10. **Diseases of Musculo Skeletal Systems**
    - Signs and symptoms of sprain tear of ligaments and arthritis.
    - Integrate accepted practices AYUSH.

11. **Care of Handicap**

- õ Handicaps – different types.
- õ Counselling for prevention of certain handicaps.
- õ Understandings the handicapped person.
- õ Helping family to ensure need based care.

PRACTICAL 10

Suggested Activities for Evaluation

Demonstration of.

- õ Urine testing for albumin and sugar.
- õ Urinary catheterization.
- õ Local application of cold and hot.
- õ Plain water enema.
- õ Checking of B.P. and TPR.
- õ Disease conditions.

D. Primary Medical Care

THEORY 10

1. **Types of Drugs**

- õ Different Systems of medicine: allopathic and AYUSH.
- õ Classifications of drugs.
- õ Forms and characteristics of drugs.
- õ Abbreviations used in medication.
- õ Administration of drugs: policies and regulation, as per protocols and standing orders.
- õ Calculation of dosage.

2. **Administration of Drugs**

- õ Routes of administration – Oral, parental (intradermal, intramuscular, subcutaneous, Intra venous), rectal, local and others.
- õ Administration of drugs: Precautions, principles.
- õ Observations and recording.

3. **Drugs used in Minor Ailments**

- õ Common drugs for fever, cold and cough, aches and pains etc.
- õ Drug kit in the sub centre, content and its use.
- õ Storage and care of drugs.

4. **Common Emergency Drugs**

- õ Methergine, misoprostol injection oxytocin, IV fluids, antibiotics, injection and magnesium sulphatederiphylline, avil and other antihistaminic, pethedine, vitamin K, antirabies vaccine, anti snake venoms as per the protocol.

- Precautions for administration.
- Storage and Care of emergency drugs.

PRACTICAL 10

Suggested Activities of Evaluation

- Preparation of list of common drugs used in sub centre, their action dosages and use.
- Demonstration of administration of medication by different routes.
- Drug study.

E. First Aid and Referral

THEORY 10

1. **Need for First Aid**
   - Principle of first resources.
   - Mobilization of resources.
   - First aid kit & supplies.
   - Bandages: Types, Uses.
   - Principle and methods of bandaging.
2. **Minor Injuries and Ailments**
   - Cuts and wounds: types, principles and first aid care.
   - Foreign bodies.
   - Burns and scalds types, principles and first aid care.
   - Health education and referral.
   - Role of ANM/health worker.
3. **Fractures**
   - Skeletal system and different bones.
   - Fractures: Types, Causes, signs and symptoms, first aid care.
   - Methods of immobilization and transportation.
4. **Life Threatening Conditions**
   - Bleeding.
   - Drowning.
   - Strangulation, suffocation and asphyxia.
   - Loss of consciousness.
   - Cardio respiratory arrest.
   - Convulsions.
   - Foreign bodies.
   - Chest injuries.
   - Shock and allergic conditions.
   - Poisoning, bites and stings.

- Stroke.
- Heat stroke.
- Severe burn.

PRACTICAL 10

Suggested Activities for Evaluation

Demonstration of following

1. Wound care.
2. Splints, slings, bandages.
3. Transportation of casualties.
4. BLS.
5. Naso gastric tube insertion.
6. Care during different emergencies.

CLASS–XII
ELECTIVE
CHILD HEALTH NURSING (731)

Learning Objectives

On completion of the course the student will be able to:

1. Describe school health programme.
2. Describe 'Right' of children.
3. Educate mothers and family member as per need of their children.

THEORY

Time: 2.5 Hours ***Marks: 50***

1. Children's Rights

- Convention of Rights of the Child.
- Prevention of child labour.
- Abuse and legal protection.
- Special care of girl child.
- Female infanticide.

2. Care of School Children

- School health: Objectives, problems and programmes.
- Environment of school.
- Assessment of general health of school children.
- Dental and eye problems.
- Nutritional deficiencies.
- School health education for children.

- Need based sharing of health information with teacher/ parents/ children.
- Records and reports.

3. Care of Adolescents

- Physical growth during adolescence.
- Emotional and behavioural changes in girls and boys.
- Special needs of adolescents.
- Sex education for adolescents.
- Counselling.

4. Care of Adolescent Girls

- Menstruation and menstrual hygiene.
- Special nutritional needs.
- Early marriage and its affects.
- Adolescent girls: Pregnancy and abortion.
- Preparing for family life- pre marital counseling.
- Role of ANM/ female health worker

PRACTICAL

Time: 2.5 Hours ***Marks: 50***

Suggested Activities for Evaluation

Case Studies

- Assessment of common adolescent illnesses in infant.
- Poster on.
  - Growth and development.
  - Prevention of common accidents in children.
  - Menstrual cycle.
  - Physical changes in adolescence.

CLASS–XII
ELECTIVE
MIDWIFERY (732)

Learning Objectives

On completion of the course the student will be able to

1. Describe male and female reproductive organs.
2. Explain process of conception and foetal development.
3. Describe female pelvis and the muscles involved in delivery of foetus.
4. Conduct normal delivery and provide care to the newborn.
5. Provide care to pregnant mother during ante, intra and post natal period at home and hospital.
6. Provide need based counselling to the mother and to her family during antenatal, intranasal and postnatal period.

7. Resuscitate the high risk new born baby.
8. Identify high-risk pregnancies and refer them immediately for safe mother- hood.
9. Identify deviation from normal labour in time and take necessary action.
10. Provide adequate care identifying abnormal puerperium.
11. Administer the drugs as per the protocols.
12. Educate community for improving quality of life of the family.
13. Promote improvement in the status of women in society.
14. Identify women's health problem and provide guidance and support.
15. Provide care and guidance to women with reproductive health problems.
16. Participate in reproductive health and family welfare programmes.

THEORY

Time: 2.5 Hours ***Marks: 50***

1. Human Reproductive System

- õ Female reproductive organs – structure and function.
- õ Menstrual cycle.
- õ Male reproductive organs structure and function.
- õ Process of conception.

2. Female Pelvis and Foetal Skull

- õ Structure of the pelvic bones-types of pelvis.
- õ Pelvic diameters.
- õ Muscles and ligaments of pelvic floor.
- õ Foetal skull: bones, diameters, sutures, size, shape, moulding, skull areas, fontanelles.

3. Foetus and Placenta

- õ Growth and development of foctus, foetal sac and amniotic fluid and foetal circulation and changes after birth.
- õ Structure and functions of Placenta, membranes and umbilical cord and abnormalities.
- õ Refer SBA module of Ministry of health and Family Welfare.

4. Normal Pregnancy

- õ Signs and symptoms of pregnancy.
- õ Various diagnostic test for confirmation of pregnancy.
- õ Physiological changes during pregnancy.
- õ Minot ailments during pregnancy and their management.
- õ Refer SBA module of Ministry of health and Family Welfare.

5. Antenatal Care

- õ Registration.
- õ Taking history of a pregnant woman.

- Physical examination, Investigation- routine and specific.
- Prophylactic medications.
- Needs based health information and guidance.
- Nutrition in pregnancy.
- Special needs of a pregnant woman.
- Involvement of husband and family.
- Identification of high risks cases and referral.
- Preparation of mother for delivery.
- Refer SBA module of Ministry of health and Family Welfare.

6. Normal Labour

- Onset and stages of labour, physiological changes.
- Changes in Uterine muscles, and cervix.
- Lie, attitude, position, denominator and presentation of foetus.
- Foetal skull.
- Mechanisms of labour.
- Identification of high risk cases.
- Foetal distress and maternal distress during labour.
- Pantograph in the management of the normal labour.
- Role of ANM/Female health worker and referral.
- Refer SBA module of Ministry of health and Family Welfare.

7. Care during Normal Labour

- History of labour.
- Importance of five 'C's.
- Monitoring progress of labour with partograph preparation of delivery.
- Care of mother in first and second stage of labour.
- Assist and conduct childbirth.
- Immediate care of new-born-resuscitation, apgar score, cord care.
- Oxytocin Misoprostol drugs: Dose, route, indication, contraindication, action, side effects, precautions, role and responsibilities of ANM/FHW.
- Delivery of placenta and examination of placenta.
- Care of mother in third and fourth stage: Recognise degrees of tear and appropriate care and referral.
- Establishment of breast feeding exclusive breastfeeding.
- Kangaroo mother care.
- Baby friendly hospital imitative.
- Record childbirth and ensure birth registration.
- Refer SBA module of Ministry of health and Family Welfare Care of mother-diet, rest, exercise, hygiene.
- Management of breast feeding.
- Prophylactic medicines.

- Special needs of postnatal women.
- Need based health education.
- Refer SBA module of Ministry of health and Family Welfare.

8. Care of New Born

- Assessment of new-born for gestation age, risk status and abnormalities.
- Neonatal resuscitation.
- Monitoring of vital signs and birth weight.
- Management of normal new-born and common minor disorders.
- Exclusive Breast feeding and management.
- Temperature maintenance, kangaroo mother care.
- Immunization.
- Care of newborn: Jaundice, infection, respiratory problems.
- Principles of prevention of infection.
- Educating mother to look after babies.
- Integrate accepted practices of AYUSH.
- Refer SBA module of Ministry of health and Family Welfare.

9. High Risk New Born

- Pre term/Low Birth Weight babies.
- Special needs of high risk babies.
- Care at home- referral and follow up.
- Care during asphyxia.
- Convulsion, vomiting.
- Care for thrush, cord sepsis, diarrhoea.
- Implementation IMNCI protocol.
- Refer SBA module of Ministry of health and Family Welfare.

10. Safe Motherhood

- Concept and cause of maternal mortality and morbidity.
- Safe motherhood components: RCH and NRHM.
- Preventive measures.
- Role of ANM/Female Health worker.
- Refer SBA module of Ministry of health and Family Welfare.

11. High Risk Pregnancies

- High risk pregnancies: Identification, Risk factors, decision making and management.
- Protocols and standing orders.
- Referral and follow up.
- Counselling and guidance about high risk conditions Involvement of husband and family.
- Role of ANM/Female Health worker.

- Refer SBA module of Ministry of health and Family Welfare.

12. Abnormalities of Pregnancy

- Common abnormalities of pregnancy: hyper emesis gravid arum, leaking and bleeding per vagina.
- Anaemia of pregnant woman.
- Eclampsia and pre eclampsia and toxaemia of pregnancy.
- Indication of premature rupture of membrances, prolonged labour, anything requiring manual intervention, UTI, puerperal sepsis.
- Obstetrical shocks.
- Uterine abnormalities, ectopic pregnancy.
- Diseases complication pregnancy – TB, diabetes.

13. Hypertension

- Infections during pregnancy – RTI/STIs malaria, HIV, AIDS.
- Rh factor.
- Standing orders and protocols.
- Role of ANM/Female Health worker.
- Role of ANM/Female Health worker.
- Refer SBA module of Ministry of health and Family Welfare.

14. Abortion

- Types of abortion, causes of abortion.
- Need for safe abortion – referral.
- Complications of abortions.
- Medical termination pregnancy.
- Care of woman who had abortion.
- Role of ANM/Health worker.
- Refer SBA module of Ministry of health and Family Welfare.

15. Abnormal Childbirth

- Common abnormalities of childbirth.
- Abnormal presentations.
- Abnormal uterine actions.
- Cephalo pelvic disproportion.
- Prolonged labour.
- Identification, immediate management and referral.
- Emergency care of mother during transfer to hospital.
- Role of ANM/Female health worker.
- Refer SBA module of Ministry of health and Family Welfare.

16. Abnormal Puerperium

- Postpartum haemorrhage and its management.

- Puerperal sepsis and its management.
- Retention of urine.
- Breast complications during lactation and their management.
- Refer SBA module of Ministry of health and Family Welfare.
- Psychiatric complications.
- Refer SBA module of Ministry of health and Family Welfare.

17. Surgical Intervention

- Assisting in the followings:
  - Induction of labour and its management.
  - Forceps and Vacuum extraction.
  - Episiotomy and suturing.
  - Craniotomy.
  - Caesarean section.
  - Pre and post operative care.
  - Role of ANM/Female health worker.
- Refer SBA module of Ministry of health and Family Welfare.

18. Medications used in Midwifery

- Pain relieving drugs.
- Anaesthetic drugs.
- For uterine contractions.
- For controlling bleeding.
- For preventing postnatal infection.
- For preventing eclampsia.
- Antibiotics.
- IV fluids.
- Role of ANM/Female health worker.
- Refer SBA module of Ministry of health and Family Welfare.

19. Life Cycle Approach

- Quality of life and life expectancy.
- People's health throughout the life cycle.
- Role of education economic status, social status on quality of life.
- Holistic approach to life.
- Refer SBA module of Ministry of health and Family Welfare.

20. Status of Women and Empowerment

- Status of women in society.
- Factors affecting status – gender bias, sex selection tests, female foeticide and infanticide sex ratio discrimination and exploitation.

- Effect of tradition, culture and literacy.
- Relationship between status of women and women's health.
- Effects of women's health in community : single, divorced deserted woman, widows special needs.
- Laws related to women. Programmes for women's empowerment.
- Refer SBA module of Ministry of health and Family Welfare.

21. Women's Health Problems

- Complications related to childbirth – VVF, RVF, prolapse and incontinence.
- Cervical erosion and leucorrhoea pruritus.
- Cancers – cervical and breast.
- Pap smear for detection of cancer cervix.
- Tumours – fibroids.
- Menstrual disorders.
- Menopause and its implications.
- Refer SBA module of Ministry of health and Family Welfare.

22. RTIs and STIs

- Causes and signs and symptoms of STIs and RTIs.
- Syndromic approach for treatment .
- Referral treatment and follow up care.
- Information, education and communication for prevention and treatment.

23. HIV/AIDS

- Epidemiological facts related to spread of infection.
- Methods of transmission.
- Effect on immunity and signs and symptoms.
- The AIDS patient community support and home care.
- Counselling: process and techniques.
- Counselling of HIV/positive patients and pregnant women.
- Standard safety measures.
- Voluntary counselling and testing center (VCTC)/Integrated counselling and testing center (ICTC) activities.
- Care continuum and Anti Retro viral Therapy (ART).
- Prevention of parent to child transmission (PPTCT): prophylaxis and breast feeding guidelines.

24. Infertility

- Classification and Causes of infertility in male and female.
- Investigation and treatment.
- Identification of couples, counselling, referral and follow up.
- Role of ANM/Female health worker.

25. Population Education

- Population trends in India.
- Vital statistics birth and death rates, growth rate, NRR, fertility rate, couple protection rate, family size.
- National family Programme trends and changes RCH-I, RCH-II programme and NRHM.
- Target free approach for FW.
- Role of mass media and IEC.
- Role of ANM/health worker.

26. Family Welfare

- Identification of eligible couples and those need contraceptive methods.
- Information related to contraception and importance of choice.
- Natural and temporary methods of contraception.
- Permanent methods.
- New methods nor-plant and injectables.
- Emergency contraception.
- Follow up of contraceptive users.
- Counselling.
- Role of ANM/female Health worker.

PRACTICAL

Time: 2.5 Hours ***Marks: 50***

Suggested Activities for Evaluation

- Taking of history and antenatal examination.
- Demonstration of vaginal examination.
- Plotting of partograph during labour.
- Return demonstration of normal delivery using five 'C's.
- Demonstration of perineal care.
- Essential Care of newborn.
- Apgar score and resuscitation of a new born baby.
- Health education on exclusive breast-feeding.
- Midwifery case book.
- Demonstration of immunization.
- Drug book.
- Records and reports.
- Case studies.
- Preparation of posters on methods of Family welfare.
- Demonstration of IUCD insertion.
- Information Education and Communication.
- Calculation for vital indicators.

CLASS–XII
ELECTIVE
HEALTH CENTER MANAGEMENT (733)

Learning Objectives

On completion of the course the student will be able to

1. Organise sub center and clinics to carry out scheduled activities.
2. Indent and maintain necessary stock.
3. Participate in the implementation of National health programmes.
4. Update knowledge and skills.
5. Provide guidance to TBA, AWW, ASHA and other voluntary health workers.
6. Collaborate and coordinate with other health team members and agencies.
7. Maintain records and reports.

THEORY

Time: 2.5 Hours ***Marks: 50***

1. The Sub Center

- Organization of functions and facilities of sub centre.
- Sub centre activity plans.
- Conduct a clinic and special programs and follow up.
- Conducting meetings and counselling sessions.
- Sub centre action plan.
- Information, education and communication.
- Display of messages.

2. Maintenance of Stocks

- Maintenance of supplies, drugs, equipment, stock, indenting.
- Calculation of indent as per population requirement.
- Management information and evaluation system (MIES).
  - Maintenance of records.
- Reports of sub centre.

3. Co-ordination

- Inter-sectoral co-ordination.
- Co-ordination with school teachers, ASHA, anganwadi workers, panchayat.
- Role of NGOs and co-ordination with government departments.

4. The Sub Centre

- Organization of functions and facilities of sub centre.
- Sub centre activity plans.
- Conduct a clinic and special programs and follow up.

- Conducting meetings and counselling sessions.
- Sub centre action plan.
- Information, education and communication.
- Display of messages.

5. Maintenance of Stocks

- Maintenance of supplies, drugs, equipment, stock, indenting.
- Calculation of indent as per population requirement.
- Management information and evaluation system (MIES).
  - Maintenance of records.
- Reports of sub centre.

6. Co-ordination

- Inter-sectoral co-ordination.
- Co-ordination with school teachers, ASHA, anganwadi workers, panchayat.
- Role of NGOs and co-ordination with government departments.

7. Implementation of National Health Program

- National Health programs and the role of the ANM.
- Detection, referral, treatment and follow up of cases of malaria, leprosy tuberculosis, blindness, goiter.

8. Update Knowledge

- Continuing education for self development – circulars, handouts, meetings, journals.
- Methods of self development.
- Interacting with community.
- Improving writing speaking abilities in local language and English.

PRACTICAL

Time: 2.5 Hours ***Marks: 50***

Suggested Activities for Evaluation

- Detection of tuberculosis, malaria, leprosy etc.
- Assignment on records and reports maintained at sub centre.
- Peer group teaching on DOTS & MDT.
- Participation of national health programmes at CHC/PHC/SC.
- Assignment on organization of sub-centre/clinics.

LIST OF RECOMMENDED BOOKS

Anatomy & Physiology

1. Ferris, E.B. and Skelley, E.G. Body Structure & Functions.
2. Albany Roper, Nancy, **Man's Anatomy, Physiology, Health & Environment,** Delmar Publishers, New York.

3. Taylor Nerman & Nepheadran, Margaret **G. Basic Anatomy & Physiology,** Churchil & Livingstone, Edinburgh.
4. Pearle, Evelyn, **Anatomy & Physiology for Nurses,** Faber Ltd.
5. Memmler, R.L. & Lada, R.B. **The Human Body in Health & Diseases,** G.B. Lippincott, Philadelphia.
6. Marshal, Stanely, **Elementary Bacteriology and Immunity.**
7. Catherine Armstong, **Anatomy & Physiology for Nurses** Second Hindi Edition 1984, Published by N. R. Brother, Sanyogita Ganj, Indore, (M.P.)
8. Gatherine F. Arnstrong, **Aids to Anatomy & Physiology for Nurses** Sixth Edition, Bailliere, Tandull & Cox T. 8 Lenrietta street book society.

Microbiology

1. Marshal, Stanely, **Elementary Bacteriology & Immunity for Nurses,** London, Lewis Publishers.
2. Ferxis Elvira B. **Micro–biology for the Nurse,** Delmar Publishers, New York.
3. Margret J. Parker, **Micro–biology for Nurse**, (Hindi Edition).
4. Simplified **Micro–biology** published by T.N.A.I.

Hygiene

1. Priest, N. A. **Modern Text Book of Personal & Communal Health for Nurses,** London, E.L. & B.S. William Hernemann Medical Books.
2. Yaspal Bedi, **Hygiene.**

Psychology

1. Nilliken, Mary Elizabeth, **Understanding Human Behaviour,** A Guide–for Health Workers, Delmar Publisher, New York.
2. Bhatia B.D. & Craig N, **Elements of Psychology & Mental Hygiene** Orient Longman & Cox, New Delhi.
3. Dr. Ramnath Sharma, **Psychology & Mental Health for Nurses,** N.R. Bros., Sanyogita Ganj, Indore, (M.P.).

Sociology

1. Gagan Hinduja, **Sociology for Nurses,** N. R. Bros., Sanyogita Ganj, Indore (M.P.).

Nutrition

1. Swaminathan, N. & Bhagwan, **R. K. One Food**, Ganesh & Co., Madras.
2. I.C.M.R. **The Nutritive Value of Indian Foods & the Planning of Satisfactory Diets.**
3. C. Gopalan, B.V. Rama Shastri, S.c. Balasubramanian, **Nutritive Value of Indian Foods**, Indian Council Of Medical Research, P.O. Box. 4508, Ansari Nagar, New Delhi.
4. Maurice H. King, **Nutrition for Developing Countries,** English Language Book Society & Oxford University Press.

Fundamentals of Nursing

1. **Manual for Health Worker (Female)** Ministry of Health & Family Planning – W.H.O. Project HMD-006 Published Vol. I & Vol. II.
2. **Manual for Health Worker (Male)** Vol. I & II Ministry of Health & Family Planning, WHO Project HMD–006.
3. SEARA – Gandhigram Institute of Rural Health & Family Planning, **A Guide for First Aid Treat tents of Minor Ailments for Auxiliary Nurse Midwives**, Madurai, Tamilnadu (Minco graphed Manual).
4. Hornenann, Grute V. **Basic Nursing Procedures,** New York, Delmar Publisher.

5. Lilli Pritam Teluram, **Manual of Nursing Arts Procedures**, Printed at New Print India Pvt. Ltd., Sahibabad. (U.P.).
6. A.H. Chalklay, **A Text Book for the Health Workers (ANM), Volume I & II,** Revised according to New Syllabus, 1987, Wiley Eastern Limited, Ansari Road, Daryaganj, New Delhi.
7. **Where There is No Doctor,** Voluntary Health Association of India. (Hindi).

Maternal & Child Health, Family Planning & Welfare

1. Cox, **H. Midwifery Manual** – A Guide for Auxiliary Midwives, McGraw – Hill for Eastern Publishers.
2. Bleier I.J. **Maternity Nursing** – A Text Book for Practical Nurses, W.B. Saunders, Philadelphia.
3. **W.H.O. Notes for the Practising Midwife,** New Delhi.
4. Laxmanswami Mudaliar, **Case Book for Midwives,** Caxton Press, Madras.
5. Berkeley **A Handbook of Midwifery for Nurses,** London, J & A Churchill.
6. Margret F. Myles. **A Text Book for Midwives,** Hindi Edition, N. R. Brothers, Sanyogita Ganj. Indore.
7. Ela Anad (Dr.) **Everything a Woman needs to know about Pregnancy,** First Edition, 1975, Vikas Publishing House Pvt. Ltd., 5 Daryaganj, Ansari Road, Delhi.
8. Joyce, McNiven, **Aids. to Obstetrics & Gynaecology Nursing,** 7th Edition, Bailliere,Yindall & Cox, 1 & 8 Henreitta Street, W.C. 21.9.6.4.
9. Margret G. Mcphedian, **The Maternity Cycle, A Physiological Approach to Nursing Carge., 1961.** The Macmillan Co. of Canada Limited, Toronto.
10. Helen Cox., Midwifery Manual, **A Guide for Auxiliary Midwives McGraw** – Hill, International Book Division, Singapore.
11. Bowlby, **Maternal Care & Mental Health**, W.H.O. Mimeograph series, W.H.O. Palais Des Nations, Geneva, 1952.
12. Ruth Young, **Hand Book on Prenatal Care for Nurses, Midwives & Health Visitors,** 3rd Edition, 1988, Issues by Maternity & Child Welfare Bureau, Indian Red Cross Society.
13. **Notes for the Practising Midwife,** Directorate General of Health Services, Ministry of Health & Family Welfare, Govt. of India, Nirman Bhavan, New Delhi.
14. **Daiyon Ki Pustika,** Swasthya Sewa Mahanideshlya, Swasthya Aur Parivar Kalyan Mantralaya, New Delhi.
15. Robert Martin, **Parshav Karm Sambandhi Roop Rekha,** Shukla Book Depot, Aminiabad, Lucknow.

Child Health

1. Oberio, J.S. Leliberte, D. Et. al., **Child Health Care in Rural Area – A Manual for Auxiliary Nurses & Midwives,** Asia Publishing House, Bombay.
2. Ghosh, Shanti, **The Feeding & Care of Infants & Young Children** UNICEF. SCAR, New Delhi.
3. Brugley C.M. **Paediatrics for the Practical Nurse,** Delmar Publishers, New York.
4. Marilyan Lang Evans, **Guide to Paediatric Nursing,** A Clinical Reference Appleton Century/ Crofts, New York.
5. **Your Child from One to Six Year**, Kekston Press, Connaught Circus, New Delhi.
6. Benjamin Spock, **Baby & Child Care**, Duell Sloon & Pearle Inc. 60 East 42nd Street, New York.
7. Nirmala Kher, **An Introduction to Child Development** Reprinted, 1973. Asia Publishing House, New Delhi.
8. **Better Health for Mother & Child** Published by Rural Health Division. Dtc., General of Health Services, Govt. of India, New Delhi.
9. Shanti Ghosh, **The Feeding & Care of Infant & Young Children,** 4th Edition, 1981, Published by Voluntary Health Association of India, C–14, Community Centre, Safdarjang Development Area, New Delhi.
10. **Medical Advice to Mother & Child,** School for Mothers, Soviet Land Booklets, New Delhi.

Family Planning & Welfare

1. Zawacki, A.A.A. **Text Book for Family Planning Field Workers**, Community & Family Study Centre, Chicago, University of Chicago.

Community Health

1. Park J.E. **Text Book of Community Health for Nurses,** Asarani Publisher, 4th Edition, 1982, Jabalpur, M.P.
2. **Community Nursing Manual, A Guide for Auxiliary Public Health Nurses.** McGraw Hill Book Co.
3. Sunder Rao Kasturi, **An Introduction to Community Health Nursing,** 1st Edition, 1974, B.J. Publications, Madras.
4. Mey Wood, Oluve, **Nursing in the Community,** 1st Edition, 1977 Bailiera Tindall, London.
5. Bynne Monica & Bennett F. J. **Community Nurshing in Developing Countries (A Manual for the Auxiliary P.H.N.)** 1st Edition, 1976 Oxford University, Press, London, P. 208.
6. H. Dhilon, **Hand Book for the Delivery & Care to Mothers & Children in a Community Development Block,** Oxford University Press, 2/11, Ansari Road, Daryaganj, New Delhi-110002.
7. Premlata Dwidedi, **Communicable Diseases,** First Edition, Anant Prakashan, 124, Reshimbag, Nagpur–9.
8. Mukund Kethar & Shobha Ketkar, **A Text Book of Community Health,** IIIrd Edition, 1987, N.R. Brothers, Sanyogita Ganj, Indore.
9. **A Public Health Manual,** Published by T.N.A.I., L–17, Green Park, New Delhi.
10. **Manual for Health Workers,** Ministry of Health & Family Welfare, New Delhi (Prepared in Hindi & English), Volume I & Volume II.

Basic Medicine & Pharmacology

1. Skelley, Esther G. **Medications & Mathematics for Nurse,** Albany, New York, Delmar Publishers.
2. K.C. Saxena & Yadav, **Elements of Pharmacology,** Hindi Edition N.R. Brothers, Sanyogitaganj, Indore. (M.P.)
3. M. Toohay, **Medicine for Nurses,** (Hindi & English), N.R. Brothers, Sanyogitaganj, Indore, (M.P.)

LIST OF TEACHING EQUIPMENTS, CHARTS, MODELS, GLASSWARE ETC.

A. Bones

1. Full size human skeleton on stand.
2. Loose bones: Skull, Cranial Bones – Frontal, Parietal, Temporal Occiptal, Ethoid, Sphenoid, Nasal Bones.

   Maxilliae & Mandible Vertebrae: Cervical, Thoracic, Lumbar, Sacral, Coccyx, Sternun, Ribs.

   Thorax: Shoulder Girdle & Upper Extremit – Scapula, Clavicle, Humerus, Radius Ulna, Carpus, Matacarpus, Phalanges, Bones of Pelvis and Lower Extremity – Innoniate bone, Fenur, Tibia, Fibula, Patella, Tarsus, Metatarsus, Phalanges, Pelvis Male & Female.

B. Charts on Human Anatomy

1. Cell and Tissue.
2. Skeletal system.
3. Muscular system.
4. Circulatory system.

   (including lumph glands and their vessels).
5. Digestive system.
6. Respiratory system.

7. Endocrine system.
8. Excretory system.
9. Reproductive system – Male and Female.
10. Nervous system.
11. Organs of special senses: Eye, Ear, Nose, Skin.
12. Human Atlas.

Loose Charts

13. Heart .
14. Superficial veins and blood vessels.
15. Development & functions of blood.
16. Diseases of blood cells.
17. Lymphatic system.
18. Circulation.

Skeletal System

19. Skeleton.
20. Disjointed elbow.
21. Fractures.
22. Birth Atlas.

Endocrine System

23. The Adrenals.
24. The Pituitary and Pancreas.
25. The Thyroid & Parathyroid.
26. The Gondas.
27. The Endocrine glands.

The Injured and Sick

28. Tripod stand.

C. Models

I. Full size Human Body Showing

1. Muscles.
2. Cavities of the body with organs (Torso).
3. Circulatory system.
4. Lymphatic system.
5. Digestive system.
6. Urinary system.
7. Reproductive system.
   Female internal genital organs.
   Female external genital organs.
   Male genital organs.

8. Heart with main blood vessels.
9. Lungs.
10. Larynx.
11. Trachea, bronchi .
12. Digestive organs–Stomach, Liver, Pancreas.
13. Brain.
14. Spinal cord with Derves.
15. Eye.
16. Ear.

II. **Loose Models**

17. Skin.
18. Eye.
19. Ear
20. Larynx.
21. Brain.
22. Heart.
23. Cross Section of brain.
24. Medium Section of pelvis.
25. Female reproductive system.
26. Foetus Showing different stages of growth.
27. Foetus and pelvis.
28. Dummy with foetus.

D. Microscope with Low Power High Power & Oil (Immersion Lens)

E. Haemoglobinometer with Pipette–18 Haemocyt Meter.

F. Sphygmomanometer–1

G. Stethoscope–1

H. Projected Aids

1. Overhead projector.
2. Epidiascope.
3. Film strip and slide projector 2 x 2.
4. 8 mm Film projector.
5. Tape Recorder.
6. V.C.R. and Television.
7. 16 mm Film projector sound.
8. Dicroscopic slides on different systems.
9. Slides 2 x 2 cm different systems and subjects.
10. Transparencies – on different systems and Family Planning.
11. Cassettes – (for 8 mm film projector) on different systems and on birth process.

REQUIREMENTS FOR NURSING ARTS & MIDWIFERY EQUIPMENTS

(For 20 students)

A. Enamelware

1.	Trays:	24" x 16"	– 6
		14" x 10"	– 6
		11" x 9"	– 6
2.	Trays with cover.		
		11" x 5"	6
3.	Bowls:	16" diameter.	– 6
		19" diameter.	– 6
		6" diameter.	– 6
		3" diameter.	– 6
4.	Bowls with cover:		
		6" diameter.	– 6
		3" diameter.	– 6
5.	Buckets with cover:		– 4
6.	Enema Can: 2 pint.		4
		1 pint.	
7.	Kidney Trays:		
		12" – 10" length.	– 6
		8" – 6" length.	– 6
8.	Galipets n as available.		
9.	Jugs		
	8 pint	4000	
	4 pint	2000	2 each
	2 pint	1000	
10.	Measuring Jugs.		
	1000 ml/2 pint capacity.		
	500 ml/1½ pint capacity.		2 each
	250 ml/1½ pint capacity.		
11.	Douche Cans.		
	1000 ml/2 pint capacity.		– 2
	500 ml/1 pint capacity.		– 2
12.	Catheter Dish with cover.		
	20" x 4"		– 4
13.	Knife Dish.		
	9" x 4"		– 4
14.	Feeding Cups.		
	250 ml/10 oz capacity.		– 3

180 ml/6 ox capacity. – 3

15. Sputum Mugs.

250 ml/10 oz capacity. – 6

16. Bed–Pan.

Perfection type. – 4

Children's.
– 2

17. Urinal.

Male. – 1

Female. – 1

18. Funnel.

Big. – 4"

Small. – 3"

19. Soap Dish.
– 6

20. Sitz bath tub. – 2

21. Baby bath tub. – 2

26" x 8" x $2\frac{3}{7}$

22. Jars with cover 17" x 7" – 2

6" x 6" – 4

4" x 4" – 4

23. Dressing Trolley.

24. Container of various sizes. – 12

25. Auto Clave.

26. Sterlizer.

B. Glassware

1. Measure Glass.

8 oz/240 ml. – 2

6 oz/180 ml. – 2

4 oz/120 ml. – 2

2 oz/60ml. – 4

1 oz/30ml. – 6

Drachm 14 ml. – 4

Minimum Measures 10 ml. – 4

2. Undine – 6" – 2

– 4" – 2

3. Eye bath. – 4

4. Douche Nozzle. – 4

5. Glass rods.
– 2

6. Pipette. – 6
7. Dropper. – 6
8. Glass connections.
9. Straight. – 12
   Y – 12
   T – 12
   L – 12
10. Drip. – 12
    Drip with strainer. – 12
11. Feeding bottles of various types hygiea auto or Free flow Boat. – 4
12. Breast pump. – 2
13. Nipple shield. – 2
14. Wolf's bottle. – 2
15. Thermometer.
    Lotion. – 1
    Bath. – 1
    Oral. – 12
    Rectal. – 6
16. Barometer. – 2
17. Pulsemeter/Stop watch. – 2
18. Lactometer. – 2
19. Urinometer. – 2
20. Manometer. – 2
21. Conical Flasks. – 2
22. Specimen glass. – 4
23. Flat bottom Flasks. – 4
24. Test tubes – 4 dozen.
25. Glass Slides. – 1"
26. Syringes.
    a) Disposable syringes of all sizes.
       50 c.c. – 1
       30 c.c. – 2
       20 c.c. – 1
       10 c.c. – 1
       5 c.c. – 1
       2 c.c. – 1
    b) All Glass.
       50 c.c. – 2
       30 c.c. – 2
       20 c.c. – 2

10 c.c. – 2

5 c.c. – 2

2 c.c. – 6

c) Tuberculin syringe. – 2

d) Insulin syringe. – 2

e) 50 c.c. – 1

30 c.c. – 1

20 c.c. – 1

10 c.c. – 2

5 c.c. – 2

2 c.c. – 1

27. Drainage bottle. – 4

28. Atomizer. – 1

29. Spirit lamp. – 4

C. Rubber Goods

1. Mackintosh.

– Bed length. – 2

– Draw mackintosh with cloth on two sides 1 m. – 4

– Enema mackintosh 1 m. – 2

– Narrow draw mackintosh with cloth on two sides – ½. – 2

– Dressing – ½. – 4

– For treatment – ½. – 4

2. Rubber or plastic apron. – 2

3. Kelly's pad – 2.

4. Cathetors Nasal. – 2

– Urethral. – 2

– Depezzer's. – 2

– Malicot. – 2

– Folley's. – 2

– Rectal. – 2

5. Ryles Tube. – 2

6. Levin's Tube. – 2

7. Rehrus Tube. – 1

8. Miller Abbot Tube. – 1

9. Flatus Tube. – 2

10. Rectal Tube. – 2

11. Stomach Tube. – 2

12. Blackmore sengstaken's Tube. – 1

13. B.L.B. Masks. – 1

14. Tourniquet. – 2
15. Ice Caps. – 2
16. Hot Water Bottle. – 4
17. Ai Cushion. – 2
18. Gloves.

    –5½" –6" –6½"

    –7" –7½" (2 Prs. each)
19. Finger stalls. – 4
20. Finger costs. – 4
21. Teats .

    – 6

    Valve. – 6
22. Endotra Cheal Tube.

    Cuffe and Plain. – 1 each
23. Air way tube. – 2
24. Latex rubber tubing. – yds.
25. Corrugated rubber sheet. – 2
26. Mocous extractor. – 2
27. Family planning kit.
28. First Aid Kit and Strecher.

D. Instruments

1. Cheatles's Forceps. – 2
2. Sponge Holding Forceps. – 2
3. Towel Clips. – 2
4. B.P. Handle Nos. 3, 4 and 5. – 1 each
5. B.P. Handle Blades No. 10, No. 11, No. 15 No. 21 No. 23.
6. Mayo's Scissors.
   - Curved. – 2 Pr.
   - Straight. – 2 Pr.
7. Dressing Scissors. – 2 Pr.
8. Bandage Scissors. – 2 Pr.
9. Nail cutting Scissors. – 2 Pr.
10. Dissecting Focepts:
    - Toothed. – 2 Pr.
    - Non-Toothed. – 2 Pr.
11. Artery Forceps:
    - Straight. – 4
    - Curved. – 4
    - Mosquito. – 2
    - Kocher's. – 4

– Spencerwelle. – 4

12. Tissue Forceps:
    – Lanes. – 2
    – Allis. – 2
    – Lehey's. – 2
13. Sinus Forceps. – 2
14. Scalpel. – 2
15. Dressing Forceps:
    – Aural . – 2
    – Ordinary. – 2
16. Nasual Speculum. – 2
17. Probe & Director. – 2
18. Greave Director with probe. – 2
19. Dissector. – 2
20. Aneurysm Needle. – 2
21. Tongue Spatula. – 2
22. Tongue Forceps. – 2
23. Mouth gag . – 2
24. Retractors different types. – 2
25. Single hooked retractor. – 2
26. Double hooked retractor. – 2
27. Tracheotomy tube 2 size. – 2
28. Trachaeal dilater. – 2
29. Speculum:
    – Aural. – 2
    – Nasal. – 2
    – Vaginal Bl-valve. – 2
    – Rectal. – 2
30. Metal Catheter . Male 2
    Female – 2
31. Metal sound:
    – Bladder. – 2
    – Uterine. – 2
32. Male Urthral dilaters. – 1 set
33. Female cervical dialtors. – 1 set
34. Sims speculum.
35. Arteries Vaginal wall retractor.
36. Ovum Forceps.

37. Blunt and sharp curetta.
38. Flushing currette.
39. Michel Clips holder. – 1
40. Michel Clips remover. – 1
41. Michel Clips. – 2 set
42. Trecar and Canula. – 2
43. Sternal puncture needle. – 2
44. Canula. – 2
45. Needles (Suture).
    Straight cutting. – 2
    Curved cutting. – 2
    Curved round bodied. – 2
    Maya's. – 2
    Galliec's. – 2
46. Injection needles:
    Hypodermoclysis. – 6
    I.M. – 6
    I.V. – 6
    Subcutaneous. – 6
    L.P. – 2
    A.P. – 2
    Liver Biopsy needle. – 2
    Cisternal. – 2
    Theracontsis. – 2
    Aspiration. – 2
47. Adaptor. – 4
48. Connections. – 2 way
49. Safety Razors with Blades. – 2
50. Drecs Smith Catheter. – 1
51. Bozemann's Catheter. – 1
52. Needle holders. – 2
53. Pelvimeter. – 1
54. Foetoscope. – 2
55. Suction apparatus (if available). – 1

E. Disposable Sets

1. I.V.
2. Blood Transfusion.
3. Hyodermo clysis.
4. Prectocylsis.
5. Disposable Napkins.

6. Disposable Caps.
7. Disposable Masks.
8. Disposable Tubes.
9. Disposable Catheters.
10. Disposable tubing for C.V.P. line.

F. Linen

1.	Mattress.	
	(adult, crib and child cot).	– 6
2.	Mattress Protector.	– 2
3.	Mattress covers.	6
4.	Bed sheets. – 30	
5.	Draw sheets.	– 30
6.	Pillows.	– 12
7.	Pillow slips.	– 30
8.	Sand bags (of various sizes).	– 6
9.	Sand bag covers.	– 6
10.	Blankets.	– 6
11.	Counterpanes.	– 8
12.	Towels.	
	Treatment, Bath and Hand.	– 30
13.	Sponge cloth.	– 30
14.	Medicine cloth.	– 6
15.	Dusters.	– 6
16.	Bedpan cover.	– 6
17.	H.W.B. covers.	– 6
18.	Ice ca P covers.	– 6
19.	Air ring covers.	– 6
20.	Gowns.	– 6
21.	Masks.	– 12
22.	Patients' clothes:	
	Jackets.	4
	Skirts.	– 4
23.	Restraints.	– 4 sets
24.	Gloves Bags.	6
25.	Trolley covers.	– 2
26.	Trolley bags.	– 2
27.	Rings.	– 6 dozs.
28.	Screens.	– 6
29.	Canvas bag (for dirty linen).	– 2

30. Table cloth. – 6
31. Baby blankets. – 6
32. Baby clothes & Drod binders. – 6 sets
33. Baby sheets. – 12
34. Baby mattress. – 2
35. Leggings. – 2
36. Perineal sheets/Guard. – 2
37. Paticuts' Gowns. – 2
38. Bandages and binders. – 2 each
39. Triangular bandage. – 20

G. Furniture

I. **For Each Class Room.** **Lecture stand tube light according to no. of students.**

1. Chairs with one arm broadened for writing purpose and shelf for keeping books.
2. Table for lectures. – 1
3. Chair for lectures. – 2
4. Black Board (Green glass) 4' x 3' preferably fixed on the wall. – 2
5. Black Board Stands (where board cannot be fixed). – 2
6. Graph Board.
7. Projector Table/Trolley.
8. White and coloured chalks.
9. Skeleton stand. – 1
10. Easel stand. – 1 each class
11. Glass Notice Board. 1 each class
12. Bulleting Board. – 1 each class
13. Wall Clock. – 1 each class
14. Glass Cases for poster with khadi or felt lining. – 1 each class
15. Spare table. – 1
16. Waste paper basket. – 1 each room
17. Pointer. – 1
18. Ink stand with ink wells with pen holders. – 1 each teacher
19. Hand washing equipments.
20. Paper weights. – 2 each teacher
21. Paper clips common pins. – 1 each teacher
22. Punching machine. – 1 each teacher
23. Stapler with staples. – 1 each teacher
24. Table glass. – 1 each teacher
25. Photographs concerning Medical profession:
    - Louis Pasteur.
    - Robert Koch.

– Lister.

– Florence Nightingale.

II. For Demonstration Room

1. Bed stead's (4 for 20 students) Gatch Bed – 1

   (6 for 21–40 students) Fracture bed – 1

   Spring bed with fitted trays & rings for gamlas. –2
2. Bedside lockers. – According to No. of beds.
3. Chairs. – According to No. of beds.
4. Cardiac Table. – 2
5. Diet Table. – 2
6. Foot Block (different sizes). – 2 prs.
7. Cradles ordinary. – 2
8. Back rest. – 2
9. Dirty lien bin. – 2
10. Wheel chair. – 2
11. Stretcher trolley for transportation of patients. – 1
12. Irrigating stands. – 2
13. Dressing trolley. – 2
14. Lock tables for keeping trays. – 2
15. Baby bath table. – 2
16. Baby cribs. – 1
17. Chair. – 2
18. Child cot. – 1
19. Black Board stand. – 1
20. Black Board. – 1
21. Duster.
22. Chalks.
23. Pointer.
24. Bowl stand. – 4
25. Screen Frame. – 2
26. Baby weighing scale. – 2
27. Infanto meter. – 2
28. Steel cupboards. – 6
29. Instruments cabinents. – 2
30. Show case for anatomy models. – 1
31. Filling cabinet. – 2
32. Long mirror. – 1
33. Foot Board. – 1

34.	Plaster board.	– 1
35.	Patra (Piri).	– 2
36.	Adult weighing scale.	– 1
37.	Hand washing equipment with stand.	– 1

For Home Delivery Equipment

1.	Midwifery kit.	– 2
2.	Earthern ware mudpots.	Large 2, Medium 3
3.	Small with lid.	– 2
4.	Earthen ware gumla.	– 2
5.	Mud Pitcher.	– 2
6.	Aluminium Degchi with lid.	– 2
7.	Earthenware gumla.	– 2
8.	Chula.	– 2
9.	Hat.	– 2
10.	Gunny bag.	– 2
11.	Patra (Piri).	– 4
12.	Aluminium bag.	– 2
13.	Postratal bags.	– 6
14.	Home visiting bags.	– 10
15.	Charpay.	– 2

X–RAY TECHNICIAN

Preamble

Medical Science has made tremendous advances in last two decades. The new diagnostic methods like, Ultrasound. C.T., NMR etc., have revolutionised the medical practice to arrive at correct and accurate diagnosis. WHO have already envisaged One X-ray unit to be attached to every primary health centre thus creating the need for trained para medical personnel in X-ray technology. On the horizon of cancer treatment, radiotherapy plays a crucial role. All modern cancer treatment centres are equipped with radiotherapy units which have an essential requirement of trained para-medical personnel in radiotherapy.

The vocational course of X-ray technician aims at meeting the demand for trained para medical petsonnel in the field of radiology/radiotherapy. The trained personnel will help in providing better radiological services leading to optimum utilization of the available resources.

Employment Potential

Wage Employments

- Radiographer Dark Room.
- Technician Radiotherapy.
- Technician.

Employing Agencies

- Medical College/Hospitals.
- Central and State Govt. hospital.
- Primary Health Centres Polyclinics and Nursing Homes.
- Private Hospitals.
- Private Clinics.
- Veterinary Hospitals and Colleges.
- Industrial Establishment e.g. Naval Dockyard.
- Armed Force Medical Services.
- Scientific and Research Institutions.
- Teaching Colleges/Hospitals of other Systems of Medicine (e.g. Homeopathy).

Sources of Technical Assistance

Technical

- Medical Colleges/Research Institutions.
- Manufacturers/Suppliers of X-ray Equipment.

Financial

- Nationalized Banks.

The Course offers Knowledge on

- Basic Principles and components of electrical circuits, X-ray equipment and its accessories.
- Basic knowledge of processing of films etc.
- Radiological anatomy and physiology of human body, Radiographic techniques and various positions for different parts of human body, Basic knowledge of X-ray tube, Basic concept of special investigative procedures like, Barium, IVP, Hysterosalpingo-graphy, Ultrasound, CT, etc.

Important Notes

- For eligibility, scheme of studies, scheme of examination and for other relevant information, rules and regulations, please refer to senior school curriculum for the relevant year of examination.
- The students of X-Ray Technician course will undergo on-the-job training for a period of 8 weeks preferably at the end of class Xl summer vacations, autumn and winter break in class XII.
- A certificate should be issued jointly by the Principal and Course Director concerned as per the format given at the end of the syllabus.
- The candidates after passing the X-Ray Technician vocational course should undergo a satisfactory practical training of one year in Govt. recognised hospital/nursing home.
- As per the guidelines laid down by the Atomic Energy Commission Regulatory Act no person less, then 18 years age is allowed to work as Radiation Worker.

CLASS–XI
ELECTIVE
ANATOMY, PHYSIOLOGY & RELATED PATHOLOGY (667)
THEORY

Time: 2 Hours ***Marks: 30***

I. (a) **Introduction** **10**

(i) Introduction to Radiology & Radiological Services.

(ii) Structure of the body–cells, tissues.

(b) **Musculo Skeletal System:** Skull, Vertebral column, Shoulder Girdle Bones of upper extremities, Bones of lower extremities, pelvis and its muscles, Ossification.

(c) **Cardiovascular System:** Heart–blood–Arteries–Veins.

(d) **Lymphatic System:** Circulation of Lymph, Lymph glands, Thoracic duct.

II. (a) **Digestive System:** Mouth–oesophagus–stomach–small intestines large intestines spleen Liver Gall bladder Pancreas. **10**

(b) **Respiratory System:** Nose, Larynx-Trachea-Lungs Bony-case.

(c) **Nervous System:** Brain-meninges-ventricles-Spinal cord and nerves.

(d) **Eye:** Structure and its function.

(e) **Ear:** Structure and function.

(f) **Surface Anatomy and Cross–sectional Anatomy.**

III. (a) **Reproductive System:** Female & Male organs. **10**

(b) **Urinary System:** Kidneys, Ureters, Bladder, Prostate and Urethera.

(c) **Skin:** Structure and its function.

(d) **Endocrine System:** Pituitary gland, Penial gland, Thymus gland, thyroid and parathyroid gland, suprarenal glands.

PRACTICAL

Time: 3 Hours ***Marks: 70***

1. Identification of the various parts & structure in human body on charts & models. **12**

2. Identification of bones of skeleton. **12**
3. Surface marking of human body. **12**
4. Identification of Bones & parts on X–ray films. **12**
5. Visit to Pathology museum for identification of Common Pathology lesions. **12**
6. Visit to Anatomy museum for identification of various parts of the human body. **10**

CLASS–XI
ELECTIVE
DARK ROOM TECHNIQUES (668)
THEORY

Time: 2 Hours ***Marks: 30***

I.
- **Photographic Process:** Light image, Image produced by radiation, Light Sensitive materials, latent image. **10**
- **Film Material:** The structure of X–ray & Imaging films, Resolving power, Grains of films, sensitivity of film, contrast of films, Type of films.
- **X–ray Film Storage:** Storage of unexposed films.

II.
- **Screens:** Construction of intensifying screens. **10**
  - Choice of fluorescent material.
  - Intensification factor, Detail, Sharpness.
  - Sped, Screen contact, care of intensifying screens, Types of Screens.
- **Cassettes:** Cassette designs, Care of cassette, Mounting of intensifying screen in the cassettes, Various types of cassettes.
- **Safe Light:** Constituents, filter, testing.

III.
- **Film Processing:** Constituents of processing solution and replenishes. **10**

  Factors affecting the development.

  Types of developer and fixer, Factors affecting the use of fixer. Silver recovery methods.
- **Film Rising, Washing and Drying:** Intermediate rinse–washing and drying.
- **Film Processing Equipment:** Manual and Automatic processing.
- **Dark Room Design:** Outlay and materials used.
- **Radiographic Image:** The sharpness, contrast, detail, definition, viewing conditions & artefacts.
- **Miscellaneous:** Trimming, identification of films, legends, records filing, report distribution.

PRACTICAL

Time: 3 Hours ***Marks: 70***

1. Testing of dark room light for safety. **3**
2. Testing of intensifying screen for uniform contact. **3**
3. Preparation of the developer and fixer. **6**
4. Loading and unloading of X–ray films. **6**
5. Processing of X–ray films. **6**

6.	Manual film processor care.	**6**
7.	Automatic film processor care.	**6**
8.	Handling of exposed and unexposed films.	**4**
9.	Prevention of artefacts.	**10**
10.	Storage & care of hangers.	**10**
11.	Care of intensifying screen & cassettes.	**10**

CLASS–XI
OPTIONAL
GENERAL PHYSICS (666)
THEORY

Time: 2 Hours ***Marks: 30***

I.
- Elementary idea of thermionic emission, Electrone–idea of mass and nature of charge, Coulomb's law, Electric field, Unit of potential. **10**
- Ohm's law, Units of resistance, potential and current, Combination of resistance in series and parallel.
- Fuses, Units of electric power, Earthing of electrical equipment.

II.
- Magnetic fields, Lines of force, Field pattern due to a straight current carrying conductor, coil carrying current, electromagnet, Construction and working of galvanometer, voltammeter and ammeter, (moving coil type and moving magnet type). **10**
- Heat and methods of transference of heat, condensers, Inductance and Impedance.
- A.C. and D.C. currents-effective current, RMS value, peak value.
- Electromagnetic induction – Laws, fields, influence.

III.
- Transformers – Principles, construction, and uses of step down and High tension transformers. **10**
- Diode values and their use in rectifiers solid-state rectifiers, its various rectifying circuits uses in X–ray machines, production of X–rays and their properties, X–ray tube–Stationary anode and rotating anode & therapy tubes, X–ray circuit, interlocking circuits, relay and timers.

PRACTICAL

Time: 3 Hours ***Marks: 70***

1.	Verification of Ohm's law.	**5**
2.	Verify the rules of series and parallels combination of resistance.	**5**
3.	Study the potential drop across different resistances.	**10**
4.	Determine the field along the axis of a coil carrying current.	**10**
5.	Study the characteristic curve of a diode valve.	**10**
6.	Study the impedance of a coil in A.C. and D.C.	**10**
7.	To find out the transformation ratio of a transformer.	**10**
8.	To construct a rectifying circuit with the help of (a) Diode valve (b) Transistor.	**10**

CLASS–XII
ELECTIVE
RADIOGRAPHY–I (GENERAL) (667)

THEORY

Time: 2 Hours *Marks: 30*

I. Radiography Preparation 15

Study and operation of X–ray machine.

(a) Checking phase and voltage, MAS and KV metre, X–ray table, Control panel.

(b) Checking of level of chemicals in dark room, temperature of solution, maintenance and care of X–ray machine, accessories and darkroom equipment and safe light.

(c) X–ray requisition form to be checked and register for radiography.

(d) Proper factors (K.V. & M.A.S.) to be selected, Appropriate Film Selection.

Assistance in fluoroscopy and other special investigative and imaging procedure.

II. Radiography Techniques 15

A. (i) Upper Limb: Fingers individual and as a whole hands, Carpal bones wrists, Forearm, elbow–head of radius, humerus, shoulder joint, Acromio clavicular joint, scapula, sterno clavicular joint, small joints.

(ii) Lower Limb: Toes, foot, calcaneum & other trarsal bones, ankle joint, legs, knees, patella, fibula, femur, intercondylar notch.

(iii) Hip & Pelvis: Hip, Neck of femur, threatre procedure, for hip pinning or reduction, pelvis, sacro iliac joints, pubic bones, acetabulum.

B. (i) Vertebral Column: Curves, postures, relative levels atlanto, occipital region, odontord process, Cervical spine, thoracic Inlet, Cervico, thoracic spine, lumbosacral spine, sacrum, coccyscoliosis, kyphosis, flexion, extension and neutral.

(ii) Bones of the thorax: Sternum ribs.

(iii) Skull: Land marks, Cranium, facial bones, maxilla, mandible, zygomata, T.M. joints, mastoids, petrous bones, optic foramen, sells turcica, P.N.S.

C. (i) Chest: Chest in teleradiography, chest supine & portable, Lardotic, apicogram and MMR.

(ii) Abdomen: Preparation, indication and contraindication, acute abdomen, pregnancy abdomen for multiplicity maturity and foetal abnormality. Pelvirnetry.

(iii) Soft tissue: Neck and breast.

(iv) Emergency Radiography: Bedside radiography, O.T. Radiography.

(v) Radiography for age evidence: Bone age evidence.

(vi) Dental Radiography: Occlusal view, Dental X–ray, Panoramic view.

PRACTICAL

Time: 3 Hours *Marks: 70*

- Taking X–ray of all the part of the human body as per the theory syllabus. **25**
- Checking all parameters. **20**
- Steps to be taken for radiography. **25**

Note: All the experiments based on syllabus should be performed by the students during the session.

Marking Scheme 70

Distribution of Marks

I. Any two experiment based on syllabus given. **30**

II. Viva voce. **30**

(i) Questions related to the experimental assigned.

(ii) Questions based on other remaining experiments given in the syllabus.

III. Sessional work. **10**

Maintenance of records.

Lab and On–the–job Training.

CLASS–XII
ELECTIVE
RADIOGRAPHY–II (668)
(SPECIAL INVESTIGATION, IMAGING AND RADIOGRAPHY)
THEORY

Time: 2 Hours ***Marks: 30***

I. (i) Pathology: Definition, cell growth, cell deformities, cell damage, defence mechanism, cell repair. **10**

(ii) Neoplasia: Benign & Malignant including its mode of growth and matastasis.

(iii) Radiation: Local and systemic.

(iv) Radiotherapy techniques.

(v) Emergency in Radiology.

II. (i) Contrast media. **10**

(ii) Urinary Tract: I.V.P., Retrograde Pyelography, Cystourethrography. Presaral Insufflation.

(iii) Biliary Tract: Oral cholecystography, I.V.C, Trans hepatic percutanous cholangiography pre-operative cholangiography – T-tube cholangiography, E.R.C.P.

(iv) Tomography: Principle, equipment and types of movements, procedure.

(v) Venography: Splenoportovenography, Peripheral venography.

(vi) Lymphangiography.

(vii) Marnmography and Xeroradiography.

(viii) Radiculography.

(ix) Dacrocystography.

III. (i) Gastro-intestinal Tract: Ba. swallow, Ba. meal upper G.I.T., Ba, meal follow through, Ba. Enema. **10**

(ii) Female Genital Tract: Hystero Salpingography, Gynecography, Placentography & Pelvinmetry.

(iii) Angiography: Carotid angiography, Fermoral arteriography, Aortography, Selective angiography etc.

(iv) CNS: Ventriculography, Myelography, Pneumoencephalography.

(v) Sialography.

(vi) Sinography.

(vii) Nasopharyngography.

(viii) Laryngography.

(ix) Bronchography.

(x) Arthrography.

(xi) Discography: to assist in various special investigative & imaging procedures & maintenance of the equipment.

PRACTICAL

Time: 3 Hours ***Marks: 70***

1. Radiography in various positions for all the special radiological procedures using contrast media, as per syllabus. **34**
2. Positioning & treatment of various cancer patients using.
   (a) prescribed filters/wedges. **18**
   (b) protecting various organs. **18**

Note: All the experiments based on the syllabus should be performed by students during the session.

Marking Scheme **70**

Distribution of Marks

I. Any two experiments based on syllabus given. **30**

II. Viva voce. **30**
   (i) Questions related to the experiments assigned.
   (ii) Questions based on other remaining experiments given in the syllabus.

III. Sessional work. **10**
   Maintenance of records.
   Lab and On–the–job Training.

CLASS–XII
OPTIONAL
RADIATION PHYSICS (666)
THEORY

Time: 2 Hours ***Marks: 30***

I.
- Latent images formation and its processing. **10**
- Various units used for measuring radiation–Roentgen, rad and rem.
- Construction of X–ray tube, X–rays–its production and properties.
- Ionization chambers, G.M. Counter and Scintillation Counter, Interaction of X–ray with matter.
- Quality and quantity of X–rays, HVT, linear absorption coefficient, Grid, Cones and Filters.
- Inverse square law, scattered radiations and appliances used to reduce it.

II. Radioactivity **10**
- Curie, Half life, decay factor.
- Details about radium, cobalt and caesium.
- Doses–dose and dose rate, exposure dose, exit dose, surface dose, depth dose, isodose charts and their uses.

III.
- Radiation Hazards, Protection against it, film badge, pocket ionisation chamber, maximum permissible dose. **10**

PRACTICAL

Time: 3 Hours ***Marks: 70***

1.	Verification of Inverse Square law.	**7**
2.	Calibration of X–ray machine.	**7**
3.	To study the affect of KV and MAS.	**7**
4.	Find out the HVT of a given beam.	**7**
5.	To check the lead apron for any crack.	**7**
6.	Find out whether the glass in the screen in lead glass or ordinary glass.	**7**
7.	To survey the X–ray control for radiation.	**7**
8.	Demonstrate that the intensifying effect of X–ray intensifying screen is due to light produced by flouro–screen and not by the X–ray.	**7**
9.	Demonstrate the use of Grid/potter–bucky diaphragm and radiographic contrast.	**6**
10.	Demonstrate the effect of improper centering of X–ray tube.	**4**
11.	Verification of optical and radiation field coincidence.	**4**

LIST OF RECOMMENDED BOOKS

1. Text Book of Radiology for Technicians by Dr. Satish Bhargava.
2. Anatomy & Physiology for Nurses by Evelyn C. Pearce.
3. Anatomy & Physiological by Kumber–Gray–Stacpoles.
4. Surface & Radiological Anatomy by Halim Das.
5. Basic Physics in Radiology by Kemp & Oliver.
6. Radiation Physics in Radiology by R. Oliver.
7. X–Ray Equipment for Student Radiographers by D.N. & Chesney.
8. X–Ray Physics & Equipment by Jaundrell, Thompson & Ashworth.
9. Fundamentals of X–ray & Radium Physics by Joseph sely.
10. Principle of Radiographic Exposure & Processing by W. Fuch.
11. Radiographic Positioning by R.C. Clark.
12. Radiographic Photography by D.N. & N.O. Chesney.
13. Radiotherapy for Beginners by Walter & Miller.
14. Radiotherapy by Priscilla Barnes Dvis Roos.
15. Radiotherapy by Robert Tiffany.
16. Diagnostic Radiography by J. Bryan.
17. Manual of Radiography issued by Director General Armed Forces Medical Services (INDIA).
18. X–Rays, their Origin, Doses & Practical Application by W.E. Schall, Publisher–Bristol, Johri Wright & Sor Ltd.
19. Clarke's Positioning in Radiography by Louis Kreel, Ilford, William Heinemann, Medical books Ltd., London.

LIST OF TRAINING INSTITUTIONS

- All Medical College Hospitals.
- All Hospitals where well established Radiology Deptt. exist.

LIST OF EMPLOYING AGENCIES

- Medical College Hospitals.
- Central & State Govt. Hospitals, Autonomous bodies & Semi Govt. Hospitals.
- Primary Health Centres.
- Polyclinics and Nursing Homes.
- Private Hospitals.
- Private Clinics.
- Veterinary Hospitals and Colleges.
- Industrial Establishments e.g. Naval Dockyard.
- Armed Forces Medical Services.
- Scientific and Research Institutions.
- Agricultural Institutions.
- Teaching Colleges, Hospitals of other Indian system of Medicine (Homeopathic, Ayurvedic and Unani)

QUALIFICATION OF TEACHER

1. Qualified Radiologist MD with three years experience.

OR

2. B.Sc. Radiography OR Diploma Medical OR +2 CBSE X–Ray Technician/Lab Technician (Radiography) with 10 years experience in Hospital recognised by DHS/DMS/DME.

SUGGESTIONS

- X–ray technician course in very lucrative, offering, right career prospect.
- An Assessment should be made regarding demand in both wage and self employment in the country and aboard before starting the course.
- The candidates should be made aware of the career prospect in wage employment, and the fact that setting up of even a small X–ray clinic involves at least a lac of rupee in equipment itself. However, if X–ray technician wishes to put up his own X–ray plant he will have to seek help of radiologist for interpretation of X–rays.
- The course is practically oriented one and hence the attachment for training has to be in well equipped radiology deptt. of hospital.
- Normally not more than 6 students be attached to one hospital.
- Anatomy, Physiology and Pathology – Should be taught be Medical doctor while general physics can be taught by Physics teacher however Radiation Physics has to be taught by Radiological Physicist.
- Dark room techniques, General Radiography special Investigations and Radiotherapy should be taught by qualified X–Ray technician and Radiological.
- Radiation Physics practical have to be performed in the Radiology Deptt. of the Hospital in XII class.
- The attachment of the students for practical training should be in morning session of the Hospital in class XII.
- The Apprenticeship should be preferably a paid one and for a minimum period of one year duration.

SUGGESTED LIST OF EQUIPMENTS AND CHEMICALS

(for a batch of Six Students)

X–Ray Equipment

- X–Ray machines – 300 M.A.s.
- Portable Machines (Automatic & Manual).
- Personal Radiation Monitoring Services from B.R.C.
- M.M.R.
- Ultrasound.
- Cancer treatment facility should be available in the hospital, Additional facility to be provided under the scheme for the course.
- Computer – P.C.
- Portable Ultrasound.
- Optional.

  CT MRI, Cobalt etc.

Radiation Physics

1. Secondary Standard Dosimeter.
2. X–Ray Dosimeter.
3. Survey Meter.
4. Copper Sheets: 25, 5 & 1 mm thick–size 30 x 30 cms.
5. Perspex Sheets: 10cm, 5cm, 30 x 30 cms.
6. Intensifying screen of 3 sizes – 15" x 12", 10" x 12", 10" x 8".
7. Aluminium sheets 1 mm thick size – 3' x 3'.
8. Film Hangers – various types of above sizes 3.

Dark Room Material

- Plastic buckets, glass rods, glass beakers.
- Developer, Fixer.

Anatomy & Physiology

1. Human Skeleton, various coloured charts depicting various systems.
2. Anatomical models of detailed cross section of Human body in different sections.

SUGGESTED CONTACT ADDRESS FOR SUPPLY THE MATERIALS

X–Ray Equipment, C.T., Ultra Sound & MRI

- Picker International.
  A–12, Sujan Singh Park, New Delhi-110003.
- Siemens India Ltd.
  Medical Engineering Division, 4–A, Ring Road, I.P. Estate, New Delhi-110002.
- International General Electric (India) Ltd.
  34–Bhagat Singh Marg, New Delhi-110001.

- INRAYS
  Plot. 356/381, Sector-24, Faridabad.
- Radon-House Pvt. Ltd.
  7, Sardar Shakar Raod, Calcutta-700036.
- Shimaza Teshaiwal Bros. Pvt. Ltd.
  198, Jamshedji Tata Road, Bombay.

CT & Ultra Sound

- Blue Star Ltd. (Hitachi)
  414/2 Bir Sarakar Marg, Parbha Devi, Bombay.
- Philips India Ltd.
  3, Haddows Road.

X–Ray Accessories

- Rege Cine films
  504, Deep Shika Building, 8, Rajendra Place, New Delhi-110008.
- Agfa Gaevart India Ltd.
  Moti Nagar, New Delhi.
- Umasons, X–ray Equipment
  Nirlep House, G.D. Ambedkar Marg, Parel, Bombay-400012.
- Kiran X–ray Screens
  509, Delamal Chambers, 29, Sir V. Thackersey Marg, Bombay-40020.
- Royal Surgical X–rays,
  Tiwari Bhavan, Alambagh, Lucknow-5.
- Electromach-Corporation
  Madhyamgram, 24 Paraganas, West Bengal.

CHEMICALS & FILMS

1. Hindustan Photo Films – Rajendra Place, New Delhi.
2. Sakura Films – Chawri Bros, 21, Darya Gang, New Delhi-110002.
3. German remedies L Td. – PB. No. 6570, Bombay-400018.
4. May & Baker India Ltd. – M & B House, Worli, Bombay-400025.
5. Eskay Fine Chemicals-IS, Matew Road, Bombay-400004.
6. Win-Medicare Pvt. Ltd. 14 Floor, Hemkunt Tower, 98 Nehru Place, New Delhi-110019.

HEALTH CARE SCIENCE

1. Introduction

Undisputedly, the wealth of a country is judged by the health of its people. Worldwide, nations are seeking viable answers to the question of how to offer a health care system, which leads to improvements in the health status of their citizens. In our view, health care in India is the responsibility of the community as a whole. A collaborative approach, which involves financial support, strategic planning and health prioritizing legislation, involves the government, community leaders, and private and public health care professionals. Here in India we must encourage individual, family and group participation in taking care of their physical, mental and emotional health and provide venues for doing so. We need to support an increase in health seeking behaviours motivated by education, through the school system, civic groups and public information.

Faults of the country's medical system have become apparent within the last decade as economics forced hospitals to begin amalgamating services and reducing staff, thereby increasing clients' access to timely services. From years of evidence, public and private health care understands the need to view health care from a business perspective; however, without losing sight of the need to provide high quality, accessible services. Indeed, we must strive to improve the health care system by creating an environment that encourages and rewards quality of care by the professionals who are providing the services. We are seeing to do more than maintain the status quo of our community's health, and instead to improve on the health status of all concerned. Through tightly coordinated partnerships with medical, social, educational, business, civic and religious organisations of this country, we can develop a comprehensive and coordinated health care system.

This curriculum on **Health Care Science** has been developed for a two year new course at 10+2 stage. It has been so designed that the trainees on completion of the course will be competent to work as General Duty Assistants (GDAs) and go up in ladder as supervisor in Hospitals and Nursing Homes, to start their own self-employment ventures. The Course intends to impart both theoretical knowledge and practical training, suited for both self and wage employment.

Scope and Prospects of Health Care Science Course

This forms a good basic course for healthcare sector, after which the pass out can either join the healthcare service system as a GDA or go for higher education (Vertical Mobility) in the health care sector related courses (advanced courses in the health sector).

Pass out of this course can be good multi-skilled worker for the healthcare industry, who can handle a number of jobs depending upon where he/she is posted.

2. Employment Opportunities

- General Duty Assistant (GDA) in a hospital.
- General Duty Assistant in a Nursing Home.
- Front Office Assistant (FOA) in hospitals.
- Patient Care Coordinator (PCC) in a hospital.
- Sanitary Assistant in a hospital.
- Ambulance Assistant.
- Health Worker.
- Marketing Assistant (Health Care).
- Health Functionary in NGOs and voluntary organizations.
- Medical Emergency Assistant.

Vocations After Higher Education

- Nursing.
- Pharmacy.

- Medical Transcription.
- Alternative Medicine Specializations (Unani, Ayurveda, Siddha, Homeopathy, Naturopathy).
- Paramedical Technicians.

3. Objectives of the Course

The main objective of the course is to develop professional competency and employable skills in General Healthcare.

The specific objectives are.

- To demonstrate understanding of Anatomy, Physiology and Dietetics in relation to general healthcare.
- Develop understanding of basic principles of healthcare delivery services.
- To deal with the customers/patients efficiently in the area of healthcare.
- To efficiently support the health care's personnel in looking after the patients/customers.
- To impart basics knowledge of Healthcare Services System.
- To be able to impart basic health education to the customers/patients.
- Communicating effectively with the customers/clients.
- To create an understanding of Healthcare Industry.
- To train a multi-skilled workers for the healthcare industry who can handle a number of jobs depending upon where he/she is posted in the hospital.
- This forms a good basic course for healthcare sector after which they can plan for vertical mobility to Diploma/Undergraduate courses.
- To provide a platform to identify advanced skills-based training in healthcare sector.
- To understand the principles of public health and have competency to implement National Health Programmes in the Community.
- To be able to manage/implement IEC activities in the community.

CLASS–XI
ELECTIVE
HEALTH CARE DELIVERY SYSTEM (728)
THEORY

Time: 3 Hours ***Marks: 60***

1. Health Care Delivery System: Staffing and their Functions **20**

(i) At Village Level.
  (a) Trained Birth Attendants.
  (b) Village Health Guides.
  (c) Anganwadi Workers.

(ii) At Sub-centre Level.
  (a) Female Health Workers.
  (b) Male Health Workers and their functions.

(iii) At Sector Level.
  (a) Male Health Supervisors.

(b) Female Health Supervisors.

(iv) At Primary Health Centre Level.

(a) Organization, Staffing and Functions.

(v) At Community Health Centre Level.

(a) Organization, Staffing and Functions.

(vi) At District Level.

(a) District Health Organization, Staffing and Functions.

(vii) At State Level.

(a) Health Department, Directorates.

(b) Tertiary Care Institutions.

2. Hospital Organization and Services — 20

Definition, Types & Functions of a Hospital.

Hospital as a System.

Clinical & Nursing Services

(OPD, casualty, ICU, wards, OTs, Nursing services, etc).

Diagnostic Services

Laboratory services & Radio imaging.

Support Services

(a) Housekeeping.

(b) Laundry & Linen.

(c) Kitchen & Canteen.

(d) Maintenance.

(e) Transportation/Transfer of Patients.

(f) Mortuary.

(g) Finance department.

(h) Personnel/HR department.

(i) Material & Purchase department.

(j) Public Relations department.

(k) Medical Record department.

(l) Pharmacy (Introduction to medication practices).

3. Medical Equipments — 10

- **Diagnostic Equipment** including medical imaging machines like x-ray machine, ultrasound, Magnetic Resonance imaging (MRI), Computerized Axial Tomography (CAT) – scans etc.
- **Therapeutic Equipment** including infusion pumps, medical lasers and LASIK surgical machines.
- **Life Support Equipment** that is used to maintain a patient's body functions including medical ventilators, heat-lung machines and dialysis machines.

4. Orientation to Specific Hospital Equipments — 10

- Ventilators.
- Monitors.

- Defibrillator.
- Infusion pump.
- X-ray machines.
- Incubator.
- Microscope.
- Petri dishes.
- Instant diagnostic tools (Urinometer, Glucometer, Pregnancy kit etc.).
- Endoscopes Equipments.
- Oxygen cylinder.
- Suction apparatus.
- ECG machine.
- Common Surgical Instruments (Names & functions).
- Boyle's Apparatus.

PRACTICAL

Time: 2 Hours ***Marks: 40***

1. Hand Hygiene **3**

Washing the hands properly with soap and water.

- Use of re-usable/disposable towels.

2. Vital Parameters Checking: Practical Training in **4**

- Checking Temperature.
- B. P.
- Pulse.
- Respiration.

3. Practical Training about Universal Safety Precautions (USPs) **3**

- Handling sharps and needless.
- BMW (Bio Medical Waste Management).
- Phlebotomy & I.V. cannulation.

4. Sterilization Procedures **2**

- Using Autoclave.
- Disinfection in rural setting.

5. Public Health **3**

- Chlorination of Water.
- Sanitary latrines.
- Sanitary disposal of waste.

6. Orientation Visits to Different Areas of the Hospital **15**

- Front Desk – Functions.
- OPDs – Cardiology.
  – ENT.
  – Neurosciences.
  – Urology.
  – Ophthalmology.
  – Medical OPD.
  – Skin (Dermatology) OPD.
  – Surgical OPD.
  – Pediatrics& Neonatal OPD.
  – Gynecology& Obstetrics OPD.
- Medical records Office
- Wards postings – Different wards on rotation.
- Acute care Areas – Casualty / ICU / Traumatology unit etc.
- Posting in Support services – Kitchen (Dietary), Laundry, etc.
- Laboratory Services Posting
- Radiology Deptt: – MRI.
  – C T Scan.
  – X – ray room.
  – Ultrasound.
- Intensive Care Unit (ICUs):
  - PICU – Pediatric Intensive Care Unit.
  - NICU – Neonatal Intensive Care Unit.
  - SICU – Surgical Intensive Care Unit.
  - MICU – Medical Intensive Care Unit.
  - CCU – Coronary Care Unit.
- Operation Theatre (OT) Rooms Posting.
- Pharmacy Posting.

(Note: Prepare report of the study visits and submit).

7. Demonstration of the Working of the Following Medical Equipments **10**

- Ventilators.
- Monitors.
- Defibrillator.
- Infusion pump.
- X-Ray Machine.
- Incubator.
- Microscope.
- Petri dishes.
- Instant diagnostic tools (Urinometer, Glucometer, Pregnancy kit etc.).

- Endoscopes Equipments.
- Oxygen cylinder.
- Suction apparatus.
- ECG Machine.
- Common Surgical Instruments (Names and functions).
- Boyle's Apparatus.

CLASS–XI
ELECTIVE
FOOD NUTRITION & DIETETRICS (729)
THEORY

Time: 3 Hours ***Marks: 60***

1. Food Nutrition 25

- Constituents of Food (Carbohydrates, Proteins, Fats, Vitamins and Minerals).
- The Process of Nutrition.
- Balanced Diet.
- Nutritional disorders (Protein energy malnutrition and Vitamin Deficiency Diseases).
- Anemia: Causes, Identification, Prevention and control.

2. Diet in Health and Disease 15

- Diet in Diabetes.
- Diet in Hypertension and Heart Disease.
- Diet in Gastro-enteritis.
- Diet in other gastro-intestinal diseases.
- Diet in urological disorder.
- Diet in other disorders.

3. Nutrition Education 10

- For pregnant and lactating women.
- For infants and children to meet nutritional needs across age groups, gender and life styles.
- For those suffering from common diseases (Tuberculosis, Anemia, Vitamin and mineral deficiency, Goitre).

4. Computer Applications in Health Care 10

- Basics of Computer including Internet.
- Usage of Computer in Hospital Administration (medical record keeping).

PRACTICAL

Time: 2 Hours ***Marks: 40***

Food Nutrition and Dietetrics

1. Preparation of ORS and usage. **7**
   - Home made ORS.
   - WHO Approved ORS Packets.
2. Posting in Hospital Catering Service. **4**
3. Posting in Dietetics Department of the Hospital. **4**
4. Project on Nutrition and Diet. **5**
5. Specimens & models: Identification & explanation. **10**
6. Project work on computer applications in healthcare documentation. **10**

CLASS–XI
OPTIONAL
ANATOMY & PHYSIOLOGY (730)
THEORY

Time: 3 Hours ***Marks: 70***

1. Definition of Anatomy & Physiology.
   (a) Description of various regions of the body. **3**
   (b) Elementary Knowledge of cells and tissues of the body. **3**
2. Elementary Knowledge of Anatomy & Physiology of different organs& systems. **2**
3. Sense Organs – Eye, Ear, Skin, Nose, Tongue. **7**
4. Skeletal System. **5**
5. Bone Structure & Types of bones, Joints & Muscles. **3**
6. Cardio vascular system. **6**
7. Respiratory System. **5**
8. Lymphatic System. **2**
9. Blood forming System. **6**
10. Digestive System. **6**
11. Uro-Genital System. **6**
12. Endocrine System. **3**
    (Name of the endocrine organs, locations and functions).
13. Reproductive System. **4**
14. Neurological System. **6**
15. Dental System. **3**

PRACTICAL

Time: 2 Hours ***Marks: 30***

1. Identification of bones, joints and muscles through use of charts and slides Skeleton's model and other models. **5**
2. Measuring Blood Pressure (BP) Temperature, Pulse, Respiratory rate, study of Blood Smear, Urine test for Protein & Sugar.

Under Microscope for blood components, study of tissues under microscope.

3. Identification of place of organs of body through: **5**
   - Charts.
   - Models.
   - Skeleton.
   - Name of Bones and joints.
   - Identification & description of Liver, Lungs, Brain & Kidneys and other body parts.
4. Anatomy & Physiology Record (every students has to make his/her own record). **5+5**

CLASS–XII
ELECTIVE
HEALTH EDUCATION, COMMUNICATION AND PUBLIC RELATIONS & PUBLIC HEALTH (728)
THEORY

Time: 3 Hours ***Marks: 70***

1. Health Education: Meaning, Definition, Objectives and Importance **4**

2. Communication for Health **7**

- Information: Definition and Components.
- The process of communication.
- Methods & media of communication.
- The concept of Information Education and communication (IEC) for health.
- Health Ethics.

3. Making Health Communication Effective **6**

- Inter personal methods of communication.
- Mass Media Methods of communication.
- Equipment for mass media communication.
- Modes, types and barriers of communication.

4. Patient Education for Common Acute Diseases **10**

- Dental Diseases.
- Diarrhea.
- Vomiting.
- Cough.
- Cough & breathlessness (Bronchitis).
- Asthma.
- Skin Diseases (e. g. scabies, boils, infected wounds).

5. Patient Education in Chronic Diseases **10**

- Diabetes.

- Asthma and Chronic Bronchitis.
- Hypertension.
- Arthritis.
- Ischemic Heart Disease.
- Obesity.
- Cancers.
- Other Chronic Diseases.

6. Personal Hygiene — 4

- Essentials of personal hygiene including personal grooming.
- Hand washing and its importance.
- Methods and pitfalls in hand washing.
- Prevention of food poisoning through proper personal hygiene.

7. Environmental Sanitation — 4

- Essentials of sanitation.
- Human faeces – methods of appropriate disposal.
- Faecal – oral contamination and Faecal – oral diseases.
- Methods of sanitation and hygiene to break faeco – oral transmission of diseases.
- Disposal of solid and liquid waste.

8. Sexuality Education and Family Life Education — 5

- Prevention of STDs (Syphilis, Gonorrhoea, Pelvic Inflammatory Disease (PID)).
- Prevention & control of HIV/AIDS.
- Safe sex.
- Universal safety precaution for control of HIV/AIDS.
- Planned Parenthood and Family Planning.

9. Public Relations in Health Care Service Institutions — 5

- Definition of public relation.
- Role and importance of public relations in health care service institutions.
- Role of General Health Assistant (GHA) in the hospitals.
- Staff-patient relationship.
- Doctor-patient relationship.
- Personal hygiene of hospital staff.
- Empathy Vs sympathy in patient care.

10. Public Health — 10

- Principles of Public Health.
- Immunization.
- National Health Programmes I (National Rural Health Mission including RCH II).

- National Health Programmes II (RNTCP, Malaria control, Blindness control, HIV/AIDS control, others).
- Disinfection of Water.
- Sanitation & disposal of Excreta.
- Methods of Disinfection.
- Data Collection.
- Basics of Medical Statistics like Mean, Mode, Median, Charts, Diagrams & Sampling Method.
- Techniques of Health Education.

11. Organizational Behaviour: Meaning, Importance of Human Relationship in Healthcare Institutions. **5**

- **Organizational Behaviour:** Meaning, need and importance, Internal and External human relations, factors affecting human relations, behavior in organizations at the individual and group level, effect of organization structure and process on behaviour.
- **Group Behaviour:** Group Dynamics formal and informal groups, Group decision making techniques, Team: Meaning, purpose, Type, Life cycle, Team work, Team building, team effectiveness.
- **Conflicts:** Nature, levels, effects, conflict resolution process, Transactional analysis – meaning, benefits.
- **Customer Relations**: Significance, How to deal with customers.

PRACTICAL

Time: 2 Hours ***Marks: 30***

1. Role play of Patient Education for any one of the item in Patient Education for Common Acute Diseases **5**

Or

Role Play of Education for any one of the item in 'Patient Education for chronic Disease.

2. Project work on Universal Safety Precautions for Control of HIV/AIDS. **6**

- Record work with suitable pictures etc.

Note: For serial no. 1 the situation can be given to the students and assume as Patients and health workers for Patient Education.

3. Visit to Five Houses in a Village (Students from Urban localities can visit Urban Slums in the City) and Collect Following Data. **5**

- Source of Water supply .
- Methods of Excreta Disposal.
- Health Status of Family Members like Height, Weight,.
- Collection of data available on the immunization card.

4. Demonstration of Water Chlorination **2**

- Sterilization of the water in a bucket.

5. Visit to DOTS Centre **4**

- Study the functioning of a DOTS centre.
- Prepare a chart on the duties & responsibilities of DOTS Providers.

6. Participate in Pulse Polio Campaign 3

- Procedure followed on the day of the campaign.
- Procedure on the subsequent days.

7. Preparation of Chart with Bar Diagram, Pie Chart, Line Diagram and Histogram 5

Note: Additional (Optional) please refer the concerned year senior school curriculum of CBSE.

CLASS–XII
ELECTIVE
BASIC CONCEPTS OF HEALTH & DISEASE AND MEDICAL TERMINOLOGY (729)
THEORY

Time: 3 Hours ***Marks: 70***

1. Definition of Health & Concepts Related to Health 15

- Primary Health Care, Secondary Care, and Tertiary Health Care.
- Promotive Health Care, Preventive Health Care, Curative Health Care, and Rehabilitative Health Care, Spiritual Health Care.
- Concepts of Social medicine, Preventive medicine and Community medicine and Public Health.

2. Concepts Related to Diseases 15

- Different kinds of diseases: Infectious/communicable/non-communicable & degenerative diseases.
- How interaction between disease causing agents (Physical, Chemical, Biological,) host and environment results in diseases.
- Modes of transmission of communicable diseases:
  - Diseases of Contact transmission.
  - Air-borne diseases.
  - Water borne diseases.
  - Vector borne diseases.

3. Promotion of Healthy Environment 5

- At individual level.
- At family level.
- At Community level.

4. Prevention & Control of Diseases 20

- Water safety.
- Food safety.
- Environmental sanitation (including safe disposal of solid & liquid wastes).
- Personal hygiene.
- Safe disposal of human excreta.
- Safe disposal of Bio Medical wasted (BMW) Management.

- Control of vectors and pests (control of house files, mosquitoes, rats, cockroaches etc.).
- Healthy housing & preventing of air pollution.
- Isolation procedures.

5. Medical Terminology — 15

5.1 Basics of Medical Terminology

- Words, Prefixes & suffixes used in medical terms (Symptomatic, Diagnostic and Operative terminology).
- Origin of medical terminology.
- Terminology to identify basic body systems, and vital signs.
- Distinction between the symptoms, signs and specific diseases.
- Determining the specialty by identifying the meaning of the word root.

5.2 Basic Word Roots, Prefixes and Suffixes

5.3 The Human Body in Health and Disease

- Terms related to pathology of cells, tissues, and glands.
- Types of diseases.
- Recognize different medical specialties and specialists.
- Terms used in different Departments of the hospital (Symptomatology, diagnostic entities, intervention methodology, equipment used etc.):
- Orthopaedics & traumatology.
- Digestive system.
- Circulatory and lymphatic system.
- Respiratory system.
- Gynaecological system.
- Obstetrics & Maternal & child care.
- Neurology & Psychiatry.
- Internal Medicine.
- General Surgery.
- ENT & Ophthalmology.

5.4 Coding of Diseases

- Introduction to coding & classification of Diseases.
- Introduction to Volume I & II of International Code of Diseases (ICD).

PRACTICAL

Time: 2 Hours — ***Marks: 30***

1. A.V. Aids – Making charts, Models, Pamphlets etc. — 10

- Water Safety.

- Food Safety.
- Healthy Housing and Prevention of air pollution.

2. Safe Disposal of Biomedical Waste Management — 10

- Demonstration with different specimen and color coded containers i.e. General waste, Sharps, Blood contaminated Swabs, Swabs or materials contaminated with any body fluids, Plastic wastes, Broken Glass pieces.

3. Medical Terminology — 10

- Practical setting exposure to procedure and tests used in hospitals.

Note:

Additional (Optional)

Please refer the concerned year Senior Secondary Curriculum of CBSE.

CLASS–XII
OPTIONAL
FIRST AID & EMERGENCY MEDICAL CARE (730)
THEORY

Time: 3 Hours ***Marks: 60***

1. First Aid — 28

- First Aid: Definition.
- First Aid Kit: Constituents and uses.
- Cardio-Pulmonary Resuscitation (CPR).
- First Aid in Road accidents.
- Control of Bleeding; epistaxis, cut – wounds, use of tourniquets.
- First Aid for fractures.
- Splinting the suspected fractures.
- Transporation of the injured.
- First Aid in Burns & shock.
- First Aid in Drowning.
- First Aid in Poisoning.
- First Aid in Electrocution.
- First Aid to Unconscious individual.
- Equipment & Procedures in Emergency care unit.

2. Emergency Assistance in — 12

- Shock.
- Snake bite.
- Poisoning.
- Fractures.
- Seizures.

- Electrocution.
- Drowning.
- Road accidents.
- Blast injuries.

3. Disaster Management **10**

- In Fire.
- In Floods & Cyclones.
- In Earthquakes.
- In Drought.
- Train Accidents / Aircraft Accidents.
- In Bomb blasts.

4. Medical & Surgical Emergency Management **7**

5. Safety Aspects in Healthcare (Needle stick injuries, vulnerable patients, identification of patients.). **3**

PRACTICAL

Time: 2 Hours ***Marks: 40***

1. Visit to the Casualty – Orientation to **15**

- Receiving casualty and Immediate actions.
- Introduction to medicines used in Casualty Department.
- Equipment used in Casualty.
- Oxygen cylinders & Oxygen mask.
- Aspiration equipment.
- B. P. Apparatus.
- Intravenous infusion.
- Ventilator.
- Monitors.

2. Visit to Fire Office **5**

- Acquaintance with fire fighting methods.
- Equipment for fire fighting.

3. Visit to Red Cross Society **5**

- Blood Bank Activities of Red Cross.
- First Aid training activities of Red cross.

4. Transfer of Patients **10**

Drills on Transferring Patients

- Bed to wheel chair.
- Bed to trolley.

- Trolley to Trolley.
- Trolley to bed.
- Transferring post operative patients.

5. Project Work on First Aid **5**

Note: Additional (Optional) Please refer the concerned year senior school curriculum of CBSE.

LIST OF RECOMMENDED BOOKS

1. First Aid and Emergency Medical Care, Theory, Class–XII, Published by CBSE.
2. First Aid and Emergency Medical Care, Practical, Class–XII, Published by CBSE.
3. Health Education, Public Relations and Public Health, Theory, Class–XII, Published by CBSE.
4. Health Education, Public Relations and Public Health, Practical Manual, Class–XII, Published by CBSE.
5. Basic Concepts of Health & Diseases and Medical Terminology, Practical Manual, Class–XII, Published by CBSE.
6. Basic Concepts of Health & Diseases and Medical Terminology, Text Book, Class–XII, Published by CBSE.
7. Anatomy & Physiology Theory, Class–XI, Published by CBSE.
8. Anatomy & Physiology Practical, Class–XI, Published by CBSE.
9. Health Care Delivery System, Hospital Organization and Services, Medical Equipment and Technology, Paper–II, Practical Manual, Class–XI, Published by CBSE.
10. Health Care Delivery System, Hospital Organization and Services, Medical Equipment and Technology, Paper–II, Practical Manual, Class–XI, Published by CBSE.
11. Food Nutrition & Dietics Theory, Class–XI, Published by CBSE.
12. Food Nutrition & Dietics Practical, Class–XI, Published by CBSE.
13. Nutrition and dietetics.
14. First Aid and Nursing.
15. NCERT, Anatomy (for MLT): NCERT, New Delhi. 1988.
16. NCERT, Physiology (for MLT) : NCERT, New Delhi 1988
17. World Health Organization (WHO), International Classification of Diseases (WHO).
18. Health Information of India – Ministry of Health & Family Welfare, Government of India.
19. Consumer Protection Act & Medical Profession – Yadava B.S.
20. Medical Terminology for Health career by E. Thonger, Alice and Burc, EMC.
21. For comprehensive reference material. Precis/handouts prepared by AHA should be made available to the students.

LIST OF COLLABORATING INDUSTRIES & INSTITUTIONS

- PSS Central Institute of Vocational Education.
- Max Healthcare Institute Limited of Medical Excellence.
- Fortis Healthcare Limited.
- Federation on Indian Chambers of Commerce & Industry (FICCI).

- Confederation of Indian Industry (CII).
- General Hospitals.
- Primary Healthcare Centers.
- Health Education Departments.
- Para Medical Institutions.
- Hospital Laboratories.
- Hosmac Foundation.
- National Institutes of Health & Family Welfare could be asked for collaboration.
- Academy of Hospital Administration (AHA).

LIST OF EQUIPMENTS AND SOFTWARE

Medical monitors, allow medical staff to record patients' vital parameters Monitors may measure patient's vital signs and other parameters including ECG, EEG, blood pressure, and dissolved gases in the blood.

Medical laboratory equipment automates or helps analyze blood, urine and gases.

The equipment needed includes:

1. Phlebotomy & Intravenous (i.v.) Cannulation Kit.
2. First Aid equipment.
3. Skeletons, charts and posters.
4. Models for all parts of body (different organs and organ system).
5. Microscopes.
6. Hand washing equipment.
   - reusable towels.
   - pumice stones (for scrub wash).
   - soap & water.
   - alcohol hand rubs.
7. Biomedical Waste (BMW) Containers and Syringe & Needle destroyers – samples of different sizes containers.
8. Slides cover slips, various stains.
9. Nutrition related charts and posters.
10. Computer and printer – with Internet connection.
11. B. P. apparatus – dial type, electronic type and mercury type.
12. Thermometer.
13. Glucometer.

LIST OF VENDORS & MANUFACTURERS OF THE EQUIPMENT

Computer Code

- 3M
- Acuson
- ATL
- Pentax
- Physio Control
- Puritan Bennett
- Abbott
- ADAC
- Baxter
- Philips
- Picker
- Quinton

- Fisher Scientific
- Siemens
- GE
- Sony
- Hill – Rom
- Spacelabs
- HP
- Stryker
- Karl Storz
- Toshiba
- Kodac
- Welch Allyn
- Lorad
- Zoll
- Marquette
- Philips
- Nellcor
- Pentax
- OEC
- Picker
- Ohmeda
- Physio Control
- Olympus
- Quinton

HEALTH AND BEAUTY STUDIES

Introduction

This curriculum on Health Care and Beauty Culture has been developed for a two-year vocational course at +2 stage. It has been so designed that the trainees on completion of the course will be competent to start their own health care and beauty culture clubs, operate and care the equipment used for the purpose. The course intends to impart both theoretical knowledge and practical training most suited for both self and wage employment.

Objectives

1. The students after undergoing this course should be able to demonstrate understanding of anatomy and physiology, dietetics in relation to beauty culture and hair dressing.
2. Develop understanding of basic principles, properties, types of various cosmetics application and their effects.
3. To operate, handle and care of the equipment, implements used in beauty culture and hair dressing.
4. To treat the clients efficiently in the area of beautification and care of the body and hair.
5. To diagnose and treat abnormalities, correction of figure faults, skin and hair.
6. To impart basic knowledge of setting up a saloon/manufacturing of cosmetics.
7. To develop knowledge of cosmetics and its preparation for different purposes.
8. To be able to deal with the problems of the clients in case of mishaps or any problem.
9. To be a confident, in display of beauty/hair product and its use.
10. To train the students in practical skills to care in maintaining sound healthy skin and hair.
11. To train the clients in body perfection through yoga exercises.
12. Communicating effectively and clearly to the client while giving treatment.

CLASS–XI
ELECTIVE
BEAUTY & HAIR (745)

Time: 2.5 Hours ***Marks: 50***

SECTION–I: BEAUTY

Unit–I: Skin Care **12**

(a) **Facials**

- Structure of skin.
- Types of Skin – Normal/Dry/Oily/Combination.
- Knowledge of material, implements & equipment.

(b) **Facial Massage**

- Basic massage manipulation.
- Preparation of client.
- Procedure for plain facial, precaution and reminder.

(c) **Facials**

- Facial treatment for different skin type – preparation, procedures & precautions.
  - (i) Oily – Galvanic & exfoliation.

(ii) Dry – paraffin, gauze facial.

(iii) Ageing – Thermo herb.

(iv) Face packs and masks according to skin type.

(v) Contraindication.

Unit–II: Superfluous Hair 7

- Factor responsible for unwanted hair.
- Various terminology used for superfluous hair.
- Various methods of hair removal.
- Depilatory method of hair removal.
  - (i) Shaving.
  - (ii) Depilatory cream.
- Epilatory method of hair removal.
  - (i) Threading.
  - (ii) Waxing.
  - (iii) Laser/Thermolysis/Electrolysis (Only basic knowledge).

Bleaching

- Theory of bleach
- Patch test of batch.
- Types of bleach.
- Knowledge of raw material/implements.
- Preparation & procedure of bleach.
- Precaution & reminder.

Unit–III: Manicure & Pedicure 9

Nail Malformation

(a) **Nail Disorders**

- Blue nail.
- Bruised Nail.
- Corrugation.
- Hang nail/agnail.
- Hypertrophy/thickening of nails.
- Onychphagy.
- Nail Biting.

(only definitions/knowledge to be given).

(b) **Nail Diseases**

- Nail fungus.
- Onychia .
- Paronychia.

(only definition/knowledge to be given).

Manicure

- Types, preparation, procedure/massage technique, material equipments and implements precautions and reminders.

Pedicure

- Types of pedicure, procedure/massage technique, knowledge of raw material required, equipments/ implements, precaution & reminders.
- Knowledge of footbath.

SECTION–II: HAIR

Unit–IV: Anatomy of Hair — 5

- Structure of Hair.
- Types of Hair.
- Hair Growth.

Unit–V: Scalp Massage — 3

- Definition of massage.
- Massage manipulation.
- Benefits of massage.
- Trolley setting.
- Procedure of scalp massage.

Unit–VI: Shampooing and Conditioning — 4

- Types of shampoo & conditioners.
- Trolley setting for shampoo.
- Preparation of client.
- Procedure of shampoo.
- Precautions and contraindications.
- Mehandi application procedure, benefits and contraindications.

Unit–VII: Hair Cutting — 10

(i) **Principles of Cutting**

- Shape of Head, Sectioning, Elevation, Cutting lines.
- Hair growth patterns.
- Hair Shaping.
- Precision Hair Cutting.
- Elevations.
- Procedure of Hair Cuts.

(ii) **Wet Styling**

- Roller Setting.
- Blow Drying.

(iii) **Thermal**

- Pressing Machine.
- Electric Rollers.
- Curling Tongue.
- Crimping Machine.

(iv) **Styling**

- Factors to be considered before styling (Facial Shape, Profession, Age, Occasion, etc.).
- Judas.
- Plaits/Braids.
- Updoos (Use of accessories).

PRACTICAL

Time: 2.5 Hours ***Marks: 50***

SECTION–I: BEAUTY

Unit–I: Facials 12

(a) Basic trolley setting for facial.

(b) Analysis of Skin.

(c) Cleansing – superficial (pre-facial).

(d) Deep Cleansing Treatment.

(e) Massage manipulations on face, neck and back.

(f) Use of facial massager.

(g) Choosing of facial product/face pack/face mask as per the skin type (professional/home remedies).

(h) Application & Removal.

(i) Facial treatments for different skin types.

- Basic trolley setting.
- Analysis of skin type/skin problem.
- Procedure for Oily – Galvanic & exfoliation.
- Procedure for Dry – paraffin, gauze facial.
- Procedure for Ageing – Thermo herb.

(j) Precautions and Reminders.

(k) Contraindications.

Unit–II: Superfluous Hair 8

(a) Judging of brow length.

(b) Shape of eye brows.

(c) Method of eye brow shaping.

- Threading (self, professional).
- Tweezing.

(d) Basic Trolley Setting.

(e) Preparation of Client.

(f) Procedure of Depilatory methods – Shaving and Depilatory Creams.

(g) Procedure of Epilatory Methods.

- Threading.
- Waxing.

(h) Precautions and Reminders.

(i) Contraindications.

(j) Bleaching.

- Basic trolley setting for bleach.
- Patch Test/Pre-Bleach Treatment.
- Procedure for different types of bleach cream powder.
- Moisturizing/cold compression (post-bleach treatment).
- Precautions and Reminders.
- Contraindications.

Unit–III: Manicure/Pedicure 8

(a) Basic table/counter setting set up.

(b) Selection of nail shape and shaping of nail.

(c) Procedure of Plain Manicure.

- Oil Manicure.
- French manicure.
- Booth manicure.
- Spa manicure.
- Nail Art.

(d) Procedure for pedicure – paraffin, electric pedicure.

(e) Hand massage and foot massage techniques.

(f) Precautions and Reminders.

(g) Contraindications.

SECTION–II: HAIR

Unit–I: Anatomy of Hair 2

(a) Analyse the hair/texture/Porosity/Elasticity/Density with help of Dorma Scope/ Magnifying glass.

(b) nalyse the hair by break method, wet and stretch technique.

Unit–II: Scalp Massage 4

(a) Care of different hair types – Dry, oily, split, damaged, under nourished, chemically treated.

(b) Selection of Hair Oil and Hair Mask.

(c) Basic Trolley setting for head massage.

(d) Procedure of Scalp Massage treatment.

(e) Precautions and Reminders.

(f) Contraindications.

Unit–III: Shampooing and Conditioning 4

(a) Preparing the client for shampooing.

(b) Procedure.

(c) Use of conditioners and rinses for different hair types.

(d) Home remedies and professional remedies for different types of hairs.

(e) Mehndi application.

(f) Precautions and Reminders.

(g) Contraindications.

Unit–IV: Basic Hair Cutting & Styling 12

(a) Knowledge of cutting tools.

(b) Cleaning of cutting tools.

(c) Sectioning of hair according to hair growth patterns.

(d) Preparation of client.

(e) Procedures of:

- Trimming, Diagonal Forward and Backward Hair Cuts.
- Blunt cut, Tapered Cut, Graduation in long and short hair.

(f) Precaution and Reminders

(i) Wet Styling

(a) Procedure of blow drying.

(b) Roller setting-on base, off base, half base.

(c) Finger Waving/Gel Styling.

(ii) Thermal Styling

(a) Setting of basic trolley for thermal styling.

(b) Use of cosmetics for thermal styling.

(c) Procedures of Thermal Styling using different tools and equipment's-
Dryers, Pressing Comb, Electric Roller, Curling Tongue, Crimping Machine.

(d) Precautions and Contraindications.

(iii) Styling

(a) Back combing on the head and on switches.

(b) Styling on switches (inter locking, types of rolls, use of spray).

(c) Fixing of hair piece on client's head.

(d) Braiding – French plait, khajuri and other types of braiding.

CLASS–XI
ELECTIVE
HOLISTIC HEALTH (746)
THEORY

Time: 2.5 Hours ***Marks: 50***

Unit–I: Anatomy & Physiology 5

Knowledge of human body and A/P related to cosmetology & holistic health.

(a) Structures and functions of cell and tissues.

(b) Basic knowledge of various systems.

- Skeletal system (Detail study of facial & neck bones).
- Muscular system (Facial & neck in detail).

Unit–II: Diet and Nutrition 5

(a) Definition of health, food and nutrition.

(b) Function of food – Physiological, Social and Psychological.

(c) Food nutrients – Function, sources, deficiency and excess – Proteins, carbohydrates, fats, minerals (iodine, iron, calcium, phosphorous, potassium & sodium), Vitamins (water soluble B & C and fat soluble A, D, E & K), water, fibre.

(d) Food groups, concept of balance diet and meal planning.

(e) Diet for different age groups, food fads and fast foods.

Unit–III: Yoga & Body Care 15

Importance of yoga in cosmetology & holistic health.

(a) Evolution of Yoga.

(b) Ashtang yoga

(c) Sukshamvyamyam (1-48).

(d) Yogic balance diet.

(e) Basic asanas (sukhasan, padmasan, vajrasana, gomukhaasana, janushishasana, trikonasana, tarasana, katichakrasana, bhujangasana, shalbasana.

(f) Posture, correct posture (sitting, standing or walking).

Unit–IV: Indian and International Body Therapies 15

Indian

(a) Naturopathy.

- Basic principles of naturopathy.
- Elements of body.
- Treatment of body by.
  - Hydrotherapy.
  - Colour therapy.
  - Mudtherapy.

(b) Ayurveda.

- Tridoshas.

- Threegunas.
- Prakruti of body.
- Knowledge of Mukhelpa.

International

(a) Massage and its benefits.

(b) Five scientific movements of massage.

(c) Elementary knowledge of international massage therapy.

- Aroma therapy.
- Deep tissue massage.
- Lymphatic drain massage.
- Stone massage.
- Sports massage.
- Swedish massage.

Unit–V: Basic Health and Safety **5**

To meet minimum occupational standards.

- Basic hygiene Standards.
- Standard procedures for safety and cleanliness.

Unit–VI: Business Studies **5**

- Finding & keeping staff.
- Book keeping.
- budgeting.
- Marketing.

PRACTICAL

Time: 2.5 Hours ***Marks: 50***

Unit–I: Yoga, Ayurveda and Body Care **20**

(a) Practice of sukhshamvyamyas.

(b) Practice of various asanas as given in theory.

(c) Posture (study of correct posture, sitting, standing, walking).

(d) Viva – file work and project work.

Unit–II: Diet and Nutrition **10**

(a) Display of various food products which contains various nutrients.

(b) Seasonal diet, display of various diets.

(c) Diet planning for adolescent girl.

(d) Diet planning for putting on and reducing for girl (16-19yrs).

(e) Planning a standard balanced diet for a week.

Unit–III: Indian & International Therapies **20**

(a) Patron's consultation.

(b) Practical demonstration of five classical massage movements and practice of the same with use of various aroma oils and stones in massage.

(c) Swedish massage demo and practice.

(d) File/project work.

CLASS–XI

GENERAL FOUNDATION COURSE (501)

(Common for Health and Beauty Studies and Beauty Services)

Time: 3 Hours ***Marks: 100***

Part–I: (Compulsory to all Vocational Courses) *Marks: 50*

A. Business Management and Entrepreneurship 30

(a) **Entrepreneurship Orientation** **5**
Importance and relevance in real life: Emphasis on self employment.

(b) **Entrepreneurship Values and Attitudes** **5**
Innovativeness, Independence, Risk Taking, Analytical ability.

(c) **Entrepreneurial Motivation** **5**
Achievement Planning, personal efficacy, entrepreneurial goal setting.

(d) **Launching of a Business Venture** **15**
Identification of project, steps in setting up a business, information about various institutions providing assistance, project formulation.

B. Computational Skills 10

(a) Percentage, ratio & proportion, profit & loss, discount, simple and compound interest, population growth and depreciation of value of articles using logarithm. **6**

(b) Area and volume: rectangle, parallelogram, circle, cube, cone, cylinder & sphere. **4**

C. Environmental Education 5

(a) Environment and the society.

(b) Environment properties risks in different economic enterprises, in use of raw materials, in processing / manufacturing and designing.

(c) Poverty and environment.

D. Rural Development 5

(a) Agriculture, the back bone of Indian Economy.

(b) Rural development projects in India including Integrated rural development programme.

(c) Agro based rural industries.

(d) Community approach to rural development.

Part–II *Marks: 50*

Communication 20

Meaning: Importance of Communication Methods of Communication. Verbal Communication, Written Communication, Visual Communication, Graphic Presentation Slides.

Essentials of successful Communication.

Ability to express.

Ability to rationalise.

Ability to understand.

Emotional state of receiver and reaction.

Personality Development **30**

To develop confidence, poise & charm.

1. (a) Self confidence and personal charm in terms of etiquettes, behaviour, language, unhuried movements, manners, good sense of humour and effective voice.
   (b) Visual poise and Social poise.
2. Staff Relation-professional approach towards profession.
3. Care of skin techniques used for cleaning, vaporizing, moisturizing, nourishing and toning.
4. Importance and knowledge of make-up and hair.
   (a) Knowledge of cosmetics used for make-up and hair style.
   (b) Procedure of make-up.
5. Self Assessment
   (a) To analyse one's own good and bad points by highlighting strong points and improving weak points for enhancing on'e personality.
   (b) Selection of clothes, designs, pattern, colour in terms of age, body structure, climate, colour of the skin, occasion, professoin.
   (c) Personal Hygiene - Care of hair, skin, use of deodorant, antiperspirant, detail, hygiene, regular bath.

CLASS–XII
ELECTIVE
BEAUTY & HAIR (745)
THEORY

Time: 2.5 Hours ***Marks: 50***

SECTION–I: BEAUTY

Unit–I: Make-Up **5**

Introduction

(a) Brief history of Make-up.
(b) Objectives of make-up application.
(c) Cosmetics for make-up.
(d) Make-up brushes and other tools.
(e) Makeup colour theory.
(f) Contraindications.
(g) Health & Safety Precautions.

Unit–II: Basic Make-Up Application **5**

(a) Client Consultation.
(b) Determining Skin Type and Colour.

(c) Preparing the workspace.

(d) Selecting make-up colours.

(e) Preparation of Client.

(f) Preparation for make-up.

(g) Application of make-up

Unit–III: Corrective Make-Up 6

(a) Ideal face proportions and features.

(b) Analyzing features and face shape.

(c) Techniques of corrective make-up application for face, eyes, eyebrows, lips, skin tones, wrinkles.

Unit–IV: Special Make-Up Techniques 9

(a) Day make-up.

(b) Evening make-up.

(c) Bridal make-up.

(d) Fantasy Make-up.

(e) Ramp make-up.

(f) Theatre and Television make-up.

(g) Photographic Make-up.

(h) Makeup for mature skin.

(i) Basic Body Art/Tattooing.

SECTION–II: HAIR

Unit–I: Disorder of Hair and Scalp 4

(a) Hair loss – Types, reason and treatments.

(b) Canities (grey hair).

(c) Pediculosis.

(d) Dandruff.

Unit–II: Advanced Cutting & Styling 5

(a) Study of Facial Shape, Bone Structure, Body Structure, Profession, Age, Occasion.

(b) Hair Cutting and Styling as per Facial Shape.

(c) Selection of Tools.

(d) Procedures for latest trends and cuts (Short and Long both).

- **Advance Hair Styling**

(a) Evening Hair styles, party hair style, bridal hair style and ramp hair styles.

(b) Styling on Artificial Aids.

- **Permanent Waving/Straightening**

Unit–III: Permanent Waving 6

(a) Meaning of permanent waving.

(b) Principle of perming.

(c) Examination of the scalp.

(d) Perming techniques preparation and procedure wrapping techniques.

(e) Maintaining the record card & client's history.

(f) Test curl.

(g) Factors responsible for failure of perming and their solutions.

- **Straightening/Relaxing**

(a) Meaning of relaxing.

(b) Principles of relaxing.

(c) Examination of the scalp.

(d) Strand test of relaxer.

(e) Preparation & procedure of relaxing.

(f) Record card & client's history.

Unit–IV: Hair Colouring and Lightening 5

Hair Colouring

(a) Purpose of hair coloring.

(b) Law of colors – primary, secondary & complimentary.

(c) Types of Hair Coloring.

Temporary, Semi Permanent, Permanent

(a) Strand Test.

(b) Patch Test.

(c) Procedure of Hair Coloring.

(d) Precautions and contraindication.

Unit–V: Bleaching and Lightening 5

(a) Definition of bleaching.

(b) Chemistry of Bleaching.

- **Activating the Bleach**

(a) Causes of over Bleach.

(b) Choice of Bleach.

PRACTICAL

Time: 2.5 Hours ***Marks: 50***

SECTION–I: BEAUTY

Unit–I: Make-Up 25

- **Practice in Facial Make-ups**

(a) Trolley setting.

(b) Planning the make-up.

(c) Blending techniques for colors.

(d) Choosing make-up colors as per skin/hair, eye, clothing.

(e) Analysis of facial shape before make-up.

(f) Practice of make-up under different lights.

- **Corrective and Camouflage Make-up**
- **Special Make-up Techniques**

(a) Day make-up.

(b) Evening make-up.

(c) Bridal make-up.

(d) Make-up for mature skin.

(e) Theatre and T.V. make-up.

(f) Practice in Body Art/Fantasy Make-up.

SECTION–II: HAIR

Unit–II: Disorders of Hair and Scalp 3

(a) Herbal Treatments for Dandruff.

(b) Falling Hair.

(c) Greying Hair.

(d) Pediculosis groups and work.

(i) Labourer.

(ii) Sedantory worker.

(iii) Pregnant /lacting mother.

(iv) Diet for healthy skin and hair.

(v) File-projects-charts.

Unit–III: Advanced Cutting & Styling 6

- **Advance Hair Cuts (Short & Long)**

Hair Cutting and Setting as per:

(a) Facial Shape.

(b) Body structure.

(c) Profession.

(d) Age.

(e) Occasion.

(f) Fashion Trend etc.

- **Advance Hair Styling**

(a) Evening Hair styles, party hair style, bridal hair style and ramp hair styles.

(b) Styling on Artificial Aids.

Unit–IV: Permanent Waving/Straightening 6

- **Permanent Waving**

(a) Basic preparation of trolley for perming.

(b) PH testing knowledge of acidic / alkaline.

(c) Hair analysis.

(d) Preparing & planning the perm.

(e) Strand test.

(f) Sectioning & sequence of winding.

(g) Winding techniques – basic, spiral, directional, staggered (brick winding), Weave binding, double winding, piggy back winding processing & developing.

(h) Testing curl.

(i) Neutralization.

(j) Practice in other type of perming rods – chop sticks, u-stick, foam rollers etc.

- **Straightening/Relaxing**

(a) Preparation of trolley for relaxation.

(b) Analysis of Hair.

(c) Relaxing method & procedure – kinky/curly/coarse.

(d) Strand test for relaxing.

(e) Neutralization.

(f) Cleansing & conditioning.

(g) Contraindications.

Unit–V: Hair Colouring and Lightening 5

- **Hair Colouring**

(a) Selection of color -Study of color depth & tone.

(b) Application of different types of colors.

(i) Chemical.

(ii) Vegetable.

(c) Patch test (skin test, color test, priority test, incompatibility test strand test).

- **Bleaching and Lightening**

(a) Chemistry of bleaching.

(b) Color variants-high lightened, low lightened.

(c) Tipped, frosted scrunching, comb technique.

Unit–VI: Preparation of Herbal Cosmetics 5

(a) Face Pack.

(b) Hair Packs.

(c) Creams.

(d) Shampoos.

(e) Hair Oils.

(f) Nail Polish Remover.

(g) Depilatory Wax.

(h) Exfoliating Mask and Scrub.

CLASS–XII
ELECTIVE
HOLISTIC HEALTH (746)
THEORY

Time: 2.5 Hours ***Marks: 50***

Unit–I: Anatomy & Physiology — 5

Brief Study of Various Systems

(a) Nervous system.

(b) Endocrine system.

(c) Circulatory/lymphatic system.

(d) Digestive system.

(e) Excretory system (kidneys).

(f) Disorders in brief (joint, hormone, basic physiological).

Unit–II: Diet and Nutrition — 5

(a) Methods of Cooking and effect on food by dry heat, moist heat and use of oil.

(b) Technologies to improve the quality of food – germination, fermentation and fortification.

(c) Body Mass Index (BMI), BMR, expected height and weight for ages.

(d) Diet for life style related disorders: Obesity, underweight, Hypertension.

(e) Diet for summer, winter and rainy season.

(f) Diet for healthy skin and hair.

(g) Diet for weight loss.

(h) Sample diet for different age groups.

Unit–III: Yoga and Health — 15

(a) Surya namaskar (mantra and exercises 1-12).

(b) Shat kramas (1-6).

(c) Bhavshudhi.

(d) Asana.

- Suptvajrasana.
- Paschimutanasana.
- Ardhmatsendrasana.
- Konasan.
- Matsyasana.
- Virasana.
- Makrasana.
- Sinhasana.
- Chakrasana.
- Savasana.
- Sarvangasana.
- Halasana.

(e) Pranayama (1-8).

(f) Sthulvyamyas.

Unit–IV: Indian and International Body Therapies — 15

(a) Detail knowledge and study of shirodhara.

(b) Detail study of.

- hydro therapy.
- colour therapy.
- mud therapy (lepa).
- body wrap (hot & cold treatment) to detoxify the body.

(c) Jacuzee hydro massage.

(d) Modern trends in spa, medi–tourism, medi–spa.

(e) Acupressure massage.

(f) Shiatsu.

(g) Reiki.

(h) Detail knowledge of reflexology massage.

Unit–V: Basic Health and Safety **5**

To meet minimum occupational standards.

- Disease caused by Unhygienic practices.

Unit–VI: Business Studies **5**

- Planning and establishing of a Spa/salon.
- Spa menu.
- Stock control.
- Communication in Spa & beauty Industry.

PRACTICAL

Time: 2.5 Hours ***Marks: 50***

Unit–I: Yoga and Health **15**

(a) History and consultation of patron.

(b) Demo and practice of sthulvyamya.

(c) Demo and practice of suryanamaskar.

(d) Demo and practice of shat karma.

(e) Practice of all asanas as in theory.

(f) Practice of mudra and bandha.

(g) Practice of prayanama as in theory (1-8).

(h) file-project work.

Unit–II: Diet and Nutrition **10**

(a) Various method of cooking to protect nutritive value of food.

(b) Diet plan for various age groups and work.

- Labourer.
- Sedantory worker.
- Pregnant /lacting mother.

- Diet for healthy skin and hair.
- File-projects-charts.

Unit–III: Indian and International Body Therapies 25

(a) Demo and practice of shirodhara.

(b) Demo and practice of hydro therapy, colour therapy, mud therapy for various ailments (joint pain, high B.P, thyroid, diabetic).

(c) Body wrap (hot & cold).

(d) Spa treatments (head to toe).

(e) Demonstration and practice of reflexology massage.

CLASS–XII
GENERAL FOUNDATION COURSE (501)
(Common for Health and Beauty Studies and Beauty Services)

Time: 3 Hours *Marks: 100*

Part–I: (Compulsory to all Vocational Courses) *Marks: 50*

A. Business Management and Entrepreneurship 30

Management of Business

Elementary treatment/exposure to basic conceptual frame work of the topic listed below:

(a)= Basic Function. **6**

(b) Marketing Management. **6**

(c) Financial Management. **6**

(d) Production Management. **6**

(e) Personnel Management. **6**

B. Computational Skills 10

1. (a) Solution of linear equations and their application to problem of commercial mathematics. **5**

   (b) System of linear equations and in equation in two variables. Applications in formation of simple linear programming problems.

2. Statistics: Raw data, bar charts and Histogram; Frequency Tables; Frequency Polygon; Ogive; Menu, Median and Mode of ungrouped and grouped data; Standard Deviation; Introduction to Mortality tables; Price Index etc. Introduction to Computers. **5**

C. Environmental Education & Rural Development 10

1. **Environmental Education** **5**

   (a) Modernisation of agriculture and environment, irrigation, water logging, use of fertilisers, pesticides, soil erosion, land degradation (desertification and deforestation), silting and drying of water resources.

   (b) Rational utilisation, conservation and regeneration of environmental resources (soil, air, water, plant, energy, minerals).

2. **Rural Development** **5**

   Principles and goals of rural development, major problems/constraints in rural development in India.

Part–II *Marks: 50*

I. Meaning of Beauty Culture, personal qualities required/needed for a successful Beautician. **12**

II. The prerequisites and methodology and procedure for setting up one's own beauty clinic, details of equipment, machinery, furniture and tools. **12**

III. (a) Name of Equipment (Manual & Electric), slimming equipment. **12**

(b) Use of Equipment for Body correction, underweights, overweight.

(c) Precautions & Benefits.

IV. Project Report - visit to various saloons and institutions. **14**

Door to door survey (Make a Report).

Market survey.

Cosmetics - its make, types & cost.

– Availability in the market.

LIST OF RECOMMENDED BOOKS

1. Beauty and Hair, Student Handbook, Class XI, Published by CBSE.
2. Holistic Health, Student Handbook, Class XI, Published by CBSE.
3. Beauty and Hair, Student Handbook, Class XII, Published by CBSE.
4. Holistic Health, Student Handbook, Class XII, Published by CBSE.
5. Hall of Textbook of Cosmetology by Mary Healy, Reagents / Prentice Hall.
6. Great Hair by Davis Biton.

STANDARD LIST OF TOOLS AND EQUIPMENTS TRADE SKILL – I & II

S. No.	Trainees Personal Kit	Quantity
1.	Pack & Bleach Brush.	01 No.
2.	Nail Brush.	01 No.
3.	Head Band.	01 No.
4.	Eye Lash curler.	01 No.
5.	Manicure set.	01 No.
6.	Cuticle cutter.	01 No.
7.	Pedicure set.	01 No.
8.	Wax applicator.	01 No.
9.	Spray Bottle.	01 No.
10.	Small Bowls.	01 No.
11.	Make-up brush set.	01 No.
12.	Make-up sponge.	01 No.
13.	Artificial Eye lash set.	01 No.
14.	Black head remover.	01 No.

S. No.	Trainees Personal Kit	Quantity
15.	Towels.	As per requirement
16.	Dye brush.	01 No.
17.	Gloves.	01 No.
18.	Cutting Sheet.	01 No.
19.	Hair cutting scissor.	01 No.
20.	Setting Clips.	As required
21.	Bob pins.	As required
22.	Jura pins.	As required
23.	Open teeth comb.	01 No.
24.	Styling comb.	01 No.
25.	Tail Comb.	01 No.
26.	Switch stand.	01 No.
27.	Plain switch.	01 No.
28.	Swiggle.	01 No.
29.	Plaits.	01 No.
30.	Razor comb.	01 No.
31.	Hair Accessories.	As per requirement

TOOLS & EQUIPMENTS

S. No.	Description Name	Quantity
1.	Tray.	20 No.
2.	Manicure Bowls/ Pedicure Tubs.	20 No. each
3.	Vibro Massagers.	4 No.
4.	Wax Heater with Thermostat with double bowl.	06 No.
5.	Manicure Tables with lamps.	6 No.
6.	Stools for Manicure.	20 No.
7.	Complete Facial Machine Latest.	03 No.
8.	Vapozone Electronic.	02 No.
9.	UV Sterlizer.	04 No.
10.	Facial beds.	06 No.
11.	Hot plate.	02 No.

S. No.	Description Name	Quantity
12.	Heater.	02 No.
13.	Heat Convector.	02 No.
14.	Air Conditioner Split 2 ton with Stabilizer.	02 No. each Lab.
15.	Mirror Panel.	20 No.
16.	Saloon Chairs.	12 No.
17.	Hot Towel Cabinet.	02 No.
18.	Refrigerator.	02 No.
19.	Faculty Table Chair.	02 No.
20.	Manicure Trolley.	06 No.
21.	Facial Trolley.	06 No.
22.	Make- up colour mixing plate.	04 No.
23.	Equipment Trolley.	06 No.
24.	Professional Massager.	02 No.
25.	Muscle Stimulator.	02 No.
26.	Geyser 25kts.	02 No. each
27.	Immersion Rod 1500 wts.	04 No.
28.	Pedistation.	06 No.
29.	UV lamps 36w with timer for nails.	06 No.
30.	Wash Units (Basins).	04 No.
31.	Galvanic.	02 No.
32.	Almirah.	06 No.
33.	Display Board.	06 No.
34.	Hair Rollers (small, medium, and large).	12 dz. Each
35.	Perming Rollers (Ladder perm, star perm, chopsticks, wood perm, circle rod).	12 dz. Each
36.	Ringlette Rollers (small, Medium and large.	12 dz. Each
37.	Plain Bun.	20 No.
38.	Hair Clipper Mechanical.	12 No.
39.	Cutting Scissor.	12 No.
40.	Thinning Scissor.	12 No.
41.	Hair Dusting soft brush.	12 No.
42.	Wigs with skin parting/woven on net.	12 No.

S. No.	Description Name	Quantity
43.	Hair extension kits (Temporary) may be purchased as required after two years.	20 No.
44.	Neck Tray.	12 No.
45.	Dye Bowl.	12 No.
46.	Colour Scale.	02 No.
47.	Crimpling Tongue.	6 No.
48.	Curling Rod.	6 No.
49.	Pedestal Hood Hair dryer.	3 No.
50.	Hand Hair Dryer Heavy duty.	12 No.
51.	Hair Clipper Electrical.	6 No.
52.	Diffuser.	6 No.
53.	Scalp Steamer electronic.	2 No.
54.	Electric roller Set (20 rollers in 3 sizes).	3 No.
55.	Shampoo station with chair.	4 No.
56.	Dummy Head on stand with slip on.	20 No.
57.	Front wash basin.	4 No.
58.	Infrared Lamp.	4 No.
59.	Sterilizing Unit Wet.	2 No.
60.	Sterilizing Unit Dry.	2 No.
61.	Dressing Out chairs.	20 No.
62.	Trollies.	12 No.
63.	Student Lockers with 12 cabinets.	04 No.
64.	Saloon Chairs.	12 No.
65.	Curtains for lab.	As per requirement
66.	Back View Mirror.	12 No.
67.	Hair Curler Set.	01 No.

BEAUTY SERVICES

Introduction

This course will enable students to acquire qualification towards successful learning of beauty services. Throughout the studies they will gain the knowledge and skills to provide a variety of basic beauty treatments and services to clients. Skills will be taught where they are able to start their own entrepreneurship ventures.

CLASS–XI
ELECTIVE
NAIL TECHNOLOGY AND RETAIL (770)
THEORY + PRACTICAL

Time: 2.5+2.5 Hours ***Marks: 50+50***

A. Nail Technology 10+

1. **Knowledge of Nail Science**
   - Relevant Principals.
   - Health and safety procedures.
   - Anatomy and function of the lower arm and lower leg.
   - Structure and function of the lower arm and lower leg.
   - Anatomy of normal human nail.
   - Common problems of Nails & skin (Diseases and disorders of hands & feet).
   - Contraindications.
   - Health & care of skin and nail (during and after the treatment).

2. **Manicure and Pedicure Services** **10+10**
   - Prepare the service area and client.
   - Tools & Cosmetics.
   - Procedure of Manicure and Pedicure (Plain).
   - Arm and leg massage.
     (a) Types of manicure.
     (b) Hot oil manicure.
     (c) Paraffin wax manicure.
     (d) French Manicure.
     (e) After care advice.

3. **Nail Art** **10+10**
   - Prepare area & client for nail art service.
   - Nail cosmetics and design supplies.
   - Providing nail art services.
   - Create and apply nail design.
   - Types of nail art.

(a) Bullion beads.

(b) Pierced nail charm.

(c) Confetti decoration.

(d) Foil art.

(e) Respond to feedback and aftercare advice in maintaining nail design.

4. **Learning Activities**

5. **Suggested Answers**

B. Retailing **10+10**

1. **Conduct Financial Transaction**

(a) Operate point of sale equipment.

- Use point of sale equipment.
- Open and close a POST.
- Clear POST and transfer tender.
- Handle cash.
- Maintain change and cash float.
- Refund and exchange procedures.
- Complete transaction error records.
- Maintain adequate supplies of POST documentation.

(b) Perform point of sale transactions.

- Apply legislation.
- Implement workplace transaction procedures.
- Learn the transaction policies under EFTPOS.
- Complete sales.
- Complete client POS documentation.
- Process client sales in a timely manner.
- Remove and reconcile takings.
- Maintain cash float record sheet.
- Maintain transaction documents and register takings.

2. **Organise and Maintain Work Areas** **10+10**

(a) Organise work area.

- Maintain your work area.
- Primaces and recency theory.
- Housekeeping policy.
- Housekeeping duties.
- Clean your work area.
- Personal hygiene practices.

(b) Clean work area.

- Remove and dispose of waste.

- Remove potential hazards ensuring customer safety.
- Precautions while disposing.
- Hierarchy of disposal management.

3. **Learning Activities**
4. **Suggested Answers**

CLASS–XI
ELECTIVE
ARTS & SCIENCE OF MAKE-UP & RETAIL (771)
THEORY + PRACTICAL

Time: 2.5+2.5 Hours ***Marks: 50+50***

A. Art and Science of Makeup — 10+15

1. **Section–A: Demonstrate Retail Skin Care and Products**
   - Introduction.
   - Prepare Service Area & Client.
   - Identify client's skin care needs.
   - Contraindications.
   - Apply & remove skin care products.
   - Advice on further product use.

2. **Section–B: Design and Make-up** — **10+15**
   - Introduction.
   - Prepare Service Area & Client.
   - Identify client's skin care needs.
   - Contraindications.
   - Cleansing.
   - Analyses of face for make-up.
   - Corrective make-up.
   - Colour design principle to make up theory.
   - Design Make up plan.
   - Selection of equipment's & products.
   - Prevent cross infections.
   - Apply make-up.
   - Apply false make up.
   - Advice on further product use.

3. **Learning Activities**
4. **Suggested Answers**

B. Retail Make-up and Skin Care — 15+10

1. **Communicate in the Workplace**

- Establish contact with customers.
- Communicating in retail environment.
- Who is my customer.
- Communicate effectively with customer.
- Good telephone communication.
- Working in teams.
- What makes a good team.
- Avoiding and handling conflicts.
- Learn to Avoid conflicts in the team.
- Read and interpret retail documents.
- Complete retail documents in line with store policy.

2. **Work Effectively in Retail Environment** **15+10**
   - Introduction to retailing.
   - What is retailing/retail organization.
   - Types of jobs in retailing.
   - Career development.
   - Being responsible in the workplace.
   - Learn to present yourself appropriately at work.
   - Being non-discriminatory in the workplace.
   - State anti-discrimination legislation.
   - Awards and agreements.
3. **Learning Activities**
4. **Suggested Answers**

CLASS–XI
GENERAL FOUNDATION COURSE (501)
(Common for Health and Beauty Studies and Beauty Services)

(Refer to page 112)

CLASS–XII
ELECTIVE
NAIL TECHNOLOGY & RETAIL (770)
THEORY + PRACTICAL

Time: 2.5+2.5 Hours ***Marks: 50+50***

A. Nail Technology **10+**

1. **Ultra Violet Gel Nail Enhancement**
   - Prepare the service area & client for service.
   - Requirement of tools & nail cosmetics.
   - Types of Nail gel enhancements service and benefits & disadvantages.

- Deal with diseases, disorder & complications.
- Knowledge of gel nail chemicals.
- Remove artificial nails.
  - Procedure for removal of temporary tips/acrylic nail/nail wraps.
- Apply or refill artificial gel nails.
- File shapes in nails.
- Apply nail tips.
- Apply gel nail enhancement.
  - Light coloured gel nail overlays.
  - Sculptured gel nail.
  - French white free edge.
  - Refill & rebalance.
  - Pink & French white backfill with gel.
  - Adding fibre wrap to gel nails.
  - No light gel application.
- After Care advice.

2. **Apply Acrylic Nail Enhancement** **10+10**

- Prepare service area & client for service, tools & cosmetics.
- Nail care commitment & procedure.
  - Choosing the acrylic nail enhancements.
  - Acrylic nails.
  - Natural nail overlay.
  - Tips & overlay.
  - Rebalance/infill.
  - Sculptured nails.
  - Fabric wrap.
  - Temporary tips/party tips.
- Acrylic nail complications.
- Remove artificial nails (temporary tips/acrylic nails/nail wraps).
- Apply/refill artificial nails.
  - File shape & apply nail tips.
  - Apply acrylic nails & nail wraps.
- Acrylic nail overlay procedure (over tips or natural nails).
- Apply acrylic enhancement to challenging nails.
  - Bitten nails.
  - Sky jump nails.
  - Crooked nails.
  - Hook nails.
- Rebalancing.

- Two colour method (pink & white backfill).
- Acrylic crack repairs.
- Apply nail wraps.
- Apply nail wrap rebalance/refill.
- After care advice.

3. **Use Electric File Equipment for Nails** **5+10**
   - Prepare the service area & client for service.
   - Identify the benefits of electric file use.
   - Deal with nail diseases & disorders.
   - Prepare yourself & work safely.
   - Identify & practice electric file techniques.
4. **Advanced Nail Art** **5+10**
   - Prepare the service area & client for service for air brush nail art.
     - Tools & implements for air brushed nail art.
     - Cleaning & maintaining air brush.
   - Deal with nail diseases, disorders & complications.
   - Apply air brushed nail art.
     - Air brushed nail art designs techniques.
     - Create & apply advanced nail art (stencil & glitter art).
   - After care advice.
     - Respond to feedback.
     - Obtain & provide after care.
5. **Learning Activities**
6. **Suggested Answers**

B. Retailing **10+5**

1. **Merchandise Products**
   - Place and arrange merchandise.
     - Identify the customer.
     - Arrange and display merchandise.
     - Identify unsuitable stock.
     - Rotate stock.
     - Applying the seven principles merchandising.
     - Apply occupational Health & safety policy.
   - Maintain a Display.
   - Prepare Display Price Tickets and Labels.
     - Analyse Tickets.
     - Prepare Labels and Tickets.
     - Store & Maintain Ticketing Equipment.

– Identify unsuitable Tickets.

- Place, Arrange and Display price tickets & Labels.
- Place correct/Labels on merchandise.
- Replace Tickets and Labels.
- Maintain Correct Price Information.
- Protect Merchandise.
- Applying correct handling storage and display techniques.

2. **Apply Safe Working Practices** **10+5**
   - Apply procedures for basic safety in workplace Occupational Health and Safety (OHS).
   - Know your safety responsibilities.
   - Recognize hazards and unsafe work practices.
   - Take precaution to reduce risk.
   - Use safe manual handing methods.
   - Apply procedures for emergencies in the retail workplace.
   - Respond to illness and accidents.
   - Follow evacuation procedures.
   - Reporting accidents and incidents.
3. **Learning Activities**
4. **Suggested Answers**

CLASS–XII
ELECTIVE
ARTS & SCIENCE OF MAKE UP & RETAIL (771)
THEORY + PRACTICAL

Time: 2.5+2.5 Hours ***Marks: 50+50***

A. Art & Science of Make–up

1. **Design and Apply Make-up for Photography** **15+15**
   - Introduction.
   - Prepare the client.
   - Contraindications.
   - Skin type conditions & colour.
   - Clean the face & neck.
   - Identify facial shape.
   - Identify corrective make up areas.
   - Corrective techniques.
   - Determine the photographic context.
   - Colour & its importance.
   - Effects of light/direction of light.

- Make up of black and white coloured images.
- Application of makeup.
- Health & Hygiene.

2. **Design and Apply Remedial Camouflage Make-up** **15+15**
   - Introduction.
   - Prepare the client for service.
   - Study of skin.
   - Skin orders.
   - Skin order.

     Nevus & pigmentation disorder, skin condition (tattoos, varicose veins).
   - Contra indications.
   - Assessment of the treatment area.
   - Identify clean skin tone.
   - Effect of light on makeup.
   - Design the camouflage make up procedures.
   - Select the products and equipment's.
   - Procedure of camouflage make up.
   - Removal of camouflage make up.
   - Home care advise.
3. **Learning Activity**
4. **Suggested Answers**

B. Retail Make-up and Skin care **10+10**

1. **Sell Product and Services**
   - Respond to customer enquiries.
   - Product knowledge.
   - Handle customer enquiries.
   - Approach the customer.
     - Open the sale.
     - Create a good first impression when approaching to customer.
   - Determine customer needs.
   - Use communication techniques.
   - Convert feature to benefits.
   - Analyse and match customer needs.
   - Communicate product features and usage.
   - Selling benefits.
   - Respond to customer objections.
   - Identify and accept customer objections and find solutions.
   - Close the sale.

- Respond to customer buying signals.
- Use closing techniques.
- Maximize sales opportunities.
- Identify opportunities for additional sales.
- Finalize the sale.

2. **Provide Service to Client** **10+10**
   - Receive, service and schedule client.
     - Receive clients and deliver service to clients.
     - Schedule Client.
   - Responds to client complains.
     - Establish and resolve the nature of complain.
     - Future remedies.
   - Identify and respond to special needs.
3. **Learning Activities**
4. **Suggested Answers**

CLASS–XII
GENERAL FOUNDATION COURSE (501)
(Common for Health and Beauty Studies and Beauty Services)

(Refer to page 120)

LIST OF RECOMMENDED BOOKS

1. Nail Technology and Retail-II, Students Handbook, Class–XII, Published by CBSE.
2. Arts and Science of Makeup and Retail–II, Students Handbook, Class–XII, Published by CBSE.
3. Nail Technology and Retailing–I, Students Handbook, Class–XI, Published by CBSE.
4. Arts and Science of Makeup and Retail–I, Students Handbook, Class–XI, Published by CBSE.
5. Beauty Therapy: The Foundation Level II, 2ed by Lorraine Nordmann.
6. Professional Beauty Therapy Level III, 2ed by Lorraine Nordmann.
7. Milady's Standard Cosmetology, ISBN:978-1-5625-3880-2.
8. Reagents/ Prentice-Hall Textbook of Cosmetology by Mary Healy.
9. Beauty Therapy: The Foundation Level II, 2ed by Lorraine Nordmann.
10. Professional Beauty Therapy Level III, 2ed by Lorraine Nordmann.
11. Milady's Standard Cosmetology, ISBN:978-1-5625-3880-2.
12. Reagents/ Prentice- Hall Textbook of Cosmetology by Mary Healy.
13. Great Hair by Davis Biton.
14. The art of dressing long hair by Guy Kremer and Jackin Wadeson.
15. Cobella's Styling and Colouring, DVD's. Beverly C.

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3.	Head Band.	01 No.
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7.	Pedicure set.	01 No.
8.	Wax applicator.	01 No.
9.	Spray Bottle.	01 No.
10.	Small Bowls.	01 No.
11.	Make-up brush set.	01 No.
12.	Make-up sponge.	01 No.
13.	Artificial Eye lash set.	01 No.
14.	Black head remover.	01 No.
15.	Towels.	As per requirement
16.	Dye brush.	01 No.
17.	Gloves.	01 No.
18.	Cutting Sheet.	01 No.
19.	Hair cutting scissor.	01 No.
20.	Setting Clips.	As required
21.	Bob pins.	As required
22.	Jura pins.	As required
23.	Open teeth comb.	01 No.
24.	Styling comb.	01 No.
25.	Tail Comb.	01 No.
26.	Switch stand.	01 No.
27.	Plain switch.	01 No.
28.	Swiggle.	01 No.
29.	Plaits.	01 No.
30.	Razor comb.	01 No.
31.	Hair Accessories.	As per requirement

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5.	Manicure Tables with lamps.	6 No.
6.	Stools for Manicure.	20 No.
7.	Complete Facial Machine Latest.	03 No.
8.	Vapozone Electronic.	02 No.
9.	UV Sterlizer.	04 No.
10.	Facial beds.	06 No.
11.	Hot plate.	02 No.
12.	Heater.	02 No.
13.	Heat Convector.	02 No.
14.	Air Conditioner Split 2 ton with Stabilizer.	02 No. each Lab.
15.	Mirror Panel.	20 No.
16.	Saloon Chairs.	12 No.
17.	Hot Towel Cabinet.	02 No.
18.	Refrigerator.	02 No.
19.	Faculty Table Chair.	02 No.
20.	Manicure Trolley.	06 No.
21.	Facial Trolley.	06 No.
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23.	Equipment Trolley.	06 No.
24.	Professional Massager.	02 No.
25.	Muscle Stimulator.	02 No.
26.	Geyser 25kts.	02 No. each
27.	Immersion Rod 1500 wts.	04 No.
28.	Pedistation.	06 No.
29.	UV lamps 36w with timer for nails.	06 No.

S. No.	Description Name	Quantity
30.	Wash Units (Basins).	04 No.
31.	Galvanic.	02 No.
32.	Almirah.	06 No.
33.	Display Board.	06 No.
34.	Hair Rollers (small, Medium, and large).	12 dz. Each
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40.	Thinning Scissor.	12 No.
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45.	Dye Bowl.	12 No.
46.	Colour Scale.	02 No.
47.	Crimpling Tongue.	6 No.
48.	Curling Rod.	6 No.
49.	Pedestal Hood Hair dryer.	3 No.
50.	Hand Hair Dryer Heavy duty.	12 No.
51.	Hair Clipper Electrical.	6 No.
52.	Diffuser.	6 No.
53.	Scalp Steamer electronic.	2 No.
54.	Electric roller Set (20 rollers in 3 sizes).	3 No.
55.	Shampoo station with chair.	4 No.
56.	Dummy Head on stand with slip on.	20 No.
57.	Front wash basin.	4 No.
58.	Infrared Lamp.	4 No.
59.	Sterilizing Unit Wet.	2 No.
60.	Sterilizing Unit Dry.	2 No.

S. No.	Description Name	Quantity
61.	Dressing Out chairs.	20 No.
62.	Trollies.	12 No.
63.	Student Lockers with 12 cabinets.	04 No.
64.	Saloon Chairs.	12 No.
65.	Curtains for lab.	As per requirement
66.	Back View Mirror.	12 No.
67.	Hair Curler Set.	01 No.

MEDICAL DIAGNOSTICS

Introduction

Objectives of Introducing Medical Diagnostics Course in Schools.

1. To help students understand the organization of Hospitals, Research labs, Diagnostic labs.
2. To equip students with the skills needed to work in a hospital or a diagnostics lab.
3. To impart skills to students that enables them to work in manufacturing units for diagnostic reagents.
4. To develop skills and ability to assist qualified experts in health care, diagnostics and related fields.
5. To develop ability and skill among students; to understand, analyze and assist the analytical, research and development work in drug labs and various pharmaceuticals.
6. To develop the technical skills to handle the equipment and apparatus of the lab.
7. To help students learn various analytical and investigative procedures and techniques used in medical labs and hospitals.

CLASS–XI
ELECTIVE
ANATOMY & PHYSIOLOGY (741)
THEORY

Time: 3 Hours ***Marks: 60***

Unit–1 **20**

A. Anatomy & Physiology of Human Body

- Human Body.
- Definition.
- Anatomical terms.
- Structure.
- Cell.
- Tissues.
- Glands and membranes.
- Physiology.
- Functions.
- Disorders.
- Causative Factor.
- Blood components, normal concentrations and its functions, Factors affecting the normal concentration.

B. Sensory Organs

- Eye, Ear, Nose, Tongue and Skin – Structure.
- Eye, Ear, Nose, Tongue and Skin – Functions & Disorders.

C. Skeletal System

- Human Skeleton-Identification, Classification and Functions of.

1) Bones.
2) Joints.
3) Muscles.

- Types of Muscles & their functions.
- Mechanism of contraction Difference between 3 types of muscles Electro myography & mechanical recording of muscle contraction.
- Locomotion Diseases of muscles Dystrophies.
- Enzymes – changes in different.
- Diseases of muscles.

D. Nervous System

- Brain & Spinal cord Spinal nerves – segments Meninges, Blood supply to Brain Division of nervous system.
- Nerve fibers – types, functions, injuries, impulses & velocity.

Unit–2 **20**

A. Cardiovascular System

- The Heart Chambers Blood.
- Vessels – Arteries and Veins Lymphatic, Pulmonary & systematic circulation.
- Lymphoid System – nodes and its importance.
- Chambers & Functions.
- Heart rate and the significance.
- Cardiac cycle.
- HR factors.
- ECG – Machine, Recording.
- Abnormalities – types Causative Factors Reporting & Interpretation.

B. Respiratory System

- Respiratory Organs.
- Larynx & Trachea Thoraciccage Lungs.
- Functions & Disorders.
- Respiration-Mechanism- Inspiration, Expiration Gas exchange mechanism.
- Lung surfactant–compliance.
- Lung volume and capacity Respiratory Exercises Artificial Respiration-Basis & Techniques.

Unit–3 **20**

A. Digestive System

- Digestive Organs.
- Pharynx, esophagus Stomach and Intestines Liver & Pancreas Peritoneum.
- Functions & Disorders.
- Pharynx, esophagus Stomach and Intestines Liver & Pancreas Peritoneum.

B. Endocrine System

- Glands.
- Location.
- Glands & Hormones.
- Functions & Disorders.

C. Genito Urinary System

- Genito Urinary Organs.
- Kidney, Ureter, bladder, Urethra, Catherisation Female Reproductive System Male Reproductive System.
- Functions & Disorders.
- Nephron & Kidneys.
- Filtration and formation of urine.
- Uremia – Dialysis, Artificial kidney Male & Female reproductive system Secondary sex characteristics.
- Sex hormones and their functions Spermatogenesis – Sperm count of normal morphology, mortality Menstrual cycle – Ovulation.
- Tests of Ovulation's – Pregnancy Changes in pregnancy Part urition lactation Family Planning methods.

PRACTICAL

Time: 2 Hours ***Marks: 40***

Unit–1 **20**

A. Anatomy & Physiology of Human Body

- Slides of primary tissues/cells.
- Glands & Membranes.

B. Sensory Organs

- Eye, Ear, Nose, Skin & Tongue.
- Apparatus, Examination & Investigation - Eye, Ear, Nose, Skin & Tongue.
- Colour Vision.
- Use of Stethograph.
- Parts of Sphygmomano meter.
- Stethoscope, papillary reflexes.
- Recording of Blood pressure.

C. Skeletal System

- Bones and corresponding joints.
- Muscles.
- Use of Knee hammer.

D. Nervous System

- Spinalcord & external features of Brain.
- Internal structureof Brain.

- Examination of reflexes.

Unit–2 **10**

A. Cardiovascular System

- Heart and Major blood vessels.
- Use of Treadmill, Medsprier.
- ECG machine.
- Aspiration of heart and lungs.

B. Respiratory System

- Larynx, trachea, lungs.
- Apparatus & investigations.
- Bronchoscopy.

Unit–3 **10**

A. Digestive System

- GIT & Major glands.
- Investigations.

B. Endocrine System

- Endocrine glands.
- Endoscopy.

C. Genito Urinary System

- Kidney, Urinary bladder & Urethra Male & Female reproductive system.
- Placenta.
- Investigations.

CLASS–XI
ELECTIVE
DIAGNOSTIC RADIOLOGY (742)
THEORY

Time: 3 Hours ***Marks: 60***

Unit–1: X-Ray Imaging **20**

1. **Introduction to Radiology – X Ray, Ultrasound, MRI, CT, PET, Radiographic Analysis and X-Ray Imaging**
   - Discovery of x-rays.
   - Properties - production.
   - X - rayspectrum.
   - Bremsstrah lung and characteristic x - rays- x - raytube.
   - 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 in fluencing them.
- Image storing & Spot film devices.
- Radio graphic films.
- Principles of Fluoroscopy.
- Fluoroscopic screens/Tables.
- Film cassette construction & application.
- Image in tensifier construction & application/types & advantages.
- Radiographic film processing.
- Use of contrast.
- Magnification of images.

2. **Effects and Control of Scattered Radiation**

- Production & significance of scattered radiation.
- Filters & beam limiting devices.
- Grid.
- Structure & materials.
- Grid ratio.
- Types of Grids.
- Grid cassettes.
- Medical Terminology.
- Assessment.

Unit–2: Dark Room Technique **20**

1. **Film Materials**

- Introduction- Electromagnetic spectrum visible spectrum.
- Structure of the film - Spectral sensitivity, green technology, basic film types, films for specialized use.

2. **Safe Light and Storage of Films**

- Principle of operation, factors, affectings a felight performance, Storage of unprocessed film, storing, radiographs, fire hazards in film stores.

3. **Photo Chemistry**

- Theory of latent image formation.
- Introduction, the concept of development.

4. **Development**
   - Nature of development, constitution of developing solution, development, time, factors affecting the use of developer.

5. **Fixing**
   - Constitution of the fixing solution, factors affecting the use offixer, replenishment, regeneration of fixing solution, silver recovery- rinsing washing & drying.

6. **Viewing & Identification of X–Ray films**
   - Radiation Protection.
   - Hazards of radiation.
     - Time, distance & shielding concept in ration protection.
   - Shielding materials.
   - Radiation surveillance indiagnostic & the rapeutic radiation installations.
   - Regulatory board & its recommendations.
   - Radiation detectors.
   - Ion Chambers.
   - G. Mcounters.
   - Scintillation counters.
   - Assessment.

Unit–3: Patient Care & Radiological Positioning **20**

1. **Introduction to Patient Care**
   - Clinical responsibility.
   - Legal responsibility, Hospital & the radiographer.

2. **General Patient Care**
   - Patient transfer technique.
   - Turning the patient (patient conditions, Mechanic safety).
   - Restraint techniques - Trauma, Pediatric, Geriatric, Physically handicapped, disturbed patients, an aesthetized patient, moving chair & stretcher patients.
   - Specific patient conditions.
   - Tubes & catheters, Nasogastric, chest, Urinary, intravenous.
   - Oxygen & other (Cast surgical & cardiac) Alcoholic, bedpans & urinals.
   - Security of patient properties. Patient, inpatient.
   - General comfort & reassurance for the patient.
   - Assessment.

PRACTICAL

Time: 2 Hours *Marks: 40*

Unit–1: X–Ray Imaging **10**

- X–Ray Tubes.
- Stationary & Rotation Anode.
- X–ray Consolestation (Demo of KV, MA and exposure time settings).
- Procedures to reduce Scattered Radiation.
- Focus Principle.
- Grids.
- Screen.
- Image in tensifiers.
- Use of contrast materials.

Unit–2: Dark Room Technique **10**

- Images to ring devices.
- Film cassette construction.
- Duplicating a film.
- Spectrum.
- Films types - Specialized use.
- Operation, storage.
- Photo chemistry.
- Development.
- Fixing.
- Radiation protection, counters.
- Assessment.

Unit–3: Radiological Positioning **20**

- Patient transfer technique.
- Turning the patient.
- Restraint techniques - Trauma, Pediatric, Geriatric, Physically handicapped, disturbed patients, an aesthetized patient, moving chair & stretcher patients.
- Tubes & catheters, Nasogastric, chest, Urinary, intravenous, oxygen & other (Castsurgical & cardiac) Alcoholic, bed pans & urinals.
- Assessment.

CLASS–XII
ELECTIVE
LABORATORY MEDICINE–II (741)
THEORY

Time: 3 Hours *Marks: 60*

Unit–1: Investigation Urine & Faces Analysis **10**

- Introduction.
- Maintenance & Equipments of Pathology Lab.
- Preparation of Reagents.
- Urine.
- Formation and composition.
- Collection Preservation Gravity & PH.
- Examination–Physical.
- Examination– Chemical.
- Sugar.
- Ketone Bodies, Bile.
- Blood, Crystals.
- Parasites & Abnormal Cells.
- Feces–Formation, Physical & Chemical Examination.
- Preparation of stool sample for microscopic examination.
- Sputum Examination.
- Assessment.

Unit–2: Body Fluids **10**

- Body Fluids.
- Cerebro spinal fluid. Synovial fluid and Pleural fluid Pericardial fluids Peritoneal fluids.
- Other fluids collected stransudateor exudates.
- Semen Analysis–Collection, Physical & Chemical examination.
- Sperm count – Microscopic examination & Motility.
- Assessment.

Unit–3: Process & Investigations **10**

- Reagents – Preparation and their uses.
- Personnel care and protection Disposal of Bio-Medical waste Smear Making.
- Staining Methods.
- Osmotic fragility test.
- Differential Counts.
- Cellcounts – RBC, WBC, and Platelets Eosinophil & Reticulocyte count ESR.
- LE Cell.
- Haemopoeisis – Erythrocytes Hemoglobin – Estimation Packed Cell Volume, Indices Hematocrit and Red cellindices Anemia.
- Leukocytes.
- Coagulation Factors.
- Coagulation disorders – Bleeding & Clotting Time.
- Bone marrow study.
- Assessment.

Unit–4: Blood Bank & Transfusion 10

- Blood Bank.
- Material & equipment Reagents – preparation Protocols.
- Storage & Preservation.
- Records in Blood bank.
- ABO System.
- Subgroups in ABO System.
- Practical importance of Other blood groups.
- Rh System.
- Antibody titers.
- Blood grouping techniques Problems in blood grouping Donor Motivation.
- Donors election & Registration.
- Blood Collection.
- Storage, Preservation & Processing of blood.
- Quality control.
- Investigation of transfusion, reactions.
- Grouping & cross matching Direct and Indirect Coombs test Mandatory Test.
- Assessment.

Unit–5: Lab Process 10

- Materials, Equipment & Techniques.
- Biopsy, Autopsy.
- Collection, Preservation & Labeling of Slides, Blocks, Specimens.
- Techniques.
- Grossing Methods.
- Fixatives.
- Processing of the tissues including Bone.
- Embedding Section Cutting Staining & Mounting Special Stains.
- Preservation of reports & records.
- Assessment.

Unit–6: Cytology 10

- Techniques Equipment & Procedures – FNAC, Imprintssmear.
- Vaginal & Buccalsmear, Swabs.
- Staining procedure and Mounting.
- Preparation of fluids for Cytological Examination.
- Immuno histo chemistry.
- Assessment.

PRACTICAL

Time: 2 Hours *Marks: 40*

Unit–1: Urine & Feces Analysis 7

- Introduction.
- Maintenance & Equipment of Pathology Lab.
- Preparation of Reagents.
- Urine.
- Formation and composition.
- Collection Preservation Gravity & PH.
- Examination–Physical Examination - Chemical Sugar.
- Ketone Bodies.
- Bile, Blood, Crystals.
- Parasites & Abnormal Cells.
- Feces–Formation, Physical & Chemical Examination Preparation of stool sample for microscopic examination Sputum Examination.
- Assessment.

Unit–2: Body Fluids 7

- Body Fluids.
- Cerebrospinal fluid, Synovial fluid.
- Pleural fluid.
- Pericardial fluids.
- Peritoneal fluids.
- Other fluids collected stransudateor exudates.
- Semen Analysis – Collection, Physical & Chemical examination.
- Spermcount – Microscopic examination & Motility.
- Assessment.

Unit–3: Hematology Process & Investigations 7

- Smear Making Staining Methods Osmotic fragility test.
- Differential Counts.
- Cellcounts – RBC, WBC, Platelets.
- ESR.
- LE Cell.
- Hemoglobin – Estimation.
- Hematocrit and Red cellindices.
- Coagulationdis orders – Bleeding & Clotting Time.
- Bone marrow study – Demo.
- Assessment.

Unit–4: Blood Bank & Transfusion 7

- Blood Bank.
- ABO Blood grouping – cell and serum grouping.
- Rh typing.
- Anti body titers.
- Blood grouping techniques – Other methods.
- Donor selection & Registration – Demo.
- Blood Collection – Demo.
- Storage, Preservation & Processing of blood – Demo.
- Quality control Demo.
- Investigation of Transfusion, reactions.
- Cross matching.
- Direct and Indirect Coombs test.
- Mandatory Test – Screening Tests – Demo.
- Assessment.

Unit–5: Histopathology Lab Process 6

- Histopathology.
- Introduction.
- Materials, Equipment & Techniques.
- Biopsy, Autopsy.
- Collection, Preservation & Labeling of Slides.
- Blocks, Specimens Techniques.
- Grossing Methods.
- Fixatives.
- Processing of the tissues including Bone.
- Embedding.
- Section Cutting.
- Staining & Mounting.
- Special Stains.
- Preservation of reports & records.
- Assessment.

Unit–6: Cytology 6

- Cytology.
- Techniques Equipment & Procedures – FNAC.
- Imprintssmear, Vaginal & Buccalsmear, Swabs.
- Staining procedure and Mounting.
- Preparation of fluids for Cytological Examination.
- Immuno histo chemistry.

- Assessment.

CLASS–XII
ELECTIVE
CLINICAL BIOCHEMISTRY & MICROBIOLOGY–II (742)
THEORY

Time: 3 Hours ***Marks: 60***

Unit–1: Concepts Instruments & Procedures 10

- Introduction - scope of biochemistry and clinical biochemistry objectives and scheme of clinical biochemistry teaching.
- Basic Biochemistry - over view of biomolecules, biochemical transformations. Biochemical organization of cell, tissues, organs and human organism.
- Ethics and Discipline - Laboratory ethics and discipline. Patient management, Reception, Registration, Biochemical parameters investigations, protocols, documentation.
- Hazards and safety - physical, chemical and biological hazards, self & patient & equipment safety. Disposal of laboratory waste and the hazardous material.
- First Aid Measures.
- Instruments, Principles & Procedures: Basis, uses, parts, installation, glass ware & plastic ware – colorimeters, balances, centrifuges, refrigerators, hot air ovens, water baths, thermometers, vortex, mixers, magnetics stirrers, UV lamp.
- Cleaning & Maintenance of Equipment.
- Assessment.

Unit–2: Investigations Separation Procedures & Analysis 10

- Separation techniques: basic principles, different types, general techniques and clinical applications of different types of electrophoresis and chromatography.
- Automation: Basic Principles, different components and general principles of usage and applications.
- Calcium and Phosphorus: Outlines of mineral metabolism. Principles of estimation of serum calcium and inorganic phosphate and their clinical importance.
- Urine Proteins: requirements of quantisation of proteins in the urine. Different samples used Principles of samples collection, preservation and analysis.
- Lipoproteins: Principles of estimation of different lipo protein fractions of lipase, & LDH.
- Acid–Base balance.
- Immuno as says.
- Sample identification and labeling.
- Types and mechanisms of actions of various anti coagulants and preservatives used Principles of Spectrophotometry and Turbidoemetry.
- Quantitative analysis.
- Calorimetery- applications in clinical biochemistry.
- Units of measurement.
- Assessment.

Unit–3: Functional Test & Profile 10

- Glucose tolerance test: Concept of tolerance tests. Definition, patient preparation, performance, reporting and interpretation of GTT.
- Liver functions tests: bilirubin, total proteins, albumin and prothrombin time, turbidity tests and serum enzyme estimations (SGPT, ALPA and GT).
- Kidney functions tests: Concept of clearance tests, Use of serum NPN substances creatinine clearance, concentration and dilution tests and urine examination.
- Gastric function tests: Principles of analysis of gastric juice, Concept of basalandmaximal acid outputs, Principles of stimulation tests & tubeless gastric analysis.
- Thyroid function tests: Principles underlying estimations of various thyroid hormones and their interpretations.
- Profiles: Concepts of Profile testing.
- Cardiac Profiles.
- Lipid Profile.
- Assessment.

Unit–4: Fundamentals of Microbiology **10**

- Personal Care.
- Infection Control.
- Sterilization Techniques - Autoclave, Hotair oven, Tyndallization & Pasteurization.
- Equipment – Handling & Maintenance.
- Assessment.

Unit–5: Bacteriology **10**

- Bacteriology.
- Applied Anatomy and Physiology of the Bacterial Cell.
- Pathogenic organisms.
- Identification & Isolation of Staphylococcus, Streptococcus, Pneumococcus, Gonococcus, eningococcus, C. diptheria, Mycobacterium tuberculae and M. Leprae, Clostridia, E. Coli, Klebseilla, Salmonella, Shigella, Proteus, Vibrio, Pseudomonas.
- Anthrax, Plague, Dengue, Japanese encephalitis.
- Assessment.

Unit–6: Mycology Immunology & Serology Parasitology Virology **10**

- Introduction & Classification.
- Enumeration of pathogenic & opportunistic fungi.
- Introduction.
- Antigens, Antibodies & Reactions.
- Hypersensitivity.
- Introduction.
- Pathogenic parasites in blood, stool and urine.
- Viruses – Classification, Cultivation & Enumeration.
- Study of the laboratory animals – Sheep, Rabbit, Mice & Guinea Pig.
- Assessment.

PRACTICAL

Time: 2 Hours ***Marks: 40***

Unit–1: Instruments & Procedures 7

- Lab Equipment – Identification, Use & Cleaning of Glass & Plastic ware.
- Pipettes: Use of Pipettes/automated.
- Sample collection – Blood, urine and body fluids, Containers - Appropriate usage for different samples.
- Centrifuge – Preparation and separation of plasma, serum protein.
- Storage of sample.
- Filters - Filter Papers & Filtration.
- Drying of chemicals.
- Weighing – Appropriate Balances.
- Solutions – Preparation, Reagents - Preparation.
- Usage-Thermometer, Vortex Mixers & Magnetic Stirrers.
- Buffers.
- Colorimeters – Beer – Lambert's Law Experiment.
- Assessment.

Unit–2: Investigations 7

- Glucose: Orthotoluidine and glucose oxidase methods.
- Urea: DAM method and urease Berthelot reaction.
- Serum Creatinine: Jaff's method end point and kinetic analyses modes.
- Serum total proteins: Biuret method.
- Serum Albumin: Dyebinding (BCG) method.
- Serum Bilirubin.
- Malloy Evelyn method, Vandenberg reaction.
- Total andc onjugated bilirubin estimation.
- Amino transferases: AST and ALT – Reitman Frankel method.

Unit–3: Separative Procedures & Analysis 7

- Estimation of serum: sodium, potassium and Lithium by Flame.
- Photometer.
- Estimation of serum bicarbonate by titration method.
- Acid base parameters using blood gas analyzers.
- Estimation & Standardization of Glucose, Urea, Creatinine, Chloride, Proteins & Transaminases.
- Standardization of pipettes and photo metric instruments – Demo and Analysis of Gastric juice, Demonstration of stimulations tests.
- Separation Techniques.
- Electrophoresis – serum proteins, hemoglobin – Demo.

- Paper chromatographic – aminoacids and carbohydrates – Demo.
- Oral glucose tolerance test.
- Estimation of 24 Marks urine proteins by turbid metric method.
- Assessment.

Unit–4: Personal Care, Sterilization & Equipment 7

- Personal Care, Sterilization & Equipment cleaning the equipment and glass ware Universal precautions.
- Methods of Sterilization – Autoclave, Hotair oven.
- Tyndallization & Pasteurization, Filtration, Disinfection & Antiseptics.
- Sterilization of Syringes, Needles & Slides.
- Sterilization of Cultureroom & Work Benches.
- Maintenance of the Equipment – Indications & Contra – Indications for Sterilization in a equipment.
- Uses of equipment.
- Refrigerators.
- Deep Freezers.
- Incubators & Water baths Different microscopes Preparation of wire loops Preparation of Pasture pipettes Preparation of smears.
- Assessment.

Unit–5: Bacteriology 6

- Staining procedures.
- Simple, Grams, Acid fast Albert, Fontana's Negative.
- India Ink & Negrosin.
- Hanging drop preparation.
- Preparation of media, pH adjustment, Sterilization, storage and disposal after use of Solid, liquid and special media.
- Disposal of specimens and contaminated material.
- Sample collection, labeling, registering and maintenance of records and statistics.
- Processing Techniques – Sputum, Blood, Urine & Stool, Pus, CSF. Swab – Wounds, Skin, Throat, Clippings, Spore, Strips.
- Assessment.

Unit–6: Mycology Immunology & Serology Parasitology 6

- Fungi – Identification, Collection & Labeling.
- Microscopy.
- KOH preparation.
- Staining methods & Culture methods.
- Lactophenol blue.
- Negative – Indian Ink Negrosin.
- Culture, Slide Culture.

- Collection of specimen.
- Labeling, separation of Sera and Storage.
- Inactivation of serum.
- VDRL Test – qualitative and semi-qualitative & quantitative.
- Widetest – principle and procedure.
- Latex tests – R.A. factor.
- Stool examination – saline, iodine staining & Concentration.
- Preservation of samples.
- Disposal of infected material.
- Peripheral bloods mear preparation and staining techniques.
- Leishman, Giemsa's & JSB stain.
- Assessment.

LIST OF RECOMMENDED BOOKS

1. Current Medical Diagnosis and Treatment 2013 by Maxine Papadakis, Stephen J. McPhee and Michael W. Rabow.
2. Problem - Oriented Medical Diagnosis (Lippincott Manual Series (Formerly known as the Spiral anual Series) by H. Harold Friedman.
3. DSM-IV Made Easy: The Clinician's Guide to Diagnosis by James R. Morrison.
4. Bates' Guide to Physical Examination and History – Taking Point (Lippincott Williams & Wilkins) by Lynn Bickley MD.

LIST OF EQUIPMENTS REQUIRED TO IMPART TRAINING AT MEDICAL COLLEGE HOSPITAL, INSTITUTES

Minimum Requirements: (for a batch of 30 students)

A. Basic Instruments.

B. Instruments for Demonstrations.

C. Reagents & Chemicals, Glassware.

A. Basic Instruments (Approx. Cost 5 lacs)

1.	Microscope with built in illumination.	Monocular	– 6
		Binocular	– 2
2.	Calorimeter.		– 1
3.	Photoelectric colourimeter.		– 1
4.	Incubator.		– 1
5.	Hot Air Oven.		– 1
6.	Autoclave.		– 1

7.	Simple Balance.	–	1
8.	Haemoglobinometer Colormetric.	–	1
9.	Single Pan Balance.	–	1
10.	Haemocytnmeter (Hellige).	–	10
11.	Water bath (Serological).	–	2
12.	Centrifuge Machine angle rotator with wintube adoptor, time & speed regulator.	–	2
13.	Innoculation Chamber Rotary.	–	1
14.	Microtome.	–	1
15.	ELISA Reader & Washer.	–	1
16.	Distillation Plant All Glass Double.	–	1
	Single Distillation.	–	1

B. Instruments for Demonstrations (Approx. Cost 10 lacs)

1.	Haematology Analyser (semi automated).	–	1
2.	Haematology Analyser (fully automated).	–	1
3.	Biochemistry Analysers (semi automated).	–	1
4.	Biochemistry (fully automated).	–	1
5.	ELISA Reader (automated).	–	1
6.	Electrophrasis Apparatus.	–	1
7.	Histo Kinett.	–	1
8.	Densitometer.	–	1
9.	Freezing Microtome.	–	1
10.	Tissue Processor.	–	1
11.	Mclntosch Apparatus for Anaerobic Culture.	–	1
12.	Laminar flow System.	–	1

C. Reagents/Chemicals, Glass Wares

As per requirements of Diagnostic Laboratories for 40–50 samples per day.

Annexure–1

APPLICATION FORMAT FOR OFFERING VOCATIONAL SUBJECT / COURSES AT SENIOR SECONDARY LEVEL

1. **Name of the Course(s) applied for:** .....
   (with subject codes) .....
   .....
   .....
2. **Name of the School (Complete address)** .....
   (Also provide Website address if available) .....
   .....
   .....
3. **Affiliation No.** .....
4. **School ID.** .....
5. **Name of the Principal** .....
   - Phone No. .....

- Mobile No. .....
- E-mail .....

6. **Infrastructure** .....
   No. of Students .....
   No. of Teachers .....
   Student-Teacher Ratio .....
   No. of Classrooms .....
   Books in Library .....
   Total Computers in Computers Labs .....
   Specification of Computers .....
   Details of Constructed area for .....
   Establishing Laboratories .....
7. **Name of Teachers for Vocational Course** .....
   (Qualifications) .....
   .....
   .....

8. **Details of Draft** (in favour of **Secretary, CBSE,** Payable at Delhi)

   DD No.: ..... Date: ..... **Amount** (in Digits)
.....

   Bank Issues: ..... **Amount** (in Words)
.....

Signature & Seal of the Principal

Note: The document complete in all respects may be sent to: **The Director (Vocational Education), Central Board of Secondary Education 2, Community Center, Preet Vihar, New Delhi-110092.**