Curriculum and Credit Framework

As per NEP 2020

For

B.Sc. Cardiac Care Technology (BCCT)

(To be effective from the Academic Session 2023-24)

Faculty of Life Sciences

Gurugram University, Gurugram

(A State Govt. University Established Under Haryana Act 17 of 2017)

SEM 1

Course Code	Course Title	Course ID	L	T	P	Credits	TE	TI	PE	PI	Total
Discipline Specific Courses (DSC)											
240/BCCT/CC/101	General Anatomy-I-Theory		2	1	-	3	50	25	-	-	75
240/ BCCT /CC/101	General Physiology-I – Theory		2	1	-	3	50	25	-	-	75
240/ BCCT /CC/101	General Biochemistry		3	-	-	3	50	25	-	-	75
240/ BCCT /CC1201	General Biochemistry - Practical		3	-	-	3	50	25	-	-	75
240/ BCCT /CC/101	General Anatomy-I- Practical		-	-	4	2	-	-	35	15	50
240/ BCCT /CC/101	General Physiology-I- Practical		-	-	4	2	-	-	35	15	50
Minor (MIC) /Vocational Courses (VOC)											
240/ BCCT /MI/101	Digital Marketing		1	1		2	35	15	-	-	50
Ability Enhancement Course (AEC)											
240/ BCCT /AE/101	English & Communication Skill-Theory		2			2	35	15	-	-	50
Skill Enhancement Course (SEC)/ Internship/Dissertation											
240/ BCCT /SE/101	Basic in Computer& Information Science- Theory		3			3	35	15	-	-	50
Value Addition Course(s)											
240/ BCCT /VA/101	Clinical Education –I(studentship)				15	5	-	-	-	-	-
Total Credits						28	**Total Marks**			550	

SEM 3

Course Code	Course Title	Course ID	L	T	P	Credits	TE	TI	PE	PI	Total
Discipline Specific Courses (DSC)											
240/BCCT /CC/301	Applied Anatomy, Physiology, Pharmacology in Cardiac care		3	-	-	3	50	25	-	-	75
240/ BCCT /CC/302	Basic Electrocardiography		2	1	-	3	50	25	-	-	75
240/ BCCT /CC/303	Basic Echocardiography		2	1	-	3	50	25	-	-	75
240/ BCCT /CC/305	Basic Electrocardiography- Practical		-	-	4	2	-	-	35	15	50
240/ BCCT /CC/306	Basic Echocardiography- Practical		-	-	4	2	-	-	35	15	50
Minor (MIC) / Vocational Courses (VOC)											
240/ BCCT /MI/301	Pursuit of Inner Self Excellence(POIS)		3	-	-	3	50	25	-	-	75
Multidisciplinary courses(MDC)											
240/BCCT /MD/301	Organizational Behavior		2	-	-	2	35	15	-	-	50
Value Addition Course(s)											
240/ BCCT /va/301	CCT Directed Clinical Education-I		-	-	15	5	-	-	-	-	-
Total Credits						**23**	**Total Marks**			**450**	

SEM 5

Course Code	Course Title	Course ID	L	T	P	Credits	TE	TI	PE	PI	Total
Discipline Specific Courses (DSC)											
240/BCCT /CC/501	Advance Electrocardiography		3	-	-	3	50	25	-	-	75
240/ BCCT /CC/502	Advance Echocardiography		2	1	-	3	50	25	-	-	75
240/ BCCT /CC/503	Invasive cardiology		2	1	-	3	50	25	-	-	75
240/ BCCT /CC/505	Advance Electrocardiography- Practical		-	-	4	2	-	-	35	15	50
240/ BCCT /CC/506	Advance Echocardiography- Practical		-	-	4	2	-	-	35	15	50
Minor (MIC) / Vocational Courses (VOC)											
240/ BCCT /MI/501	Basic of Clinical Skill Learning		3	-	-	3	50	25	-	-	75
Multidisciplinary courses(MDC)											
240/BCCT /MD/501	Hospital Operation Management		2	-	-	2	35	15	-	-	50
Value Addition Course(s)											
240/ BCCT /VA/501	CCT Directed Clinical Education-III		-	-	15	5	-	-	-	-	-
Total Credits						**23**	**Total Marks**			**450**	

SEMESTER-I

Nameofthe Programme	**B.Sc.Cardiac CareTechnology**
Nameofthe Course	General Anatomy

TeachingObjective	Tointroducethestudentstotheconceptsrelatedto Generalanatomy, Muscular, Respiratory, Circulatory, Digestive and Excretory system
Learning Outcomes	Comprehendthenormaldisposition;interrelationships, gross,functional and applied anatomy of various structures in the human body. Demonstrateandunderstandthebasicanatomyof Respiratoryand Circulatorysystem Demonstrateandunderstandthebasicanatomyof Digestiveand Excretorysystem

S.No.	Topics	
1	**IntroductiontoAnatomical termsofthehumanbody**-Basicanatomicalterminology, anatomical position, anatomical planes, and levels oforganization inthebody, organsystems, skeleton, and cavities ofthebody. **Organization of the humanbodyat the cellularlevel**-Structureof the cell comprising of cell membrane, cytoplasm, cell organelles, nucleus, cell extensions etc.Organization of the human body at the tissue level- Epithelial, Connective, Muscular& Nervous tissue.	
2	**Blood**-Compositionofblood Featuresofredbloodcells,whitebloodcells, platelets. **Lymphatic system** - Features of lymph vessels, lymphatic tissue & organs, lymphatic, spleen, tonsil, thymus. **Nervous system** - Central nervous system, brain, cerebellum, spinal cord, cranial nerves, autonomic nervous system. **Muscular system**-Skeletalmuscle,cardiacmuscle,smooth muscle, muscles of thebody. **Skeletalsystem**-Featuresofbones,axialskeleton,appendicularskeleton, Musculoskeletalsystem-Jointsofupper&lower limb.	
3	**Respiratorysystem**-Nose&paranasalsinuses, pharynx, larynx, trachea, lungs. **Cardiovascularsystem**-Hear&bloodvessels. **Digestivesystem**-Oralcavity, pharynx, salivary glands, esophagus, stomach, small intestine, Large intestine, Liver, Gallbladder. **Urinarysystem**-Kidneys,juxtaglomerularapparatus,ureters,urinarybladder,urethra.	

4	**Introduction to genetics**- Features of chromosomes, DNA. **Reproductive system in females**- External & internal genital organs, breast. **Reproductivesysteminmales**- Penis,scrotum,testes,prostategland. **Endocrine system** Hormones, pituitary gland, thyroid gland, parathyroid glands, adrenal glands, endocrine pancreas. **Specialsenses**-Olfactorysystem,tasteapparatus,externalmiddle&internal ear,eye. **Skin**-Featuresofskin, hair,sebaceousglands,sweatglands,nails.	
	Total	

Referencebooks:

1. SampathMadhyastha'sManipalmanual ofanatomyforalliedhealthsciences
2. KrishnaGarg&MadhuJoshi'sPracticalanatomyworkbook
3. Dixit'sAtlasofHistologyforMedicalStudents
4. BasicHistology:AColorAtlas&Text
5. Jana'sExamOrientedPracticalAnatomy
6. Krishan'sAnatomyMnemonics

General Anatomy **Part I-(Demonstration)**

Sr.No.	Topics	
1.	Demonstration of various parts of body	
2.	Demonstration of tissues of body	
3.	Demonstration of parts of digestive system	
4.	Demonstration of parts of respiratory system	
5.	Demonstration of parts of skin	
6.	Demonstration of parts of excretory system	
7.	Demonstrationofvariouspartsofcirculatorysystem(demonstrationfrommodels)	
8.	Examination of blood film for various blood cells from stained slides	
9.	Blood pressure estimation	

TextBooks:

1. ManipalManualofAnatomyforAlliedHealthSciencescourses: MadhyasthaS.
2. G.J.Tortora&N.PAnagnostakos:PrinciplesofAnatomyandPhysiology
3. B.D.Chaurasia:HandbookofGeneralAnatomy

Nameofthe Programme	**B.Sc.Cardiac Care Technology**
Nameofthe Course	**General Physiology PartI**

Teachingobjective	To teach basic physiological concepts related to General physiology, Haematology, Nerve-Musclephysiology,Cardiovascular,Digestive&Respiratoryphysiology
Learningoutcomes	Tounderstandthebasicphysiologicalconceptsof Generalphysiology Tounderstand thebasicphysiologicalconceptsofHematology Tounderstandthebasicphysiologicalconceptsof Nerve-Muscle physiology Tounderstandthebasicphysiologicalconceptsof Respiratory physiology To understand thebasicphysiologicalconceptsofCardiovascular physiology

S.No.	Topics	
1	**Introductionto physiologyof the humanbody** –Compositionof body, Homeostasis, Introduction to chemistry of life. **Organizationofthehumanbodyatthecellularlevel**-Functionoflipids, carbohydrates, proteins & cell organelles. **Organizationofthehumanbodyatthetissuelevel**-FunctionofEpithelial, Connective, Muscular & Nervous tissues.	
2	**Blood**-Haemopoesis,haemostasis,coagulationofblood,bloodtransfusion. **Lymphatic system**-Function oflymph vessels, lymphatic tissue &organs, lymphatic, spleen, tonsil, thymus. **Resistance&immunity**-Innate immunity, acquiredimmunity,humoral&cell mediated immunity.	
3	**Nervous system** -Properties of nerve fibers, function of neuralgia, synapse, CNS, CSF, brain, cranialnerves, demonstration of reflexes. **Muscularsystem**-Propertiesofskeletalmuscle,cardiacmuscle,smoothmuscle, muscles of the body. **Skeletalsystem**-Functionsofbones, axial skeleton,appendicularskeleton. **Musculoskeletalsystem**-Movementinthejoints ofupper&lower limb.	
4	**Respiratory system**-Physiology ofrespiration, pulmonary function tests,gas exchange inlungs, transport of gases between lungs & tissues, regulation of respiration. **Cardiovascularsystem**-Heart&bloodvessels:Systemiccirculation,pulmonary circulation, ECG, cardiac output, blood pressure. **Digestivesystem** –Processofdigestion, function foralcavity,pharynx'ssalivary glands, esophagus, stomach, smallintestine, largeintestine, liver, gallbladder, and pancreas. **Urinary system** - Function of kidneys, juxtaglomerular apparatus, ureters, urinary bladder, urethra, physiology of urine formation, glomerular filtration, tubular re-absorption, water balance, maturation. **Introductiontogenetics**-Featuresofchromosomes,DNA,proteinsynthesis,dominant Inheritance,recessiveinheritance,sexlinkedinheritance.	

	Reproductivesystem-female: Physiologyoffemalereproductivesystem. **Reproductivesystem-male:**Physiologyofmalereproductivesystem. **Endocrine system** - Mechanism of action of hormones, function of pituitary gland, thyroid gland, parathyroid glands, adrenal glands, endocrine pancreas. **Specialsenses**-Physiologyofolfaction,taste,hearing,balance&vision. **Skin** - Function of skin, hair, sebaceous glands, sweat glands, nails, temperature regulation.	

ReferenceBooks:

1. CCChatterjee'sHumanPhysiology
2. CCChatterjee'sPracticalPhysiologyforParamedicalCourses
3. CNChandra Shekhar's ManipalManualofMedicalPhysiology
4. RKMaurya'sMedicalPhysiology

General Physiology Part I (Demonstration)

S.No.	Topics	
1	StudyofMicroscopeandits use,CollectionofBloodandstudyofHaemocytometer	
2	Haemoglobinometry	
3	WhiteBloodCellcount	
4	RedBloodCellcount	
5	DeterminationofBloodGroups	
6	Leishman'sstainingandDifferentialWBCCount	
7	DeterminationofBleedingTime, DeterminationofClottingTime	
8	Pulse&BloodPressureRecording,AuscultationforHeart Sounds	
9	ArtificialRespiration–Demonstration,Spirometry-Demonstration	

Textbooks

1. BasicsofmedicalPhysiology–DVenkateshandH.HSudhakar, 3rdedition.
2. PrinciplesofPhysiology–DevasarePramanik, 5th edition.
3. HumanPhysiologyforBDS –DrA.K.Jain,5th edition.
4. TextbookofhumanPhysiologyfordentalstudents-Indukhurana2nd edition.
5. EssentialsofmedicalPhysiology fordentalstudents–Sembulingum.

NameoftheProgramme	B.Sc.Cardiac Care Technology
NameoftheCourse	General Biochemistry

Teaching Objective	Attheendofthecourse,thestudentdemonstrateshisknowledgeand understanding on: Structure, function and interrelationship of biomoleculesandconsequencesofdeviationfrom normal. Integrationofthevariousaspectsofmetabolism,andtheir regulatorypathways. Principles of various conventional and specialized laboratoryinvestigationsandinstrumentation, analysis and interpretation ofagiven data. Todiagnosevariousnutritional deficiencies Identifyconditionand plan fordiet Providehealtheducationbaseontheclientdeficiencies
Learning Outcomes	Define"biochemistry." Identify the fiveclasses of polymericbimolecularandtheirmonomericbuildingblocks. Explainthe specificityof enzymes (biochemical catalysts), andthe chemistry involved in enzyme action. Explainhowthe metabolismofglucose leadssultimatelytothe generation of large quantities of ATP. Describehowfatsandaminoacidsaremetabolized,andexplainhow they can be used for fuel. Describethestructure ofDNA,andexplainhow itcarriesgenetic information in its base sequence. DescribeDNAreplication. DescribeRNAand proteinsynthesis. Explainhowproteinsynthesiscanbecontrolledatthelevelof transcription and translation. Summarizewhat iscurrentlyknown about the biochemicalbasisof cancer.

Sr. No.	Topics	
1	IntroductiontoMedicallab.Technology,RoleofMedicallabTechnologist Safetymeasures,Firstaid Cleaningandcareofgeneral laboratoryglasswareandequipment:Stepsinvolved incleaning soda lime glass;Steps involved in cleaning borosil glass Preparationofchromic cid solution,Storage	
2	Method of preparation of distilled water,Type ofwater distillation plants, Storage of distilled water UnitsofMeasurement:S.IunitandCGSunits,Conversion Strength,molecularweight,equivalentweight Normality,Molarity, Molality,Numerical	
3	Calibrationofvolumetricapparatus:Flask,Pipettes,Burettes,Cylinders Analyticalbalance:Principle,Working,Maintenance Conceptof pH:Definition,HendersonHasselbatchequation,Pkavalue,pHindicator Methods of measurement of pH:pHpaper,pHmeter,Principle, working, maintenance and calibration of pH meter Volumetricanalysis:Normalandmolarsolutions Standardsolutions Preparationofreagents Storage of Chemicals	
4	Osmosis:Definition,Typesofosmosis,Factorsaffectingosmoticpressure Specimen collection and Processing ofBlood, Urine and CSF, Separation of Serum and Plasma forBiochemic Analysis. Deproteinizationofsample,HandlingofspecimensforTesting,Transportof specimen Preservationofspecimen,FactorsaffectingtheClinicalresults,EffectsofStorageonsample	
Total		

General Biochemistry(Demonstration)

S.No.	Topics	
1	Cleaningofthelaboratory glassware(Volumetricandnon-volumetric)	
2	Preparationofdistilledwater	
3	Principle,workingandmaintenanceofpHmeter.	
4	Toprepare0.1NNaOHsolution.	
5	Toprepare0.2NHClsolution.	
6	Toprepare0.1molarH2SO4	
7	Toprepare0.2Molar Sodiumcarbonatesolution.	
8	Demonstrationofosmosisanddialysis.	

Textbooks:

a. TextbookofMedicalLaboratoryTechnology,Volume 1,3rd EditionbyPrafulGhodkar
b. TextbookofMedicalLaboratoryTechnology,Volume2,3rd EditionbyPrafulGhodkar
c. MedicalLaboratoryTechnology(Volume1):ProcedureManualfor Routine Diagnostic, KanaiMukharjee
d. MedicalLaboratoryTechnology(Volume2):ProcedureManualfor Routine Diagnostic, KanaiMukharjee
e. MedicalLaboratoryTechnology(Volume3):ProcedureManualfor Routine Diagnostic, KanaiMukharjee
f. EssentialsofBiochemistry, SecondEdition, Dr.(Prof)Satyanarayana
g. EssentialsofBiochemistry, 2nd Edition,Dr.PankajaNaik
h. PrinciplesandTechniquesofBiochemistryandMolecular Biology, 5Th Edition, Wilson &Walker

Referencebooks:

- AnIntroductiontoChemistry,8th EditionbyMarkBishop
- ClinicalChemistrymadeeasy,1st EidtionbyHughes
- TietzFundamentalsofClinicalChemistry,7th EditionbyCarlBurtis

Nameofthe Programme	**B.Sc. Cardiac Care Technology**
Nameofthe Course	**Basic in Computer & Information Science**
TeachingObjective	Thecoursehasfocusoncomputerorganization.computeroperatingsystemandsoftware, andMSwindows, Wordprocessing, Exceldataworksheet andPowerPoint presentation. Thestudentswillbeabletoappreciatetheroleofcomputertechnologyandsomeextentable to gain hand-on experience in usingcomputers.
LearningOutcomes	After successful completion of this course students will able to: Do basic assembly of the desktop system Do effectively MS office Do use of internet in effective & meaningful way

Sr. No.	Topics	
1	BasicLanguageSkills:GrammarandUsage. Business Communication Skills.Withfocusonspeaking-Conversations,discussions, dialogues, short presentations,pronunciation. Teachingthedifferentmethodsofwritinglikeletters, E-mails,report,casestudy,collectingthepatient data etc.	
2	Basiccompositions,journals,withafocuson paragraphformandorganization. Basic concepts &principlesofgoodcommunication. Specialcharacteristicsofhealthcommunication.	
3	Types&processofcommunication-verbal, non-verbalandwrittencommunication. Upward,downwardandlateralcommunication. Therapeuticcommunication:empathyversussympathy.	
4	Communicationmethodsforteachingandlearning. Communicationmethodsforpatienteducation. Barriersofcommunication&howto overcome.	

Reference Book:

-Raman,Meenakshi&Sharma,Sangeeta.TechnicalCommunication
-Konar,Nira.CommunicationSkillsForProfessionalsPHILearningPvt.Ltd-2011
-BoardofEditors.WrittenandSpokenCommunicationinEnglish, University Press2007

BCCT1.5P-CommunityOrientation&ClinicalVisit(includingrelated practicals to the parent course) (Total -120 hrs.)

ABILITYENHANCEMENTELECTIVECOURSE

Nameofthe Programme	**B.Sc.Cardiac CareTechnology**
Nameofthe Course	**English and Communication Skills**
TeachingObjective	This course deals with essential functional English aspectsoftheof communication skills essential for the health careprofessionals. Totrainthestudentsinoralpresentations, expositorywriting, logical organization and Structural support.
Learning Outcomes	Abletoexpressbetter. GrowpersonallyandprofessionallyandDevelopconfidence inevery field

Sr. No.	Topics	No.of Hrs.
1	BasicLanguageSkills: Grammar andUsage. Business Communication Skills. Withfocusonspeaking-Conversations, discussions, dialogues, short presentations, pronunciation. Teachingthedifferentmethodsofwritinglikeletters,E-mails,report,casestudy,collectingthepatient data etc.	
2	Basiccompositions, journals, with a focuson paragraphformandorganization. Basic concepts &principlesofgoodcommunication. Specialcharacteristicsofhealthcommunication.	
3	Types&processofcommunication-verbal, non-verbal andwrittencommunication. Upward,downwardandlateralcommunication. Therapeuticcommunication:empathyversussympathy	
4	Communicationmethodsforteachingandlearning. Communicationmethodsforpatienteducation. Barriersofcommunication&howto overcome.	

Textbooks:

- GrahamLock,FunctionalEnglishGrammarIntroductionto secondLanguage Teachers.Cambridge University Press, New York, 1996.
- GwenVanServellen.CommunicationforHealthcareprofessionals:Concepts,practiceand evidence, Jones & Bartlett Publications, USA, 2009

Nameofthe Programme	B.Sc. Cardiac Care Technology
Nameofthe Course	**Digital Marketing Theory**

TeachingObjective	Tounderstandanddefineterminologycommonlyusedinenvironmentalscience Toteachstudentsto listcommonandadversehumanimpactsonbiotic communities, soil, water, and air Quality. Tounderstandtheprocessesthat governstheinteractions oforganisms with the biotic and abiotic. Understandtheir relationshipbetweenpeopleandtheenvironment; Differentiate between key ecological terms and concepts
Learning Outcomes	Currentenvironmentalissuesandhighlighttheimportanceofadopting an interdisciplinary approach. Sampleanecosystemtodetermine populationdensityanddistribution. Createfoodwebsandanalysepossibledisruptionoffeeding relationships.

Unit 1	Introduction to Digital Marketing	Principles of Digital Marketing; Digital Marketing Channels; Tools to Create Buyer Persona; Competitor Research Tools, Website Analysis Tools, etc.
	Content Marketing	Content Marketing Concepts & Strategies; Planning, Creating, Distributing & Promoting Content; Optimize Website UX & Landing Pages; Measure Impact; Metrics & Performance; Using Content Research for Opportunities, etc.
Unit 2	Social Media Marketing	Introduction; Major Social Media Platforms for Marketing; Developing Data-driven Audience & Campaign Insights; Social Media for Business; Creation & Optimization of Social Media Campaigns, etc.
	Search Engine Optimization	Search Engine Optimization Fundamentals; Keywords and SEO Content Plan; SEO & Business Objectives; Writing SEO Content; On-site & off-site SEO; Optimize Organic Search Ranking, etc.
Unit 3	Web Analytics & Google Analytics	Google Analytics Tools; Web Analytics Tools, etc.
	E-mail Marketing	Effective E-mail Campaigns; E-mail Plan; E-mail Marketing Campaign Analysis; Measuring Conversions & keeping up, etc.
	Web Design	Web design, optimization of websites; Publishing a basic website; User-centred Design and Website Optimization; Design Principles and Website Copy; Website Metrics & Developing Insight, etc.
	Introduction to CRM	Fundamentals to CRM; CRM Platforms; CRM Models; CRM Strategy, etc.
Unit 4	Video Advertising	Basics of Video Advertising; Creating Video Campaigns; Measurement & Optimization; Creating & Managing a YouTube Channel; Targeting Video Campaigns, etc.
	Digital Marketing Budgeting	Digital Marketing Budget & Plan; Resource Planning; Cost Estimating; Cost Budgeting; Cost Control

Books:

- Carson,R.2002.SilentSpring.HoughtonMifflinHarcourt.
- Gadgil,M., &Guha,R.1993.ThisFissuredLand: AnEcologicalHistoryofIndia.Univ. of California Press.
- Gleeson,B.andLow,N.(eds.)1999.GlobalEthicsandEnvironment,London,Routledge.
- Gleick,P.H.1993.Water inCrisis.PacificInstituteforStudies inDev.,Environment & Security. Stockholm Env. Institute, Oxford Univ.Press.
- Groom,MarthaJ.,GaryK.Meffe,andCarlRonaldCarroll.PrinciplesofConservation Biology. Sunderland: Sinauer Associates,2006.
- Grumbine,R.Edward,andPandit,M.K.2013.ThreatsfromIndia'sHimalayadams. Science, 339: 36-37.
- McCully,P.1996.Riversnomore:theenvironmentaleffectsofdams(pp. 29-64).ZedBooks.
- McNeill, JohnR. 2000. SomethingNewUndertheSun:AnEnvironmentalHistory of the Twentieth Century.
- Odum,E.P.,Odum,H.T.&Andrews,J.1971.FundamentalsofEcology.Philadelphia: Saunders.

SEMESTER--III

Nameofthe Programme	**B.Sc.Cardiac CareTechnology**
Nameofthe Course	**Applied Anatomy, Physiology, Pharmacology in Cardiac care**

TeachingObjective	• Describe the structure and function of the heart including the electrical activity involved in the normal and abnormal cardiac cycle. • Describe the structure and function of the myocytes & function of the peripheral and coronary circulatory systems at rest and during physical activity • DiscussAnatomyofCoronaries ofHeart • Discuss the factors which impact the cardiac output and identify those factors impacted by physical activity and environmentalfactors • TounderstandIndicationandContraindications,UsesandAdverseeffects of drugs, Mechanism of Action
Learning Outcomes	Tounderstand CoronaryAnatomy 2. To enable students, differentiate between normal heart sounds and murmurs. 3. To enable students, a preliminary understanding of the circulatory system from a physiological and functional perspective, as well as related terminologies. 4. Students will be proficient in Pharmacology with proficient knowledge about the different drugs / medicines to be given in various cardiovascular diseases, dose calculation and mode of administration. 5. Also recent advances inpharmacologywillplaya keyrole in research aspect of the students.

Sr. No.	Topics	
1.	**ANATOMY OFCARDIOVASCULAR SYSTEM:**AnatomyofArteries and arterioles,AnatomyofAorta,Capillariesandsinusoids,Anastomoses,Veinsand venules, Anatomy of Coronary arteries: Left and Right Surfaceanatomy ofheart,Structure of theheart,Surface and Borders, Pericardium, Myocardium and Endocardium, Chambers: Right Atrium (Venous Area, Septum, Atrial Appendage), Right ventricle: (Inflow, Atrial Sinus, Outflow), Left Atrium (Venous, Ventricular Septum, Appendage, MV), Left Ventricle (Inflow, Body, Outflow), Anatomy of SA node and AV node, Anatomyof Cardiac Valves: Eustachian, A-V Valves, Semilunar Valves, ValveApparatus	
2.	**PHYSIOLOGYOFCARDIOVASCULARSYSTEM:**Physiologyof Aorta, Physiology of Carotid Bifurcation, Systemic, Pulmonary, Coronary and Portal circulation, Nerve supply of the heart, Major Arteries and Veins supplying Head, Neck and Thorax, Major Arteriesand VeinsofUpper limb,Major Arteriesand VeinsofPelvis and Lower Limb.	
3.	**BLOOD VESSELS AND HEMODYNAMICS:** Regulation of Blood pressure: HormonalandNeuralregulation,Pulseandsitesforpulseassessment,Shockand Homeostasis, **CLINICALPATHOLOGIESINPHYSIOLOGYOFCVS:**CoronaryArteryDisease(CAD),CongestiveHeartFailure(CHF), andAtherosclerosis,Shockand Hemorrhage, Syncope, Hypertension.	

4	**GENERAL PHARMACOLOGY:** Sources of drugs, Route of drug administration, Pharmacokinetics,Pharmacodynamics,Firstpassmetabolism,Adversedrugreactions **DRUGSUSEDINCARDIOVASCULARSYSTEM(with itsMOA,ADRs, Indicationsandcomplications):**Anti-Hypertensives,Anti-AnginalAgents,Anti- Failure Agents, Anti-Arrhythmic Agents, Antithrombotic Agents **DRUGSUSEDINNERVOUSSYSTEM(withitsMOA,ADRs,Indicationsand complications):** Anticholinergics & Adrenergic, Narcotics, Sedatives & Hypnotics	

RecommendedLearningResources:

TextBooks:

- TextbookofAnatomy(Vol.1,2,3):B.D.Chaurasia
- Rossand WilsonAnatomy&Physiology inHealthandIllness,12thEditionbyAnneWaugh and Allison Grant
- PrinciplesofAnatomy&Physiology,12thEditionbyGerardJ.Tortora&BryanDerrickson
- TextbookofPhysiology(Vol.1,2):Dr.A.K.Jain
- EssentialsofMedicalPhysiology,SixthEditionbyKSembulingamandPremaSembulingam

Name of the Programme	B.Sc. Cardiac Care Technology
Name of the Course	Basic Electrocardiography

TeachingObjective	• Toenablestudents, understandthecorrectplacementofallelectrodes • Todemonstratepatient positioningandpreparation • Toteachstudentsabout maintenanceoftheECGmachine,wiresand electrodes.
Learning Outcomes	• TodevelopunderstandingregardingElectrocardiographyandits procedure. • Describetheproper hook-upprocedurefor a12-LeadECG • IdentifybasicnormalECGwaveformmorphologyandcommon interpretation. • Enumeratethemeasuresto betakenbefore,afterandduringECG procedure.

Sr. No.	Topics	
1	**BASIC ELECTROPHYSIOLOGY:** Heart: An electrical field, Electrical and Mechanical properties of the heart, Cardiac electrical field generation during activation, Cardiac wave fronts - Action potential: Repolarization and Depolarization, Cardiac electrical field generation during ventricular recovery,Conduction system of the heart:In detail	
2	**BASICSOFELECTRODEPLACEMENTANDLEADSELECTIONANDAXIS DEVIATION:** Basics of Electrodes and Leads, ECG deflections: Isoelectric, Upright, Negative and Biphasic, Types of ECG leads- Standard limb leads, Precordial leads and the Wisdom central, Augmented limb leads, Unipolar V/S Bipolar leads, Placement of leads with universal color code, Hexa-axialreference frame and Electrical axis, X axis – time presentation, Y axis – voltage presentation, Right & Left axis in normal ECG, Einthoven's Triangle, Deviation of Axis. **BASICSOFSTRESSTEST:** Protocols,leadplacement,instructiontothepatient, rhythm analysis	
3	**ECGCOMPONENTS-WAVESANDINTERVALS:**ECGwaveforms:Rate,Rhythm and Normaltime intervals-The Normal Electrocardiogram, The Normal P wave &Atrialrepolarization,Atrio-ventricularnodeconductionandthePRsegment,VentricularactivationandtheQRScomplex,GenesisofQRScomplex,Ventricular recoveryand ST-T wave, Normal variants and Rotation of the heart, ECGPAPER,Rate measurement: Six second method, Large box method, Small box method	
4	**SINUS RHYTHMS & ATRIOVENTRICULAR BLOCKS (Description, Possible causes,ECGcriteria,Planofassessment, Potentialtreatments):**NormalSinus Rhythm, Sinus Bradycardia, Sinus Tachycardia, 1st Degree AV block, 2nd Degree AV block:Type-IorMobitz-I,2ndDegreeAVblock:Type-IIorMobitz-II,3rdDegreeAV block/ CHB **BASICSOFECGINTERPRETATION:**Basicstepsforinterpretation-Rate,Rhythm, P-wave examination, P to R interval, QRS width, Rhythm interpretation **ATRIAL&VENTRICULARARRHYTHMIAS(Description,Possiblecauses,ECG criteria, Plan of assessment, Potential treatments):** Premature Atrial Contractions (PACs), Atrial Flutter (AF), Atrial Fibrillation (A. Fib), Paroxysmal Atrial Tachycardia, Premature Ventricular Contractions (PVCs), Ventricular Tachycardia (V. Tach),SupraventricularTachycardia(SVT),VentricularFibrillation(V.Fib), Asystole	

BCCT 3.2P–Basic Electrocardiography

Sr.No.	Topics	
1	Step stopper form an ECG	
2	Patient positioning according to various conditions.	
3	Proper communication with patient to find out the history	
4	ECG machine operating and maintenance	
5	Maintain ECG catalogue for self-assessment	
6	Common errors in ECG recording	

RecommendedLearning

Resources: Text Books:

1. ECGMade Easy–AtulLuthra
2. ReferencebyPGDCC – IGNOUHandbooksforECG, ECHOandStressTest
3. AnIntroductiontoElectrocardiography:SchamrothColin
4. ClinicalElectrocardiography:Goldberger.A

Nameofthe Programme	B.Sc.CardiacCareTechnology
Nameofthe Course	Basic Echocardiography
TeachingObjective	• Toprovideabriefintroductiontoechocardiography, itstechniquesand types of Echocardiography. • Toprovidepractically andclinicallyusefulapplicationof Echocardiography. • Toexplainecho techniques availableand toputecho intoaclinical perspective.
Learning Outcomes	• Todevelopanunderstandingregarding Echocardiography. • Totrainstudentstoperformechocardiographyexaminationsby explaining the position of transducers. • Tomakestudentsawareofrecentadvancesinechocardiography. • TounderstandtheroleofCardiacCaretechnicianwhileassistingthe Cardiologist as well as when performing individually.

Sr. No.	Topics	
1	**INTRODUCTIONTOECHOCARDIOGRAPHY:**BasicsOfUltrasoundWaves, Characteristics Of: Sound Wave, Frequency And Attenuation, Basic Principle Of Echocardiography,IndicationsOfEchocardiography,TypesOfEchocardiography,Importance Of Gel In Echocardiography **MURMURS:** Types Of Murmurs Heard In Echocardiography- Systolic And Diastolic Murmurs, Possible Causes Of Murmurs, Conditions Associated With Murmurs, Features Of Murmurs Suggesting Echocardiography	
2	**KNOBOLOGYANDINSTRUMENTATION:**Transducer:BasicPrincipleAndWorking,TypesOfTransducers,PiezoelectricCrystalsAndItsEffect,Various Knobs UsedOnEcho Machine With Its Description And Application **DOPPLEREFFECT:**BasicsOfDoppler,ApplicationsOfDoppler,TypesOfDoppler, Continuity Equation **ECHOCARDIOGRAPHYTECHNIQUES:BASICPRINCIPLES,INDICATIONSANDUSESOF:**2DTransthoracicEchocardiography,M-Mode,EchoWindows AndViews UsedInTransthoracicEchocardiography,DopplerEchocardiographyInDetail:Pulsed,Continuous Wave And Color Flow Mapping **CARDIAC ASSESSMENT:** Measurement Of Cardiac Dimensions, Basics Of:EvaluationOf SystolicAndDiastolic LeftVentricularFunction,EjectionFraction,Fractional Shortening,RegionalWallMotionAbnormalities:Classification,StrokeVolumeAndCardiac Output Assessment, TransvalvularGradients And Orifice Area	
3	**ECHOCARDIOGRAPHYASSESSMENTINVALVULARHEARTDISEASE:**RoleOfEcho In Assessment Of ValvularHeart Diseases, 2D Findings, Doppler Calculations, M-Mode Findings And Views Seen In: Mitral Regurgitation, Mitral Stenosis With Different Types Of M-Mode Pattern, Mitral ValveProlapse, Aortic Regurgitation, Aortic Stenosis: Types Of AS, InfectiveEndocarditis, TricuspidRegurgitation, TricuspidStenosis, PulmonaryRegurgitation, Pulmonary Stenosis **BASICSOFTOE,STRESSECHO&CONTRASTECHO:**Advantages&Disadvantages, Applications,Indications&Contraindications,Complications,PatientPositioningAnd Medications Used **ECHO IN SPECIAL HOSPITAL SETTINGS:** Clinical Uses Of Echocardiography In: PreoperativeCases,IntraoperativeCases,IntensiveCareUnit(ICU),CoronaryCareUnit (CCU),CardiacCatheterizationLaboratory(CCL),Accident&Emergency(A&E) Department, Portable (Hand-Held) Echo.	

4	**ECHO ASSESSMENT IN CAD:** Assessment Of Ischemia, Assessment Of Myocardial Infarction, Complications Of MI Detection By Echo, Myocardial Hibernation **ARTIFICIAL (PROSTHETIC) VALVES:** Basics Of Artificial Valves, Types Of Artificial Valves, Echo Examination Of Prosthetic Valve, Basics Of Prosthetic Valve Malfunction, Echo Assessment Of: Endo carditis, Thrombus, Dehiscence, Regurgitation, Variance, Degeneration **HYPERTENSIONANDLVH:**IndicationsForEchoInHypertension,EchoFindingsIn Hypertension, Left Ventricular Hypertrophy: Echo Findings **SCREENINGANDFOLLOW-UPECHO:**GoodIndicationsForScreeningEcho,Less Clear-Cut Indications For Screening Echo, Follow-Up Echo	

BCCT 3.3PBasicEchocardiography

Sr.No.	Topics	
1	LearnaboutProbeandScanner settings.	
2	Learnabout StructuralandFunctionalassessmentofthe heart.	
3	Learnaboutvariouswindowsandviewsusedin Echocardiography.	
4	Learnabout qualitativereportingsystemalongwithvarious software's associated with Echo reporting.	

RecommendedTextBooks:

- EchoMadeEasy:SamKaddoura
- ReferencebyPGDCC – IGNOUHandbooksforECG, ECHOandStressTest.
- FeigenBaum'sEchocardiography
- TajikJamilforEchocardiography.

Coursecode-BCCT3.4CP: BCCTDirectedClinicalEducation–I

Students will gain additional skills in clinical procedures, interaction with patients and professionalpersonnel.Studentswillapplyknowledge from clinicallearningexperience under the supervision of a Cardiologist or senior technologist Students are tested on intermediate clinical cardiac care skills. **(Total- 405 hrs)**

GENERICELECTIVECOURSE

Nameofthe Programme	**B.Sc.CardiacCareTechnology**
Nameofthe Course	**Pursuit ofInnerSelfExcellence(POIS)**

TeachingObjective	• To inculcate moral values in students – Self-Discipline , Time Management, Develop attitude of Service with humility, Empathy, Compassion, brotherhood, Respect for teachers, colleagues & society members. • Develop Effective means of communication & presentation skills in students • To develop wisdom in students for deciding their career based on their areas of interest and innerskills. • Introduce techniques for Relaxation, Meditation & Connecting with innerself. • Rejuvenation Techniques which can be used by students to distress themselves •To improve performance of students during various assignments, projects, elocutions, events, quiz, interviews.
Learning Outcomes	• Students will become self dependent, more decisive and develop intuitive ability for their study and career related matter. • Student'sabilitytopresenttheirideaswillbedeveloped. • Enhanced communication skills, public speaking & improved Presentation ability. • Studentswill beable to exploretheir innerpotentialand innerability to become a successful researcher or technician & hence become more focused. • Studentswillobservesignificantreductioninstresslevel. • With the development of personal attributes like Empathy, Compassion, • Service, Love &brotherhood,studentswillserve the societyand industry in better way with teamwork and thus grow professionally.

Sr. No.	Topics	
1	**Spiritual Values for human excellence :** The value ofhuman integration; Compassion, universal love and brotherhood (Universal Prayer) ; Heart based living ; Silence and its values, Peace and non-violence in thought, word and deed ; Ancient treasureofvalues-Shatsampatti,Patanjali'sAshtangaYoga,Vediceducation–The role ofthe Acharya , values drawn from various cultures and religious practices - Ubuntu, Buddism, etc.; Wh spirituality? Concept – significance ; Thought culture	
2	**Ways and Means :** Correlation between the values and the Courses ;Different teaching techniques to impart value education; Introduction to Brighter Minds initiative;Principles of Communication; Inspiration from the lives of Masters for spiritual values-RoleofthelivingMaster	
3	**Integratingspiritualvaluesandlife:**RelevanceofVBSE(ValueBased SpiritualEducation) in contemporary life ;Significantspiritualvalues;Spiritualdestiny; Principles of Self-management; Designing destiny	
4	**Experiencingthrough theheartforself-transformation(Heartfulness Meditation):** Who amI? ; Introduction to Relaxation; Why, what and how HFN Meditation? Journal writing for Self-Observation; Why,what and how HFN Rejuvenation (Cleaning)? ; Why, what and how HFNconnect to Self (Prayer)?; Pursuit of inner self excellence.	
	Books: I) TheArtofLearning:**AJourneyinthePursuitofExcellence,** JoshWaitzkin, Simonand Schuster, 2007 II) RealityatDawn.ByShriRamChandra,PublishedbyISRC	

Nameofthe Programme	**B.Sc.CardiacCareTechnology**
Nameofthe Course	**OrganizationalBehavior**

TeachingObjective	Tounderstandthe initialinsightsintounderlyingprinciplesand fundamental theories of organizational behavior. TheStudentshoulddevelopasense ofwhat fallsunderthe domainof organizationalbehavior. He should develop an understanding of academic views on the behavior andmotivationsofpeopleinorganizationsandthe purposes of organizations. Thiscourseclearlytakes anacademicandscientific lenswiththe aim of understanding human behavior in organizations.
Learning Outcomes	Describeandapplymotivationtheoriestoteamandorganizational scenarios inorder achieve a team's or an organization's goals and objectives. Explaintheeffectofpersonality,attitudes,perceptionsandattributions ontheirownand other'sbehaviorsinteamand organizationalsettings. Explaintypesofteamsandapplyteamdevelopment,teameffectiveness, and group decision making models andtechniques. Analyseandapplyleadershiptheoriesandbetterunderstandtheirown leadership style.

Sr. No.	Topics	
1	Organizational Behavior - Definition - Importance - Historical Background - Fundamental conceptsofOB-21st Centurycorporate-DifferentmodelsofOBi.e.autocratic,custodial,supportive	
2	**OrganizationStructure andDesign**- AuthorityandResponsibilityRelationships -Delegation of Authority and Decentralization - Interdepartmental Coordination - Emerging Trends in CorporateStructure, StrategyandCulture-Impact ofTechnologyonOrganizationaldesign- Mechanistic vs. Adoptive Structures – Formal and Informal Organization	
3	Learning-ProcessofLearning-PrinciplesofLearning –OrganizationalRewardSystems –BehavioralManagement PerceptionProcess –Nature&Importance-PerceptualSelectivity-PerceptualOrganization- Social Perception - Impression Management Motivation-Motives-Characteristics –Classificationof motives –PrimaryMotives -Secondary motives - Morale - Definition and relationship with productivity – MoraleIndicators	
4	Leadership-Definition-Importance-LeadershipStyles-ModelsandTheories of LeadershipStyles Conflict Management - Traditional vis-a-vis Modern view of conflict – Constructiveand Destructiveconflict – ConflictProcess-Strategiesforencouragingconstructiveconflict - Strategies for resolving destructiveconflict	

Books:

I) OrganizationalBehavior,9thEd.-Stephen Robbins
II) HumanBehaviour atwork-DavisandNewstorm
III) OrganizationalBehaviour-UmaSekaran
IV) OrganizationalBehaviour-FredLuthans
V) OrganizationalBehaviour-K.Aswathappa

SEMESTER--V

Nameofthe Programme	**B.Sc.CardiacCareTechnology**
Nameofthe Course	**AdvancedElectrocardiography**

TeachingObjective	Toenablestudents, understandaboutvariousarrhythmias. Todemonstratepatient positioningandpreparation. Toteachstudentsabout maintenance of the ECGmachine,wires andElectrodes.
Learning Outcomes	TodevelopanunderstandingregardingEchocardiography. To train studentstoPerformEchocardiographyexaminationsby explaining the position of transducers.Tomake student saw are of recent advances inEchocardiography. TounderstandtheroleofCardiacCaretechnicianwhileassistingthe Cardiologist as well as when performing individually.

Sr. No.	Topics	
1	**ANATOMYOFTHECONDUCTION SYSTEM&BASICSOF ELECTROPHYSIOLOGY:**SAnode,AVnode,InternodalandInter-atrialconduction,Bundlebranches,History,Equipmentused,Procedure,Restinginterval measurements, Management of Arrhythmias by EP study	
2	**GENESISOFCARDIACARRHYTHMIASAND MANAGEMENT:** Various Mechanisms of Arrhythmogenesis&disordersofimpulse formation: Artifacts, Electrical interference, Somatic tremor, Wandering baseline, Antiarrhythmic agents class I, class II, class III, class IV, Implantable electric devices fortreatmentof cardiac arrhythmias, Ablation theory for cardiac arrhythmias: Basic	
3	**ECG IN ISCHEMIC HEART DIESEASE:** Coronary events and ECG, ECG changes inIHDandMyocardialInfarction,Investigations: Stress test-Indications,Contraindications,Pre-testprobability,ExerciseProtocols,Interpretation of reports **CARDIACPACING&RADIOFREQUENCYABLATIONTHERAPY:** Indications, Temporary and Permanent Pacing, NBG codes, Types of Pacing, Complications,CommonsitesofAblation,Management ofA.Flutter,V.Tach,A. Fib, AVNRT	
4	**DISORDERS OF IMPULSE CONDUCTION:** Reentry mechanism, Tachycardia's caused by reentry, Electrical remodeling of atria, Sinus reentry, Atrial reentry, AV node reentry, Pre-excitation syndrome, Ventricular tachycardia caused byreentry,PACEMAKERS:TypesofPacemakers,ComponentsofPacemaker,Singleand Double Timing cycles, Pacemaker Troubleshooting	

AdvancedElectrocardiography

S.No.	Topics	
1	Learnabout12-leadECG	
2	Learnabout various software'sassociatedwithECG.	
3	Learnvariousconditions indicatedfor Electrocardiography	

RecommendedTextBooks:

- ECGMade Easy–AtulLuthra
- ReferencebyPGDCC – IGNOUHandbooksforECG, ECHOand StressTest.
- HamptonJ. 2003,TheECGmadeEasy(6thed.)ChurchillLivingstone,Edinburgh
- AnIntroductiontoElectrocardiography:SchamrothColin

Nameofthe Programme	**B.Sc.CardiacCareTechnology**
Name oftheCourse	**AdvancedEchocardiography**

TeachingObjective	Toprovideabriefintroductionto Echocardiography,itstechniques and types of Echocardiography. Toprovide practicallyandclinically usefulapplicationofEchocardiography. Toexplainechotechniquesavailableandto putechointoaclinical perspective.
Learning Outcomes	Todevelopanunderstandingregarding Echocardiography. TotrainstudentstoPerformEchocardiographyexaminationsby explaining the position of transducers Tomakestudentsawareofrecentadvancesin Echocardiography. TounderstandtheroleofCardiacCare technician while assistingthe Cardiologist as well as when performing individually.

Sr. No.	Topics	
1	**HEARTFAILURE,MYOCARDIUMANDPERICARDIUM:**Heart failure, Assessment of LV systolic function, Coronary Artery Disease, Cardiomyopathies and Myocarditis, Diastolic function, Right heart and lungs, Long-axis function, Pericardial disease, Device therapy for heart failure – Cardiac Resynchronization Therapy	
2	**TRANSESOPHAGEALECHOCARDIOGRAPHY:**StandardviewsusedinTOE, Indications for TOE, AdvantagesandDisadvantagesofTOE,Patient preparationandcareduringTOE, UsesofTOE,Contraindications toTOE,ComplicationsofTOE,	
3	**CARDIACMASSES,INFECTIONANDCONGENITALABNORMALITIES:** Cardiac masses - Tumors (primary or secondary), Thrombus, Infected material (vegetation or abscess), Congenital Abnormalities- Shunts: ASD, VSD, PFO, Coarctationoftheaorta,Congenitalvalvularabnormalities-Ebstein'sAnomaly, PulmonaryStenosis,Bicuspid Aorticvalve.	
4	**SPECIALSITUATIONSANDCONDITIONS:**Pregnancy,Rhythmdisturbances:A. Fib,V.Fib,Syncope,Palpitations,LVH,Stroke,TIAand Thromboembolism, Breathlessness and Peripheral edema **ECHOABNORMALITIESINSOMESYSTEMICDISEASESANDCONDITIONS:**HIVinfectionandAIDS,Chagas'disease,Lymediseas e,Rheumatic heart disease, Obesity **RECENTADVANCES INECHOCARDIOGRAPHY:**3DEcho,4DEcho,TissueDopplerImaging	

AdvancedEchocardiography

Sr.No.	Topics	
1	LearnaboutadvanceEchosettings.	
2	Learnabout qualitativereporting system alongwithvarioussoftware's associated with Echo reporting.	
3	Learnvariousconditions indicatedfor Echocardiography	

RecommendedTextBooks:

- EchoMadeEasy:SamKaddoura
- ReferencebyPGDCC – IGNOUHandbooksforECG, ECHOandStressTest.
- FeigenBaum'sEchocardiography
- TajikJamilforEchocardiography.

Referencebooksorrelatedwebsites:www.123sonography.com

Nameofthe Programme	**B.Sc.CardiacCareTechnology**
Nameofthe Course	**InvasiveCardiology**

TeachingObjective	Toenablestudents, understandnewtechniques forprocedures inand around the heart emerge that again need expert knowledge and manual dexterity. To understand such interventions which include diagnostic and therapeutic electrophysiology; implantation or exchange of complex pacemaker systems or Percutaneouscardioverter-defibrillator-pacers; Percutaneousvalve repairsorreplacementsetc
Learning Outcomes	Toenablestudentsto notonlybeahelpinghandtothosejust starting out Inthespecialtybut alsoto serveasareference forthosewho havebeen working in Invasive field for some time

Sr. No.	Topics	
1	**CONTRASTMEDIA:**Basics,DefinitionofHydrophilicity,Osmolarity,and Viscosity,ContrastAgentsusedintheCCL,Uses,Complications,Contrastmedium reactions:Mild,Moderate,Severe,Allergies:Anaphylacticand Anaphylactoid Reaction, Contrast-Induced Nephropathy (CIN) **HEMODYNAMICS:**Introduction to Hemodynamics, Pressure Measurement System, Sources of Error and Artifacts: Fluid Artifacts, Electronic and Electrical Artifacts, Human Error: Leveling and Balancing, Slopecalibration, Hemodynamic waveforms,Gradient,ValveAreaCalculations,Cardiacoutputformulas-Fick, Ejection fraction **IVUS:**History,Angiographyvs.IVUS,IVUSsystems,DiagnosticApplicationsof IVUS, Complications of IVUS, Optical Coherence Tomography (OCT)	
2	**FUNCTIONAL ASSESSMENT OF CORONARY DISEASE:**Intravascular PressureMeasurement:CoronaryPressuresandFractionalFlowReserve **PTCA:**History,Indications,Materialsused,TypesofAngioplastyballoons(OTW, SOE,Fixed-wireballoons,Perfusionballoons,CompliantandNon-Compliant balloons, Stent Implantation, Contraindications, Complications **ICHARDWARES:**Stents:Composition,Types,Guidewires:Composition,Types, Catheters: Diagnostic and Guiding **IABPANDOTHERCARDIACASSISTDEVICES:**IABP-PhysiologicPrinciplesofCounterpulsation,Indications,Contraindications,Insertion,Timing: Timing errors, Troubleshooting,Weaning and Balloon Removal, Complications, BasicsofPercutaneousventricularassistdevices:TandemHeart,Impella, Percutaneous Coronary Bypass	
3	**PERIPHERAL CAROTID ANGIOGRAPHY:**Introduction, Cerebrovascular Anatomyandpathology,Diagnosisandpatientselection,Patientpreparation, Diagnostic procedure, Post procedure Care	
4	**CARDIAC PHARMACOLOGY:**Local Anesthetics, Analgesics And Sedatives: Opioids, Morphine, Fentanyl, Diazepam, Midazolam, Lorazepam, Vasodilators: Nitroglycerine, Sodium Nitroprusside, Beta receptor blockers: Metoprolol, Propranolol, Esmolol, Labetalol, Calcium Channel Blockers: Diltiazem, Verapamil, Nicardipine, Anticoagulation Agents: Platelet Aggregation Inhibitors, Aspirin, Clopidogrel, Glycoprotein IIb/IIIa Inhibitors, Tirofiban, Heparin, Warfarin, Thrombolytics: Streptokinase, Urokinase, Anistreplase, rTPA, Reteplase, Tenecteplase **RECENTADVANCESININVASIVE CARDIOLOGY**	

RecommendedTextBooks:

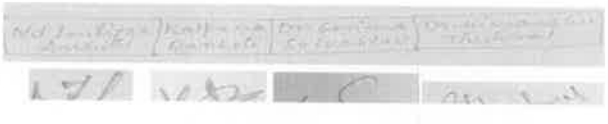
1. InvasiveCardiology, 3rdEditionbySandyWatson.

Referencebooksorrelatedwebsites:

1.TheInterventionalCardiacCatheterizationHandbook,3rdEditionByMortonj.Kern

Coursecode-BCCT5.4CP:CCTDirectedClinicalEducation–III

Students will gain additional skills in interventional procedures, cardiac pharmacology and recent advancements. Students apply knowledge from previous clinical learning experience under the supervision of a senior technologist. Students are tested on intermediate pharmacological andinvasivetechniques.
(Total-360hrs)



COREELECTIVECOURSES

Nameofthe Programme	**B.Sc.CardiacCareTechnology**
Nameofthe Course	**BasicsofClinicalSkillLearning**

TeachingObjective	• ToUnderstandthebasic ideasonhowtocheck forVitalSignsofthe Patient • ThiscoursetheStudentwilllearnhowto handlethepatientsand their positioning TheywillalsolearnontheBasicsofNasal-GastricTube TheStudentswilllearnonAdministrationofIV,IVandMedication Also they will know about Cleanliness in the Asepsis
Learning Outcomes	After successful accomplishment of the course, the students would be able to Measure Vital Signs, do basic physical Examination of the patients, NG tube basics, Administration of Medicines The students will learn about Asepsis, and the Cleanliness related to asepsis and on mobility of the patients

Sr. No.	Topics	
1	**MEASURINGVITALSIGNS:**Temperature:AxillariesTemperature,Pulse:Sitesof pulse, Measurement, Respiratory, Blood Pressure, Pain: Pain Scale **PHYSICALEXAMINATION:**Observation,Auscultation(Chest),Palpation, Percussion, History Taking **FEEDING: ENTRAL FEEDING, NG TUBE:**Measurement, Procedure, Care, RemovalofNasal-GastricTube,Nasal-GastricTubeFeeding,andParentralNutrition.	
2	**ADMINISTRATIONS:**Oral, Intravenous, Intramuscular, Subcutaneous, Recapping of Syringe, Loading of Drugs, Calculation of Drugs, Venipuncture, IV Infusion, Cannula, Attachment ofIV infusion Set, Fluid Collection, Heparin Lock, Maintenance ofIV set, Performing Nebulizer Therapy, Inhaler, Oxygen Therapy (Nasal, prongs, nasal Catheter,Venturi Mask, face mask)	
3	**ASEPSIS:**Hand washTechniques,(Medical, Surgical) UniversalPrecaution, Protecting Equipments:UsingSterileGloves,OpeningaSterilepackageandEstablishingaSterile Field, Sterile Dressing Changes, Surgical Attire ,Wound Dressing, Suture Removal, Cleaningand ApplicationofSterile Dressing, Wearing and Removalofpersonal protective Equipment	
4	**MOBILITYANDSUPPORT:**MovingandPositioning,rangeofMotionexercises (Active & Passive) Assisting for Transfer, Application of Restraints	

Nameofthe Programme	**B.Sc.CardiacCareTechnology**
Nameofthe Course	**HospitalOperation Management**

TeachingObjective	1. Topromotescientificmanagementofhospitaland advancementof health care systems so as to make itrational, responsive and cost efficient 2. To promotethedevelopment ofhighqualityof hospitalcare inthe community and the country. 3. Ithastoprovideasatisfactoryenvironmenttothepatientandalso to the Doctorsforclinicalresearch.
Learning Outcomes	1. Understand and apply resource management concepts (personnel, finance, and materialresources) and the processes and strategies needed in specific hospital sectors 2. Communicate effectively and develop their leadership and teambuilding abilities 3. Apply modern change management and innovation management concepts to optimize structures 4. Analyze existing hospital service policies and enhance theiralignment Withinthelocalandnationalcontext

Sr. No.	Topics	
1	**MEDICO-LEGALCASES:**Introduction,LawsassociatedwithMedico-LegalCases, Three Core Contents in Medico-legal cases w.r.t Doctors, Patient & Profession,	
2	**CONSIDERATIONSOFETHICS:**Consent,Confidentiality,MentalHealth,End of life and Organ Transportation, Research & Clinical Trials **EQUIPMENTOPERATIONSMANAGEMENT:**Hospitalequipmentrepairand maintenance,typesofmaintenance, joborders,equipmentmaintenancelogbooks, AMCS	
3	**HOSPITAL INFORMATION SYSTEM(HIS):** Hospital Information System Management,softwareapplicationsinregistration,billing,investigations,reporting, medical records management, Security and ethical challenges	
4	**ROLEOFMEDICALRECORDSINHEALTH CARE MANAGEMENT:** Computers for Medical records, Developments of computerized medical record informationprocessingsystem(EMR's),Computerstored(Vs)Manualhandwritten record, Advantages of EMR (Vs) Manual	

INTERNSHIP

Guidelines:

i. Theinternshipshallcommenceafterthestudenthas completedandpassedall Courses up to VIsemesters.
ii. Theinternship iscompulsory.
iii. Thedurationoftheinternship shallbe6Months.
iv. ThedegreeofBachelor inAlliedHealthSciencesshallbeawardedafterthesatisfactory completion of the internship.

EvaluationofInternees:

FormativeEvaluation:
Day to day assessment ofthe internees during their internship postings should be done by the Head of the Department/Facuity assigned. The objective is that all the interns must acquire necessary minimum skills required for carrying out day to day professional work competently. This can be achieved by maintainingRecords /LogBookbyall internees. This will not only provide a demonstrable evidenceof theprocesses oftrainingbut moreimportantlyoftheinternee's ownacquisitionofcompetenceasrelated to performance.

SummativeEvaluation:
It shallbebasedontheobservation of the Sr.Technical staff/Facultyofthedepartment concernedand Record / Log book maintained by the interns. Based on these two evaluations, the Head of the Department shall issuecertificateofsatisfactorycompletionoftraining, following whichtheuniversity shall award the degree or declare him/her eligible for it.
Toimplement theproject workuniformlyfor all thespecialties in view of the curriculumandtraining tobeacceptableinternationallyandthestudentstoget opportunityfor higher studiesandemployment.