JAMIA HAMDARD

DEPARTMENT OF PARAMEDICAL SCIENCES

CBCS ENABLED SYLLABUS

BSc. Cardiology Laboratory Techniques

SYLLABUS FOR

B.Sc. Cardiology Laboratory Techniques

Choice Based Credit System (CBCS)

Approval Date: _____

(__thBOARD OF STUDIES)

Deemed to be University
Accredited in 'A' Grade by NAAC
Declared to be designated as Institute of Eminence (IoE) by MHRD, GOI
NEW DELHI 110062
www.jamiahamdard.edu

PROGRAM NAME: BSc. Cardiology Laboratory Techniques

PROGRAM CODE: 320

ACADEMIC SESSION OF INTRODUCTION OF THE PROGRAMME: (2022-2023)

SCHOOL NAME: SNSAH

DEAPRTMENT NAME: DEPARTMENT OF PARAMEDICAL SCIENCES

APPROVAL DATE OF THE BOARD OF STUDIES (B.O.S) MEETING FOR THE PRESENT SYLLABUS **___TH _____ 202_ (___TH BOARD OF STUDIES)**
APPROVAL DATE AND NUMBER OF ACADEMIC COUNCIL OF MEETING FOR THE PRESENT SYLLABUS **__ AC (_____ 202_)**

Curriculum Framework of N.B.A Programme

SCHOOL OF NURSING SCIENCES & ALLIED HEALTH

Vision Statement (School Level):
Ensuring quality, cost- effective healthcare for one and all, in the communities we serve.

Mission Statements (3 to 4) (School Level):

MS1: To welcome onboard the best of talent, the best of equipment

MS 2: The best of practices to deliver the best of patient care

MS 3: Setting a benchmark in the healthcare segment, across regions

NAME OF THE DEPARTMENT/CENTRE

Vision Statement (Department/Centre Level): **PARAMEDICAL SCIENCES**

To create an institute of national & international repute in Paramedic offering states of the art education entailing the finest skills combined with compassionate patient care.

Mission Statements (3 to 4) (Department/Centre Level):

MS1: To provide the most advanced and comprehensive course offerings to health sciences student possible by employing the most qualified faculty, utilizing the most advanced technology.

MS 2: To provide a quality paramedical education and prepare human & competent global paramedic professional

MS 3: To provide the highest level of quality patient care and can make contribution towards education and research.

Name of the Academic Program: B.Sc. Cardiology Laboratory Techniques

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

Upon the completion of Academic Programme (B.Sc. Cardiology Laboratory Techniques), students will be able to:

QD-1: The development of skills and knowledge required for the practice of Cardio Vascular Technologist

QD-2: To access, create, analyse knowledge regarding Cardio Vascular Diseases.

QD-3: To develop clinical skills in the diagnosis and management of Cardiac patients.

QD-4: Describe the general diagnostic evaluation and workup of the Non –invasive cardiac lab tests;

QD-5: Describe the general basis and performance of Cardiac Cath Lab Procedures

Mapping Program Educational Objectives (PEOs) with Mission Statements (MS)

	MS-1	MS-2	MS-3
QD-1	3	2	1
QD-2	2	3	1
QD-3	2	1	3
QD-4	1	3	2
QD-5	3	2	1

PROGRAM OUTCOMES (POs

After completing this Course, the students should be able to …….

PLO-1 To know the Anatomy of Human Body & funtions of Heart.
PLO-2 To Understand the pharmacology of Cardio Vascular Drugs
PLO-3 To Understand about different cardiac diseases
PLO-4 To develope the knowledge about Electrocardiography (ECG)
PLO-5 To develope the knowledge about Echocardiography (ECHO)
PLO-6 To Remember the procedures performed at Cardiac Cath Lab
PLO-7 To perform the Treadmill Test & Holter Monitoring
PLO-8 To perform CPR (Cardio Pulmonary Resuscitation), Defibrillator

PROGRAM SPECIFIC OUTCOMES (PSOs)

After completing this Course, the students should be able to …….

PSO-1 To know the concept of healthy living

PSO-2 To understand the procedures

PSO-3 To assist doctor at different Cardiac Departments

PSO-4 To perform the diagnostic tests

Mapping of Program Outcomes (POs) and Program Specific Outcomes (PSOs) with Program Educational Objectives (PEOs)

	QD-1	QD-2	QD-3	QD-4	QD-5
PLO-1	3	2	2	3	1
PLO-2	3	3	3	3	3
PLO-3	2	3	3	2	2
PLO-4	2	3	3	2	2
PLO-5	2	3	3	2	2
PLO-6	2	3	3	2	2
PLO-7	2	2	3	2	3
PLO-8	2	2	3	3	2
PSO-1	1	2	3	2	1
PSO-2	2	1	2	1	1
PSO-3	1	1	1	1	2
PSO-4	1	2	1	1	2

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SEMESTER-I

Course Code: 101(Theory) & 103(Practical)

Title of the Course: Human Anatomy

L-50 T-2 **Credits (L=2, T=1): 3**

(L=Lecture hours, T=Tutorial hours)

COURSE LEARNING OUTCOMES (CLOs)

After completing this Course, the students should be able to….

CLO1 Demonstrate the different parts of the human body.

CLO2 Learn the Preservation, and, embalming of body organs

CLO3 Learn the study of bones, joints ,and muscles

CLO4 Comprehend the biology concerned with the study of the body structure of organisms and their parts.

CLO5 Categorize general slides of tissues & organs

Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs) and Program Specific Outcomes (PSOs)

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PSO1	PSO2	PSO3	PSO4
CLO1	2		1	1	1	1	1	1		1	1	1
CLO2	2	1	1	1	1	1	1	1		1	1	1
CLO3	1	1	1	1	1		1	1	1	1	1	1
CLO4	2	1	1	1	1		1	1	1	1	1	1
CLO5	1	1	1	1	1	1		1	1	1	1	1

Detailed Syllabus:

UNIT-I **12 hrs**

Introduction to Anatomy

Anatomical terms, planes, organization of human body- cell, tissue, organ & organ system.

Musculo-skeletal system:

Types of bones, structure & divisions of the skeleton system, name of all the bones and their parts, joints- classification. Structure and types of muscles

Anatomy of the Nervous system

Central nervous system & Peripheral nervous system- different components

UNIT-II **12 hrs**

Anatomy of Circulatory system:
General plan of circulatory system and its components-
Heart- size, location, coverings, chambers, blood supply, nerve supply, the blood vessels
General plan of circulation, pulmonary circulation
Name of arteries and veins and their positions Lymphatic system - general plan Anatomy of the Respiratory system:
Organs of Respiratory System (Brief knowledge of parts and position)

UNIT-III **13 hrs**

Anatomy of the Digestive system:
Anatomy of alimentary tract; Parts of the tract
Accessory glands of digestion; Pancreas, Liver, Gall Bladder
Anatomy of Excretory system Kidneys- location, gross structure, excretory ducts, ureters, urinary bladder, urethra

UNIT-IV **13 hrs**

Reproductive system
Male Reproductive System
Female Reproductive System Anatomy of the endocrine system
Name of all endocrine glands their positions, Hormones and their functions- Pituitary, Thyroid, Parathyroid, Adrenal glands, Gonads & Islets of pancreas

GFC-103 HUMAN ANATOMY (Practical)
Practicals based on the topics mentioned in the syllabus.

Reference Books:

1. Human Anatomy Regional and Applied Vol. 1, Vol.2 & Vol.3, B.D.Chaurasia C.B.S.Publishers, New Delhi
2. Hand Book of General Anatomy B.D.Chaurasia, C.B.S.Publishers, New Delhi
3. Text Book of Human Histology Inderbir Singh, Jaypee Brothers, Medical Publishers, Delhi
4. Gray's Anatomy Susan Standring, Elsevier Churchill Livingstone, Edinburg

Teaching-Learning Strategies
Giving lectures to large groups of students, followed by tutorials and seminars, as well as some independent study, is the teaching approach used. However, there are a range of alternative delivery techniques that can be highly effective, and concepts like didactic learning and problem-

based learning are commonly employed in teaching with the use of power point presentations, group discussions, and A/V aids.

Assessment methods and weightages

Evaluation of marks are done on internal and external assessment. Each theory course shall carry 100 marks. Of these, 75 marks shall be for semester examination and 25 marks for internal assessment.

Internal assessment for 25 marks in respect of theory papers will be based on written tests, assignments, presentations, viva-voice etc.

The minimum pass marks shall be 40% (grade E) in each theory/ assignment and viva-voce (combined examination).

Course Code: 102(Theory) & 104(Practical)

Title of the Course: Human Physiology

L-50 T-20 **Credits (L=2, T=1): 3**

(L=Lecture hours, T=Tutorial hours)

COURSE LEARNING OUTCOMES (CLOs)

After completing this Course, the students should be able to ……

CLO1 Know about the measuring of Blood pressure, heart rate, pulse rate, respiratory rate, reflexes.

CLO2 Learn to measure RBC, WBC, and Platelet count

CLO3 Learn to measure the bleeding time and clotting time

CLO4 Understand the RH grouping factors of blood

CLO5 Recognize Blood Groups - ABO and RH grouping

CLO6 Perform hemoglobin test

Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs) and Program Specific Outcomes (PSOs)

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PSO1	PSO2	PSO3	PSO4
CLO1	1	1	1	1	1	1	1	1	1	1	1	1
CLO2	1	1	1	1	1	1	1	1	1	1	1	1
CLO3	1	1	1	1	1	1	1	1	1	1	1	1
CLO4	1	1	1	1	1	1	1	1	1	1	1	1
CLO5	1	1	1	1	1	1	1	1	1	1	1	1
CLO5	1	1	1	1	1	1	1	1	1	1	1	1
CLO6	1	1	1	1	1	1	1	1	1	1	1	1

Detailed Syllabus:

UNIT-I **12 hrs**

General Physiology

Cell, Transport across cell membrane, homeostasis, resting membrane potential, action potential

Blood

Composition and functions of Blood

RBC, WBC, Platelet count, Hemoglobin

Blood Groups - ABO and RH grouping

Hemostasis & Anticoagulants

UNIT-II **12 hrs**

Cardio vascular system
Cardiac muscle, Pacemaker & conducting tissue
Cardiac Cycle
Cardiac output, Heart rate, ECG
Arterial blood pressure
Respiratory System
Functions of Respiratory system
Mechanism of respiration, lung volumes & capacities

UNIT-III **13 hrs**

Nerve & Muscle physiology
Neuron structure & properties
Neuromuscular junction
Skeletal muscle structure mechanism of contraction
Cerebrospinal Fluid (CSF): Composition, functions & Circulation.
Central & autonomic Nervous system Organization of CNS
Functions of various parts of Brain, in brief
Composition, functions and circulation of CSF
Differences between sympathetic and parasympathetic division

UNIT-IV **13 hrs**

Digestive system
Functional Anatomy, organization & innervations
Composition and functions of all Digestive juices
Digestion & Absorption of carbohydrates, proteins and fats
Excretory System
Kidneys: Functions, Nephron, Juxta-glomerular Apparatus
Renal circulation
Mechanism of Urine formation
GFR
Endocrine and Reproductive systems Endocrine glands & hormones secreted
Functions of Reproductive system
Male Reproductive System: spermatogenesis, Testosterone.
Female reproductive system: Ovulation, Menstrual cycle.
Pregnancy test

Reference Books:

1.Text book of Guyton (Arthur C) Prism Publishers Bangalore.
2.Review of medical Ganong Appleton and Physiology, Lange.

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GFC 104 HUMAN PHYSIOLOGY (Practical)

Practicals based on the topics mentioned in the syllabus.

Course Code: 105

Title of the Course: Medical Ethics, Legal aspects and Medical Terminology

L-5 Qualifying **No Credits**

(L=Lecture hours)

COURSE LEARNINGOUTCOMES (CLOs)

After completing this Course, the students should be able to ……

CLO1 Know about the Ethical, Moral, and Legal responsibilities
CLO2 Learn their roles as health care professionals.
CLO3 Understand the principles of medical ethics
CLO4 Uphold their responsibilities with dignity in a medical profession
CLO5 Accomplish their assigned tasks in their clinical rotations.

Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs) and Program Specific Outcomes (PSOs)

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PSO1	PSO2	PSO3	PSO4
CLO1	1	1	1	1	1	1	1	1	1	1	1	1
CLO2	1	1	1	1	1	1	1	1	1	1	1	1
CLO3	1	1	1	1	1	1	1	1	1	1	1	1
CLO4	1	1	1	1	1	1	1	1	1	1	1	1
CLO5	1	1	1	1	1	1	1	1	1	1	1	1

Detailed Syllabus: **5 hrs**

Role Definition and Interaction, Ethical, Moral, and Legal Responsibilities
Medical terminology- The course employs a body systems-oriented, word-analysis approach to learning medical terminology. The goal of the class is to prepare students for the terminology they might encounter in their subsequent coursework, in their clinical rotations and ultimately in their roles as health care professionals.

Books Recommended:

CM Francis Medical Ethics
EMMESS Medical Terminology

Teaching-Learning Strategies

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based learning are commonly employed in teaching with the use of power point presentations, group discussions, and A/V aids.

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The minimum pass marks shall be 40% (grade E) in each theory/ assignment and viva-voce (combined examination).

Course Code: 106

Title of the Course: English

L-25 Qualifying **No credits**

(L=Lecture hours)

COURSE LEARNING OUTCOMES (CLOs)

After completing this Course, the students should be able to ……
CLO1 Speak and write proper English
CLO2 Read and understand English
CLO3 Understand and practice medical terminology
CLO4 Acquire a good command over English
CLO5 Apply commonly used medical terminology in medical practice.

Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs) and Program Specific Outcomes (PSOs)

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PSO1	PSO2	PSO3	PSO4
CLO1	1	1	1	1	1	1	1	1	1	1	1	1
CLO2	1	1	1	1	1	1	1	1	1	1	1	1
CLO3	1	1	1	1	1	1	1	1	1	1	1	1
CLO4	1	1	1	1	1	1	1	1	1	1	1	1
CLO5	1	1	1	1	1	1	1	1	1	1	1	1

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The minimum pass marks shall be 40% (grade E) in each theory/ assignment and viva-voce (combined examination).

Books Recommended:
General English Book (SP Bakshi)
English skills Part B (Terry Phillips)

Course Code: 107

Title of the Course: Computer Skills

L-5 T-30 Qualifying **No credits**

(L=Lecture hours, T=Tutorial hours)

COURSE LEARNING OUTCOMES (CLOs)

After completing this Course, the students should be able to ……

CLO1 Know about basics of computer application
CLO2 Perform computer applications related to medical records and information system.

Mapping of Course Outcomes (CLOs) with Program Learning Outcomes (PLOs) and Program Specific Outcomes (PSOs)

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CLO 1	1	1	1	1	1	1	1	1	1	1	1	1	1
CLO 2	1	1	1	1	1	1	1	1	1	1	1	1	1

Teaching-Learning Strategies
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The minimum pass marks shall be 40% (grade E) in each theory/ assignment and viva-voce (combined examination).

Books Recommended: Computer Fundamentals: 8th Edition, Computer Basics (Biitu Kumar)

SEMESTER-II

Course Code: 201 (Theory) & 204 (Practical)

Title of the Course: Pharmacology

L-30 P- 50 **Credits: 2+4= 6**

(L=Lecture hours, T=Tutorial hours)

COURSE LEARNING OUTCOMES (CLOs)

After completing this Course, the students should be able to ……

1. To know about the Pharmacological agents and substances based upon the generic drug name, pharmacological classification, clinical uses and most prevalent undterstanding of adverse effects.
2. To remember the action of drugs as well as their application in clinical medicine.
3. Student will be able to apply the concepts of therapeutics and assimilate that into practice throughout his/her professional career.

Mapping of Course Outcomes (CLOs) with Program Learning Outcomes (PLOs) and Program Specific Outcomes (PSOs)

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PSO1	PSO2	PSO3	PSO4
CLO1	2	2	3	3	3	2	1	1	2	1	2	2
CLO2	2	3	3	3	3	2	1	1	2	2	2	2
CLO3	3	3	3	3	3	2	1	1	2	1	2	2

Detailed Syllabus:

BCLT 201, PHARMACOLOGY
MM Theory-100 (75+25)

Pharmacology relevant to the Cardiology lab technician course

This course introduces the students to basic pharmacology of common drugs used and theirimportance in the different treatments.

UNIT-I **10 hours**
Terminology-Classification of drugs Principles of drug administration and routes of administration

UNIT-II **5 hours**
Drug allergy and toxicity, mechanism of drug action

UNIT-III **5 hours**

Definition, actions, indications, and contraindications, adverse reactions of the following in brief:-Drugs acting on autonomous nervous system

UNIT-IV **10 hours**

Definition, actions, indications, and contraindications, adverse reactions of the following in brief:- Cardiovascular drugs – enumerate the mode of action, side effects and therapeutic uses of thefollowing drugs:
Drugs used in the treatment of shock
Antihypertensive example: beta adrenergic antagonists, alpha adrenergic antagonistsetc.
Ant arrhythmic drugs
Cardiac glycosides
Sympathetic and non-sympathetic ino-trophic agentsCoronary vasodilators
Anti-anginal
Drugs used in Haemostasis – anticoagulants Thrombolytics and anti-thrombolytics

REFERENCES:

Essentials of Medical Pharmacology by K.D Tripathi
Pharmacological Classification of Drugs; by K.D Tripathi

Teaching-Learning Strategies

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Assessment methods and weightages

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BCLT 204, PHARMACOLOGY (Practical)

Practical based on the topics mentioned in the theory syllabus

Course Code: 202 & 205

Title of the Course: Pathology (Theory)

L-35 P- 50 **Credits: 3+4= 7**

(L=Lecture hours, T=Tutorial hours)

COURSE LEARNING OUTCOMES (CLOs)

After completing this Course, the students should be able to ……

CLO1 To know about the Pathology of Blood
CLO2 To understand and remember the Pathology relevant to Cardiac Lab Technologist
CLO3 Student will be able to perform different types of blood tests used for diagnosis of various types of diseases

Mapping of Course Outcomes (CLOs) with Program Learning Outcomes (PLOs) and Program Specific Outcomes (PSOs)

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PSO1	PSO2	PSO3	PSO4
CLO1	2	2	2	3	2	2	1	1	2	1	2	2
CLO2	2	2	2	3	2	2	1	1	2	2	1	3
CLO3	3	3	2	3	3	2	1	1	2	1	2	3

Detailed syllabus:

GFC 202, PATHOLOGY

Pathology relevant to the Cardiology lab technician course

UNIT-I **5 hours**

Collection of Blood Anti-Coagulants
Coagulation Profile; method and principles; Advantages and disadvantages Clot Retraction time; Bleeding Time, clotting time

UNIT-II **15 hours**

Blood Groups: Introduction; ABO Blood Groups in heritance of ABO Group; Techniques of Blood Grouping: Slide Method; Tube Method; Bombay; Phenotype; Clinical Significance; Minor Blood Groups
Rh – Typing: Techniques of Rh Grouping; Rh-Incompatibility; Erythroblastosis foetalis (HDN); Rh - Immunization; D4-Antigen.
Transfusion reactions and complications of blood transfusion Blood Components; Packed red

cells; Platelet
Concentrate-Appropriate uses; Granulocyte concentrate; appropriate uses; Fresh Frozen Plasma (FFP); appropriate uses; Factor VIII and Factor IX concentrate and appropriate uses; Cryoprecipitate and appropriate uses; Albumin; and Immuno globulin and other products.

UNIT-III **15 hours**

Terminologies-
Cell Injury, Degenerations, Cell death & Necrosis, Inflammation, Healing, Tuberculosis, Typhoid, Thrombosis- briefly, Embolism- briefly, Ischemia and Infraction -briefly
Derangements of body fluids
Disorders of circulation Anemia, Leukemia

Teaching-Learning Strategies

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Assessment methods and weightages

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The minimum pass marks shall be 40% (grade E) in each theory/ assignment and viva-voce (combined examination).

GFC 205, PATHOLOGY (Practical)

Practical based on the topics mentioned in the theory syllabus.

References:

Basic Pathology; by Sunil R. Lakhani
Textbook of Pathology- 8th Edition by Harsh Mohan

Course Code: 203 & 206

Title of the Course: Microbiology (Theory)

L-35 P- 50 **Credits: 3+4= 7**

(L=Lecture hours, T=Tutorial hours)

COURSE LEARNING OUTCOMES (CLOs)

After completing this Course, the students should be able to ……

CLO1 To know the infectious processes and organism, immune responses, risks to patients and personnel and universal precautions.
CLO2 To identify and remember the culture characteristics of different bacteria
CLO3 Student will be able to perform the techniques required to identify the bacteria.

Mapping of Course Outcomes (CLOs) with Program Learning Outcomes (PLOs) and Program Specific Outcomes (PSOs)

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PSO1	PSO2	PSO3	PSO4
CLO1	2	3	2	2	2	2	1	1	1	1	2	2
CLO2	2	2	2	3	2	2	1	1	2	2	1	2
CLO3	3	2	2	3	2	2	1	1	2	1	2	2

Detailed Syllabus:

GFC 203, MICROBIOLOGY

Microbiology relevant to the course
Microbiology reviews the infectious processes and organisms, immune responses, risks topatients and personnel, and universal precautions.

UNIT-I **5 hours**
Introduction to microbes, source of infection, models of spread, bacterial Cell, growthrequirements of bacteria, bacteria Cycle.

UNIT-II **5 hours**
Sterilization and Disinfection; Definition; Methods of sterilization procedures techniques anduses; Clinical Importance, Biomedical Waste & Its management

UNIT-III **15 hours**
HIV & AIDS, Hepatitis Virus; Hepatitis A; B; & C failures of various types of hepatitis virusBasic Fundamentals of Immunology
Immunological Apparatus; structure and functions, T-Cells; B-Cell

lymphocytesAntigen, Antibody, Antigen and Antibody reactions
Immunoglobulins; Classes of immunoglobulins; I_gG; I_gA; I_gM;
I_gD; I_gE;Immune Responses; Immunity; Hyper Sensitivity

UNIT-IV **10 hours**

Classification of Human Parasites
Vector and arthropods of medical importance (Mosquitoes, Fleas, Tick, Flies, Sand fly,Scabies etc)

GFC 206, MICROBIOLOGY (Practical)

Practical topics based on the topics mentioned in the theory syllabus.

Teaching-Learning Strategies

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The minimum pass marks shall be 40% (grade E) in each theory/ assignment and viva-voce (combined examination).

References:

Ramanik Sood, Laboratory Technology (Methods and Interpretations) J.P. Bros, NewDelhi
Sachdev K N, Clinical Pathology & Bacteriology J.P. Bros, New Delhi.
Basic Laboratory Methods in Parasitology, J.P. Bros, New Delhi
Ananthnarayan & Panikar, Text book of Medical Microbiology
Robert Cruckshank, Medical Microbiology – The practice ofMedical Microbiology
D.R. Arora Text book of Microbiology, CBS Publications, New Delhi
Prof. C.P. Baveja, Practical Microbiology, Arya Publications.

SEMESTER- III

Course Code: 301 & 304

Title of the Course: Medicine Relevant to Cardiac Lab Technology (Theory)

L-50 P- 50 **Credits: 4+4= 8**

(L=Lecture hours, T=Tutorial hours)

COURSE LEARNING OUTCOMES (CLOs)

After completing this Course, the students should be able to ……

CLO1 To know about epidemiology of Cardio Vascular Diseases
CLO2 To know the harmful effects of Tobacco & develop an understanding the methods of Tobacco Cessation
CLO3 Student will be able to understand and remember about the disorders of Respiratory, Renal and Central Nervous System
CLO4 To gain the knolwdge of medicine related to Cardio Vascular Diseases and apply for further.

Mapping of Course Outcomes (CLOs) with Program Learning Outcomes (PLOs) and Program Specific Outcomes (PSOs)

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PSO1	PSO2	PSO3	PSO4
CLO1	2	3	3	3	3	2	1	1	1	1	2	2
CLO2	2	2	3	3	2	2	1	1	2	2	1	2
CLO3	3	3	2	3	2	2	1	1	2	1	2	2
CLO4	2	2	3	3	3	2	1	2	2	1	2	2

Detailed Syllabus:

BCLT 301, MEDICINE- RELEVANT TO CARDIOLOGY LAB TECHNOLOGY

UNIT-I **10 hours**

Preventive Cardiology Epidemiology of CVD in India Burden of tobacco in India

Harmful effects of tobacco on health and environment Methods of tobacco cessation

Legislative and preventive program for tobacco control

UNIT-II **15 hours**

Hematology Anemia

Bleeding disorders

Laboratory tests used to diagnose bleeding disorders (in brief) Respiratory System

Chronic obstructive airway diseases (COPD)

Concept of obstructive versus restrictive pulmonary disease PFT and its interpretation

Renal System ARF & CRF

End stage renal disease

Role of dialysis and renal transplantation in its management

UNIT-III **10 hours**

CNS

Automatic nervous system

(Sympathetic & Parasympathetic system)

Brief mention of CNS disorders & their etiology

UNIT-IV **15 hours**

Diabetes Mellitus Obesity Pregnancy

Pediatric Patient (neonate/Infant) Elderly patient

BCLT 304, MEDICINE- RELEVANT TO CARDIOLOGY LAB TECHNOLOGY (Practical)

Practical based on the topics mentioned in the syllabus.

Teaching-Learning Strategies

Giving lectures to large groups of students, followed by tutorials and seminars, as well as some independent study, is the teaching approach used. However, there are a range of alternative delivery techniques that can be highly effective, and concepts like didactic learning and problem-based learning are commonly employed in teaching with the use of power point presentations, group discussions, and A/V aids.

Assessment methods and weightages

Evaluations of marks are done on internal and external assessment. Each theory course shall carry 100 marks. Of these, 75 marks shall be for semester examination and 25 marks for internal assessment. Internal assessment for 25 marks in respect of theory papers will be based on written tests, assignments, presentations, viva-voice etc.

The minimum pass marks shall be 40% (grade E) in each theory/ assignment and viva-voce (combined examination).

References: Manual of Cardiac Diagnosis by Kanu Chatterjee, Manual of Cardiovascular Medicine 4th Edition by Brian. P Griffin

Course Code: 302, & 305

Title of the Course: Cardiac Disease I (Theory)

L-30 P- 50 **Credits: 2+4= 6**

(L=Lecture hours, T=Tutorial hours)

COURSE LEARNING OUTCOMES (CLOs)

After completing this Course, the students should be able to ……

CLO1 To know about the prevalence, causes and prevention of different types of Cardiovascular Diseases
CLO2 To understand the Signs & Symptoms of Cardio Vascular Diseases
CLO3 To gain the knowledge of diagnosis, Treatment and management of Cardio Vascular Diseases & apply for further

Mapping of Course Outcomes (CLOs) with Program Learning Outcomes (PLOs) and Program Specific Outcomes (PSOs)

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PSO1	PSO2	PSO3	PSO4
CLO1	3	3	3	3	3	2	1	1	1	2	2	1
CLO2	3	3	3	3	2	3	1	1	2	2	1	1
CLO3	3	3	2	3	2	2	1	1	2	1	2	1

Detailed Syllabus:

BCLT 302, CARDIAC DISEASES-I

UNIT-I **10 hours**

Prevalence, causes and prevention of cardiovascular diseases
IHD b) RHD C) Hypertension d) CHD
Heart failure Causes, Types, symptoms and signs, diagnosis, management, prevention.
Arrhythmias- Brady and Tachy-arrhythmias, causes, diagnosis and management

UNIT-II **10 hours**

Atherosclerosis- Definition, risk factors, pathogenesis, Clinical significanc andprevention.
Coronary artery disease- Types, Causes, Symptoms and signs, diagnosis, investigations, management, complications
Hypertension- Definition, causes, signs and symptoms, diagnosis, evaluation, management.

UNIT-III **5 hours**

Pulmonary Hypertension Definition, Causes, diagnosis and treatment
Rheumatic fever- Rheumatic Heart disease, Mitral valve and aortic valve disease
Infective endocarditis

UNIT-IV **5 hours**

Congenital Heart Diseases- Common CHD, Diagnosis and management
ASD, VSD, PDA,PS, AS,
Coarctation of aorta, Dextrocardia

BCLT 305, CARDIAC DISEASES-I (Practical)

Practical based on the topics mentioned in the theory syllabus

Books recommended:

Color of Atlas Cardiovascular Disease by Glenn N Levine
Clinical Cardiology by Achyut Sarkar

Teaching-Learning Strategies

Giving lectures to large groups of students, followed by tutorials and seminars, as well as some independent study, is the teaching approach used. However, there are a range of alternative delivery techniques that can be highly effective, and concepts like didactic learning and problem-based learning are commonly employed in teaching with the use of power point presentations, group discussions, and A/V aids.

Assessment methods and weightages

Evaluations of marks are done on internal and external assessment. Each theory course shall carry 100 marks. Of these, 75 marks shall be for semester examination and 25 marks for internal assessment.

Internal assessment for 25 marks in respect of theory papers will be based on written tests, assignments, presentations, viva-voice etc.

The minimum pass marks shall be 40% (grade E) in each theory/ assignment and viva-voce (combined examination).

Course Code: 303 & 306

Title of the Course: Cardiac Disease II (Theory)

L-30 P- 50 **Credits: 2+4= 6**

(L=Lecture hours, T=Tutorial hours)

COURSE LEARNING OUTCOMES (CLOs)

After completing this Course, the students should be able to ……

CLO1 To know about the prevalence, causes and prevention of different types of Cardiovascular Diseases
CLO2 To understand the Signs & Symptoms of Cardio Vascular Diseases
CLO3 To gain the knowledge of diagnosis, Treatment and management of Cardio Vascular Diseases & apply for further.

Mapping of Course Outcomes (CLOs) with Program Learning Outcomes (PLOs) and Program Specific Outcomes (PSOs)

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PSO1	PSO2	PSO3	PSO4
CLO1	3	3	3	3	3	2	1	1	1	2	2	1
CLO2	3	3	3	3	2	3	1	1	2	2	1	1
CLO3	3	3	2	3	2	2	1	1	2	1	2	1

Detailed Syllabus:

BCLT30CARDIAC DISEASES-II

UNIT-I **10 hours**

Cardiomyopathies- Dilated Cardiomyopathy, Hypertrophic Cardiomyopathy, RestrictiveCardiomyopathy
Pericardial diseases- Acute Pericarditis, Pericardial effusion,
Pericardial tamponade chronicconstrictive pericarditis

UNIT-II **5 hours**

Peripheral vascular diseases
Anaemia

UNIT-III **5 hours**

Chronic obstructive Lung disease

UNIT-IV **10 hours**

Acute and chronic renal failure
Fluid therapy
Central venous lines, Interpretation of Investigation reports

BCLT 306, CARDIAC DISEASES-II (Practical)

Practical based on the topics mentioned in the theory syllabus

Teaching-Learning Strategies

Giving lectures to large groups of students, followed by tutorials and seminars, as well as some independent study, is the teaching approach used. However, there are a range of alternative delivery techniques that can be highly effective, and concepts like didactic learning and problem-based learning are commonly employed in teaching with the use of power point presentations, group discussions, and A/V aids.

Assessment methods and weightages

Evaluations of marks are done on internal and external assessment. Each theory course shall carry 100 marks. Of these, 75 marks shall be for semester examination and 25 marks for internal assessment.

Internal assessment for 25 marks in respect of theory papers will be based on written tests, assignments, presentations, viva-voice etc.

The minimum pass marks shall be 40% (grade E) in each theory/ assignment and viva-voce (combined examination).

References:

Braunwald's Heart Diseases- Medicine, 2-Volume set
Illustrated guide to Cardiovascular Disease by Glenn N Levine

SEMESTER- IV

Course Code: 401 & 404

Title of the Course: Basics of Cardiac Lab Technology (Theory)

L-35 P- 50 **Credits: 3+4**

(L=Lecture hours, T=Tutorial hours)

COURSE LEARNING OUTCOMES (CLOs)

After completing this Course, the students should be able to ……

CLO1 To know about the use of Electro- Medical equipments and their safe guards
CLO2 To understand and remember the concepts of ICU/CCU and recovery room concepts
CLO3 To gain the knowledge BLS & ACLS, Cardiac Monitoring and apply for further

Mapping of Course Outcomes (CLOs) with Program Learning Outcomes (PLOs) and Program Specific Outcomes (PSOs)

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PSO1	PSO2	PSO3	PSO4
CLO1	2	3	1	1	1	1	3	3	1	2	2	3
CLO2	2	3	1	1	1	1	3	3	1	2	2	3
CLO3	2	3	1	1	2	1	3	3	1	2	2	3

Detailed Syllabus:

BCLT 401, BASICS OF CARDIAC TECHNOLOGY

Electricity & electro medical equipments & their safe guards
Basics of electricity &functioning of electro medical equipments
Earthing & care of apparatus, Static electricity **10 hours**

Intensive coronary unit & recovery room concepts **5 hours**

Trans-oesophageal Cardiopulmonary resuscitation –Basic cardiac life support - Advanced cardiac life support **5 hours**

Management of Cardiac arrest- definition, causes, external cardiac message, artificial respiration & other drugs &
Procedures used in the management of cardiac arrest. **3 hours**

Cardiac monitoring –definition, purpose of cardiac monitoring, How to recognize variousarrhythmias **5 hours**

Use of Defibrillator-Indications, how to use the defibrillator Complications during theprocedure & its management **5 hours**

Radiation Hazard & safety **2 hours**

BCLT 404, BASICS OF CARDIAC TECHNOLOGY

Practical based on the topics mentioned in the theory syllabus

References:

Textbook of Cardiovascular Technology by Bronson, Lynn

Teaching-Learning Strategies

Giving lectures to large groups of students, followed by tutorials and seminars, as well as some independent study, is the teaching approach used. However, there are a range of alternative delivery techniques that can be highly effective, and concepts like didactic learning and problem-based learning are commonly employed in teaching with the use of power point presentations, group discussions, and A/V aids.

Assessment methods and weightages

Evaluations of marks are done on internal and external assessment. Each theory course shall carry 100 marks. Of these, 75 marks shall be for semester examination and 25 marks for internal assessment.

Internal assessment for 25 marks in respect of theory papers will be based on written tests, assignments, presentations, viva-voice etc.

The minimum pass marks shall be 40% (grade E) in each theory/ assignment and viva-voce (combined examination).

Course Code: 402 & 405

Title of the Course: Electrocardiography ECG (Theory)

L-35 P- 50 **Credits: 3+4= 7**

(L=Lecture hours, T=Tutorial hours)

COURSE LEARNING OUTCOMES (CLOs)

After completing this Course, the students should be able to ……

CLO1 To know about the Basic principles of electrocardiogram
CLO2 To understand the leads, ECG waves and intervals, Rate and rhythm and How to recognize the Cardio Vascular Disorders
CLO3 To remember the position of electrodes and perform the Electrocardiography, TMT & Holter Tests

Mapping of Course Outcomes (CLOs) with Program Learning Outcomes (PLOs) and Program Specific Outcomes (PSOs)

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PSO1	PSO2	PSO3	PSO4
CLO1	2	3	1	1	1	1	3	3	1	2	2	3
CLO2	2	3	1	1	1	1	3	3	1	2	2	3
CLO3	2	3	1	1	2	1	3	3	1	2	2	3

Detailed Syllabus:

BCLT 402, ELECTROCARDIOGRAPHY

UNIT-I **10 hours**

Basic principles, Electrocardiographic paper The Electrocardiograph,
The Electrical field ofHeart
The leads, standard limb lead, Precardial lead, ‘V’ lead & ‘AV’ lead Basic ECG deflections. Normal ECG The ‘P' wave The ‘QRS’ complex T wave, the S-T segment, P-R segment The‘U’ wave Rate & rhythm Rotation of the heart, The Q-T interval.

UNIT-II **15 hours**

Abnormal ECG
Exercise stress Testing, Exercise protocols, Electrocardiographic measurements, Exercise testing-Indication and techniques. ECG in myocardial infarction
Study of various major ECG abnormalities including types of conduction blocks, Hypertrophy, WPW, COPD, Valvular diseases, SSS, Tachycardia, its varieties, Pre-mature beats.

Coronary Artery Disease

UNIT-III **5 hours**

Effect of various Cardio-toxic drugs on ECG,
Effects of Electrolyte disturbance of ECG effect of hyper hypothermia.Disease of Heart & ECG

UNIT-IV **5 hours**

Interpretation of TMT report- Criteria for TMT positive test, contra indication of TMT, conditions where TMT is not useful, complications that may occur in TMT room and its management
Myocardial perfusion scan- procedures & usefulness of Myocardial perfusion scan. Holter Monitoring- procedure & and usefulness.

BCLT 405, ELECTROCARDIOGRAPHY (Practical)

Practical based on the topics mentioned in the theory syllabus

Books recommended

Stress testing –Principles & Practice,
Myrvin H. ElustadScuamroth- ECG
Marriott's Practical Electrocardiography
EKG interpretation by Nathan Orwell
The ECG made easy Ninth Edition

Teaching-Learning Strategies

Giving lectures to large groups of students, followed by tutorials and seminars, as well as some independent study, is the teaching approach used. However, there are a range of alternative delivery techniques that can be highly effective, and concepts like didactic learning and problem-based learning are commonly employed in teaching with the use of power point presentations, group discussions, and A/V aids.

Assessment methods and weightages

Evaluations of marks are done on internal and external assessment. Each theory course shall carry 100 marks. Of these, 75 marks shall be for semester examination and 25 marks for internal assessment.
Internal assessment for 25 marks in respect of theory papers will be based on written tests, assignments, presentations, viva-voice etc.
The minimum pass marks shall be 40% (grade E) in each theory/ assignment and viva-voce (combined examination).

Course Code: 403 & 406

Title of the Course: Echocardiography ECHO (Theory)

L-35 P- 50 **Credits: 3+4= 7**

(L=Lecture hours, T=Tutorial hours)

COURSE LEARNING OUTCOMES (CLOs)

After completing this Course, the students should be able to ……

CLO1 To know about the Basic principles of Ultrasound, Echo Instrumentation, M-Mode & Echocardiographic Windows
CLO2 To understand the Selection of Transducer, Positioning of Patient and features appear during different structural cardiac disorders
CLO3 To remember the position of transducer and perform the Echocardiography Tests

Mapping of Course Outcomes (CLOs) with Program Learning Outcomes (PLOs) and Program Specific Outcomes (PSOs)

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PSO1	PSO2	PSO3	PSO4
CLO1	2	3	2	1	1	2	3	3	1	2	2	3
CLO2	2	2	2	2	1	1	3	3	1	2	2	3
CLO3	2	3	1	2	2	1	3	3	1	2	2	3

Detailed Syllabus:

BCLT 403, ECHOCARDIOGRAPHY-I

UNIT-I **15 hours**

Echocardiography- Basic principles of ultrasound, M-Mode Echocardiography, Two dimensional Echocardiography, Doppler Echocardiography, colour flow, Echocardiography
Instrumentation: Basic pulse Echo system, Transducer, Pulse generation, Echo detection, Echo displays, A mode, B mode, M-mode, Display & recording
Echo-cardiographic Examination: Selecting transducers, Position of the patient, Placement ofthe transducer, Setting control, M-Mode labeling, 2 D Echo, Normal variants, Terminology, Identification of segments, Doppler Echocardiography

UNIT-II **15 hours**

Echo in rheumatic heart disease-Echo in mitral stenosis, mitral incompetence, aortic stenosis, aortic incompetence, pulmonary hypertension, post MVR, Post AVR. Prosthetic valve Malfunction, LA clot.

Echo in congenital heart disease- Echo in ASD, VSD, PDA, pulmonary stenosis, aortic stenosis, Coarctation of aorta, TOF, Dextrocardia.
Echo in ischemic heart disease- Echo in acute myocardial infarction, old myocardial infarction & other ischemic heart disease related conditions, LV aneurysm.

UNIT-III **5 hours**

Echo in other cardiovascular disease-
Echo in various types of Cardiomyopathy, infective endocarditis, diseases of aorta, Mitral valve prolapse, Myxoma & other cardiovascular diseases

BCLT 406, ECHOCARDIOGRAPHY-I (Practical)

Practical based on the topics mentioned in the theory syllabus

Teaching-Learning Strategies

Giving lectures to large groups of students, followed by tutorials and seminars, as well as some independent study, is the teaching approach used. However, there are a range of alternative delivery techniques that can be highly effective, and concepts like didactic learning and problem-based learning are commonly employed in teaching with the use of power point presentations, group discussions, and A/V aids.

Assessment methods and weightages

Evaluations of marks are done on internal and external assessment. Each theory course shall carry 100 marks. Of these, 75 marks shall be for semester examination and 25 marks for internal assessment.
Internal assessment for 25 marks in respect of theory papers will be based on written tests, assignments, presentations, viva-voice etc.
The minimum pass marks shall be 40% (grade E) in each theory/ assignment and viva-voce (combined examination).

References:

Echo made easy by Atul Luthra
Textbook of Clinical Echocardiography by Catherine Otto

SEMESTER- V

Course Code: 501 & 504

Title of the Course: Echocardiography II (Theory)

L-35 P- 50 **Credits: 3+4= 7**

(L=Lecture hours, T=Tutorial hours)

COURSE LEARNING OUTCOMES (CLOs)

After completing this Course, the students should be able to ……

CLO1 To know about the Trans- oesophageal Echocardiography, Stress Echo, Doppler & Contrast Echocardiography
CLO2 To understand the Echo in different types of Cardiac Abnormalities & 3D echo
CLO3 To assess the cardiac functions with the help of echocardiogram and perform the TEE

Mapping of Course Outcomes (CLOs) with Program Learning Outcomes (PLOs) and Program Specific Outcomes (PSOs)

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PSO1	PSO2	PSO3	PSO4
CLO1	2	3	2	1	1	2	3	3	1	2	2	3
CLO2	2	2	2	2	1	1	3	3	1	2	2	3
CLO3	2	3	1	2	2	1	3	3	1	2	2	3

Detailed Syllabus:

BCLT 501, ECHOCARDIOGRAPHY-II

UNIT-I **10 hours**

Trans esophageal echocardiogram- indications, procedures, usefulness & complications, one may encounter and its management.
Stress Echo- procedure & indications.
Fetal echocardiogram- procedure, basic interpretation

UNIT-II **15 hours**

Peripheral Doppler- procedure & usefulness of peripheral Doppler
Assessment of cardiac function- measurements of all cardiac chambers and assessment of cardiac function

UNIT-III **5 hours**

Contrast Echo cardiogram-Procedure & usefulness of Contrast Echo cardiogram.Myocardial Contrast Echo- Basic knowledge

UNIT-IV **10 hours**

Echo in pericardial disease-pericardial effusion, cardiac tamponade, constrictive pericarditis.

1) 3D Echo
2) Other latest developments in the field of Echocardiogram

BCLT 504, ECHOCARDIOGRAPHY-II

Practical based on the topics mentioned in the theory syllabus

References:

The practice of Clinical Echocardiography by Catherine Otto
The EACVI Textbook of Echocardiography

Teaching-Learning Strategies

Giving lectures to large groups of students, followed by tutorials and seminars, as well as some independent study, is the teaching approach used. However, there are a range of alternative delivery techniques that can be highly effective, and concepts like didactic learning and problem-based learning are commonly employed in teaching with the use of power point presentations, group discussions, and A/V aids.

Assessment methods and weightages

Evaluations of marks are done on internal and external assessment. Each theory course shall carry 100 marks. Of these, 75 marks shall be for semester examination and 25 marks for internal assessment.

Internal assessment for 25 marks in respect of theory papers will be based on written tests, assignments, presentations, viva-voice etc.

The minimum pass marks shall be 40% (grade E) in each theory/ assignment and viva-voce (combined examination).

Course Code: 502, & 505

Title of the Course: Cardiac Catheterization I (Theory)

L-35 P- 50 **Credits: 3+4= 7**

(L=Lecture hours, T=Tutorial hours)

COURSE LEARNING OUTCOMES (CLOs)

After completing this Course, the students should be able to ……

CLO1 To know the basics of Cardiac Cath Lab, Material and equipments used, Sterilization. Identification of materials & equipments
CLO2 To understand the Fluoroscopic Imaging System and angiographic views prior to Cardiac Cath Procedures
CLO3 To remember the use of different types of materials used in Cardiac Cath Lab
CLO4 To assist the doctor at Cath lab and to handle the C arm machine to perform different procedures

Mapping of Course Outcomes (CLOs) with Program Learning Outcomes (PLOs) and Program Specific Outcomes (PSOs)

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PSO1	PSO2	PSO3	PSO4
CLO1	2	3	2	1	1	2	3	3	1	2	2	3
CLO2	2	2	2	2	1	1	3	3	1	2	2	3
CLO3	2	3	1	2	2	1	3	3	1	2	2	3
CLO4	2	3	2	2	2	1	1	1	2	2	2	3

Detailed Syllabus:

BCLT 502, CARDIAC CATHETERIZATION-I

UNIT-I **10 hours**

Preparation for Cath procedure and post procedure care
Cardiac Catheterization laboratory- General details of Cardiac Catheterization equipment, how tohandle the machine, common problems, one may come across and how to overcome it

UNIT-II **15 hours**

Radiation hazards
Materials used in the Cath Lab- All catheters , balloons, guidewires, pacemakers, contrast materials &other materials used in the Cardiac Catheterization Laboratory and Sterilization of all these materials.

UNIT-III **10 hours**

Right heart Catheterization- procedure, cath position, Oxymetry at various levels, angios done & itsinterpretation

Left heart catheterization- procedure, cath position, Oxymetry at various levels, angios done & itsinterpretation.

BCLT 505, CARDIAC CATHETERIZATION-I (Practical)

Practical based on the topics mentioned in the theory syllabus

References:

Cath lab practical's by Sudeep Mishra

Kern's Cardiac Cath Handbook 7th Edition

Teaching-Learning Strategies

Giving lectures to large groups of students, followed by tutorials and seminars, as well as some independent study, is the teaching approach used. However, there are a range of alternative delivery techniques that can be highly effective, and concepts like didactic learning and problem-based learning are commonly employed in teaching with the use of power point presentations, group discussions, and A/V aids.

Assessment methods and weightages

Evaluations of marks are done on internal and external assessment. Each theory course shall carry 100 marks. Of these, 75 marks shall be for semester examination and 25 marks for internal assessment.

Internal assessment for 25 marks in respect of theory papers will be based on written tests, assignments, presentations, viva-voice etc.

The minimum pass marks shall be 40% (grade E) in each theory/ assignment and viva-voce (combined examination).

Course Code: 503 & 506

Title of the Course: Cardiac Catheterization II (Theory)

L-35 P- 50 **Credits: 3+4= 7**

(L=Lecture hours, T=Tutorial hours)

COURSE LEARNING OUTCOMES (CLOs)

After completing this Course, the students should be able to ……

CLO1 To know the basics of Cardiac Cath Lab, Material and equipments used, Sterilization. Identification of materials & equipments

CLO2 To understand the Fluoroscopic Imaging System and angiographic views prior to Cardiac Cath Procedures

CLO3 To remember the use of different types of materials used in Cardiac Cath Lab

CLO4 To assist the doctor at Cath lab and to handle the C arm machine to perform different procedures

Mapping of Course Outcomes (CLOs) with Program Learning Outcomes (PLOs) and Program Specific Outcomes (PSOs)

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PSO1	PSO2	PSO3	PSO4
CLO1	2	3	2	1	1	2	3	3	1	2	2	3
CLO2	2	2	2	2	1	1	3	3	1	2	2	3
CLO3	2	3	1	2	2	1	3	3	1	2	2	3
CLO4	2	3	2	2	2	1	1	1	2	2	2	3

Detailed Syllabus:

BCLT 503, CARDIAC CATHETERIZATION-II

UNIT-I **10 hours**

Coronary Angiogram-procedure, materials used, type & amount of dye used, indications & contra indications, various pictures recorded in various angles and gross interpretation.
Peripheral Angiogram- procedure, indication & contra indication

UNIT-II **10 hours**

Coronary Angioplasty- procedure, materials used, complications one may encounter and how to manage it.
Peripheral Angioplasty- materials used & procedure. Angioplasty of coarctation of aorta
Valvuloplasties- procedure, indications, complications and preparation of balloons, mitral valvuloplasty, balloon aortic valvuloplasty, Balloon pulmonary valvuloplasty & Balloon tricuspid valvuloplasty

UNIT-III **15 hours**

Coil closure & device closure of PDA- procedure, indications & materials used for coil & device closure of PDA
Device Closure of ASD- procedure, indications & materials used for device closure of ASD
Device Closure of VSD procedure, indications & materials used for & device closure of VSD
Electrophysiological studies-basic knowledge of electrophysiological studies

BCLT 506, CARDIAC CATHETERIZATION-II (Practical)

Practical based on the topics mentioned in the theory syllabus

Teaching-Learning Strategies

Giving lectures to large groups of students, followed by tutorials and seminars, as well as some independent study, is the teaching approach used. However, there are a range of alternative delivery techniques that can be highly effective, and concepts like didactic learning and problem-based learning are commonly employed in teaching with the use of power point presentations, group discussions, and A/V aids.

Assessment methods and weightages

Evaluations of marks are done on internal and external assessment. Each theory course shall carry 100 marks. Of these, 75 marks shall be for semester examination and 25 marks for internal assessment.
Internal assessment for 25 marks in respect of theory papers will be based on written tests, assignments, presentations, viva-voice etc.
The minimum pass marks shall be 40% (grade E) in each theory/ assignment and viva-voce (combined examination).

References:

The Cardiac Catheterization Handbook by Morton J Kern

Essential Cardiac Catheterization by Rob Buttler

Textbook of Interventional Cardiology by Samir Kapadia'

Atlas of Catheterization and Interventional Cardiology by Mauro Moscucci

Grossmans' and Baims' Cardiac Catheterization, Angiography and Intervention 9th Edition

SEMESTER- VI

Course Code: 601

Title of the Course: Project & Viva Voce

P- 780 **Credits: 52**

(L=Lecture hours, T=Tutorial hours)

COURSE LEARNING OUTCOMES (CLOs)

After completing this Course, the students should be able to ……

CLO1 Identify and investigate a research problem
CLO2 Apply an appropriate research design and associated methods rigorously
CLO3 Collect patient data to design a conclusion on a given research topic
CLO4 Able to perform quantitative analysis of specimen.

Mapping of Course Outcomes (CLOs) with Program Learning Outcomes (PLOs) and Program Specific Outcomes (PSOs)

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PSO 1	PSO 2	PSO 3	PSO 4
CLO 1	2	3	2	1	1	2	3	3	1	2	2	2
CLO 2	2	2	2	2	1	1	3	3	1	2	2	3
CLO 3	2	3	1	2	2	1	3	3	1	2	2	3
CLO 4	1	2	2	2	2	1	1	1	1	2	2	2

Detailed Syllabus:

BCLT-601 Assignment & Viva-Voce

1 year mandatory Internship