



YENEPOYA

(DEEMED TO BE UNIVERSITY)

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**YENEPOYA INSTITUTE OF ALLIED
HEALTH SCIENCES**

PROGRAM OUTCOMES AND COURSE OUTCOMES .

UNDERGRADUATE PROGRAM

BACHELOR OF SCIENCE

CARDIO VASCULAR TECHNOLOGY

ATTESTED

Dr. Gangadhara Somayaji KS

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PROGRAM OUTCOMES
UNDERGRADUATE PROGRAM
BACHELOR OF SCIENCE
CARDIO VASCULAR TECHNOLOGY

(K -Knowledge, S -Skill , A -Attitude)

- PO 1 Apply knowledge of human cardiovascular system in the management of cardiovascular related disorders. (K,A)
- PO 2 Plan and implement clinical and scientific activities related to the profession of cardiovascular technology. (K,S)
- PO 3 Demonstrate the ability to use theoretical knowledge and critical thinking skills in clinical practice(K,S,A)
- PO 4 Identify and solve complex problems arising during cardiovascular care of the patients(K)
- PO 5 Become well-versed in performing and interpreting techniques such as Electrocardiography, Exercise Stress Testing, Echocardiography, Cardiac catheterization, and instrumentation(K,S,A)
- PO 6 Utilize modern tools and techniques in the arena of cardiovascular technology for patient compliance, care before during and after the procedures(K,A)
- PO 7 Become well-prepared for working in a team associated with assisting cardiac surgeons and cardiologists in a high-pressure hospital environment(S,A)
- PO8 Be a cognizant and responsive to the cardiovascular care of the community and possess a commitment to continuously improve knowledge and abilities(A)
- PO9 Demonstrate leadership qualities and entrepreneur skills by working and communicating effectively in interdisciplinary environment, either independently or in a team(K,S,A)
- PO10 Imbibe ethical practices and moral values in personal and professional endeavors(K,S,A)
- PO11 Apply the knowledge and skills to assess societal and legal issues related to cardiovascular care of the patients.(K,A)
- PO12 Demonstrate effective oral and written communication skills.(K,S,A)


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COURSE OUTCOMES
UNDERGRADUATE PROGRAM
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CARDIO VASCULAR TECHNOLOGY

Semester I

Anatomy	CO	Description
	CO 1	Comprehend the gross, functional and applied anatomy of various structures in the human body along with their inter-relationships.
	CO 2	Correlate the structure with the functions.
	CO 3	Competent to apply anatomical knowledge to perform minor technical procedural skills
Physiology	CO	Description
	CO 1	To broadly understand the physiological structure of each organ system and its physiological functions
	CO 2	To understand broadly the clinical abnormalities of organs and its clinical physiological implications
Biochemistry	CO	Description
	CO 1	Understanding the basic principles and procedures in specimen collection, reagent preparation and testing in Clinical laboratory
	CO2	Understanding the properties of biomolecules, their function and biochemical process involved in health and disease
	CO3	Understanding the importance of nutrition in health and disease

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	CO	Description
Basic ECG(BECG)	CO1	To have an idea on cardiac electrophysiology
	CO2	To understand the technical basis of ECG recording
	CO3	To gain theoretical knowledge on normal ECG variables
	CO4	To gain theoretical knowledge on the common abnormalities in ECG
	CO5	To gain basic practical skill to interpret a given ECG

	CO	Description
Cardiac Anatomy and Physiology(CAP)	CO 1	To understand the normal structure and functioning of the heart
	CO 2	To understand the cardiac hemodynamics
	CO 3	To have a knowledge on the generation of normal heart sounds and their variations in different disease conditions
	CO 4	To understand the arterial and venous supply of the heart and body

	CO	Description
English and Communication Skills	CO 1	Enable students in enhancing the ability to comprehend spoken and written English.
	CO 2	Avail effective communicative English in their professional work.
	CO 3	Practice students' skills in verbal and written English during clinical and classroom experiences.

	CO	Description
Constitution of India	CO 1	Understanding the structure of Constituent Assembly
	CO 2	To understand the fundamental duties and rights of Indian citizen
	CO 3	Knowledge regarding electoral process of India
	CO 4	Understand the importance of directive policies of state policies

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- CO 5 Understand the structure and composition of Indian Constitution, and the ways of amending the constitution
- CO 6 Stimulate the roles of each of the three branches of government
- CO 7 Understand the provisions in the constitution for different areas

Semester II

General Pathology

- | CO | Description |
|------|--|
| CO 1 | To be able to define the medical terms, define and classify disease and understand the concepts of the disease. |
| CO2 | Able to describe the causes and mechanism of common diseases that occur during the routine work and also changes seen in different individuals and various organs and fluids |
| CO3 | Able to enumerate the laboratory tests eg: urine, blood, bodyfluids and its application on various diseases |

Microbiology

- | CO | Description |
|------|---|
| CO 1 | Understanding of role of microbial agents in health and disease |
| CO 2 | Understand and practice various methods of Sterilization and disinfection |

Advanced ECG and Holter Monitoring

- | CO | Description |
|-----|---|
| CO1 | To gain knowledge in Diagnosis of an arrhythmia |
| CO2 | To understand the origin and mechanism associated with arrhythmias |
| CO3 | To correlate ECG findings to a reach a clinical interpretation. |
| CO4 | To Gain knowledge and to enable the diagnostic skill in Interpretation of any given ECG |
| CO5 | To Evaluate cardiac related symptoms by Holter monitoring and analysing |

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Cardiac Embryology (CEM)

CO	Description
CO1	To Understand Developmental facts of cardiovascular system and fetal circulation
CO2	To Describe the embryological development of structures of the heart
CO3	To Identify regions of the fetal heart
CO4	To understand the developmental changes relate to definitive cardiac structure and abnormalities
CO5	To Relate fetal heart structures to adult counterparts

Health Care

CO	Description
CO 1	Describe the concepts of health, illness and national health policy various welfare programs in India.
CO 2	Explain the concepts of Nursing
CO 3	Explain the basic special needs of the patient, bandaging and first aid for common emergencies
CO 4	Explain infection control

Environmental Studies

CO	Description
CO 1	Students will be able to learn about environment, factors affecting it, environmental ethics and its protection
CO2	Students will be able to describe a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability
CO3	Students will be able to Critically analyze technical subject matter (written or oral) for scientific merit apply learned environmental knowledge and understanding to solve technical /research problems in new contexts

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Sociology

CO	Description
CO 1	Able to understand the meaning of sociology, its relationship with other disciplines and also to gain knowledge on the sociological methods of investigations
CO 2	Able to understand social factors and its role in health and disease
CO 3	Able to understand the meaning, importance and agencies of socialization
CO 4	Able to understand the concept and role of social groups in health, sickness and rehabilitation
CO 5	Able to understand the meaning of family and its role in health, nutrition and sickness among members
CO 6	Able to understand the meaning, features and health hazards of rural and urban communities
CO 7	Able to understand the concept of culture and health and their relationship
CO 8	Able to understand the meaning of social change, factors of social change, social change and stress, social change and health
CO 9	Able to understand the meaning of social problems and types of social problems in the society
CO 10	Gain knowledge on the social security and social legislation measures for the disabled
CO 11	Able to understand the meaning of social work and role of medical social worker

Ethics

CO	DESCRIPTION
CO1	To understand the fundamentals of Medical Ethics
CO2	To Understand the Ethical Issues in Professional conduct of Healthcare
CO3	To gain knowledge in the Medico legal aspects of health records in healthcare practice
CO4	To be able to explain the respective ethical challenges and potential conflicts of interest in the functional departments of the organization
CO5	To increase the awareness and knowledge of the value dimensions of interactions with the patients, colleagues, relations and public.

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CO6 To Understand and respect the rights of the patient and the duties responsibilities of the healthcare people

Semester III

Systemic Pathology

CO	Description
CO 1	To be able to define the medical terms, define and classify disease and understand the concepts of the disease.
CO2	Able to describe the causes and mechanism of cardiovascular diseases that occur during the routine work and also changes seen in different individuals
CO3	Able to enumerate the laboratory tests eg: urine, blood, bodyfluids and its application on cardiovascular diseases

Applied Microbiology

CO	Description
CO 1	To understand urinary tract and bloodstream infections
CO2	To study viral infections of importance
CO3	To learn infection control measures and to understand methods of sterilization and disinfection

Pharmacology

CO	Description
CO1	Know the basics of pharmacology like history, scope & general principles
CO2	Describe the pharmacokinetics and pharmacodynamics of essential and commonly used drugs.
CO3	To appreciate adverse reactions and drug interactions of commonly used drugs
CO4	Knowledge on essential drugs in special conditions such as diuretics, opioids, corticosteroids, antihistamines, antiemetics, IV fluids and Immunosuppressants etc

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Congenital Heart Diseases I - T (CHD-I)	CO	Description
	CO1	To gain knowledge indepth of various acyanotic congenital heart diseases
	CO2	To understand the morphology and classifications of acyanotic congenital heart diseases
	CO3	To understand the hemodynamics of each acyanotic congenital heart disease in detail
	CO4	To understand relevant screening and / or diagnostic tests appropriate for cardiovascular risk stratification
	CO5	To develop theoretical and practical skills to how to approach acyanotic congenital heart diseases by echocardiography
	CO6	To understand and develop theoretical and practical skills in cardiac catheterization,Interventional and Surgical Management

Physics And Instrumentation (PI)	CO	Description
	CO1	To understand basic concepts of ultrasound physics and its applications to patient care
	CO2	To gain knowledge on technical aspects of an echocardiographic machine
	CO3	To gain theoretical and practical knowledge on common source of errors and how to overcome it
	CO4	To understand the application of 2D and doppler principles in image acquisition
	CO5	To understand hemodynamics using doppler assessment
	CO6	To gain theoretical and practical skill in position of transducer and its role in patient care

Kannada	CO	Description
	CO 1	To comprehend and communicate in simple Kannada and improve their vocabulary of daily usage
	CO2	to understand distinct sounds and improve pronunciation
	CO3	to form simple sentences to talk to patients, bystanders and the localities

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Semester IV

Congenital Heart Disease II - T (CHD- II)	CO	Description
	CO1	To gain knowledge indepth of various Cyanotic congenital heart diseases
	CO2	To understand the morphology and classifications of Cyanotic congenital heart diseases
	CO3	To understand the hemodynamics of each cyanotic congenital heart disease in detail
	CO4	To understand relevant screening and / or diagnostic tests appropriate for cardiovascular risk stratification
	CO5	To develop theoretical and practical skills to how to approach cyanotic congenital heart diseases by echocardiography
	CO6	To understand and develop theoretical and practical skills in cardiac catheterization ,Interventional and surgical Management
Clinical cardiology	CO	Description
	CO1	To gain knowledge on the clinical examination of cardiac diseases
	CO2	To understand various cardiac and noncardiac causes of symptoms associated with cardiac diseases
	CO3	To provide proper diagnosis and care for patients with cardiac diseases
	CO4	To understand the grade of severity of cardiovascular diseases based on symptoms
Cardiac stress and Nuclear cardiology	CO	Description
	CO1	To understand the various cardiac stress tests and nuclear tests used in diagnostic cardiology
	CO2	To gain practical knowledge in performing various cardiac stress test and nuclear tests
	CO3	To understand the importance of myocardial viability in patients who require cardiac revascularization
	CO4	To gain theoretical and practical knowledge in cardiac monitoring and managing cardiac arrest in emergency situations

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Basics in Cardiac Cath and hardware's	CO	Description
	CO1	To gain knowledge in the various hardware's and instruments used in cardiac catheterization laboratory
	CO2	To understand the X ray production and importance of radiation safety in Cath lab
	CO3	To gain practical knowledge in providing the hardware's during various procedures in Cath lab
	CO4	To understand the emergency medications used in Cath lab and the importance of maintaining Cath lab sterility

Biostatistics	CO	Description
	CO 1	At the end of the course students will be familiar with statistics methods and techniques.
	CO 2	After the completion of the course students will be able to manage the data with various validation and cleaning process
	CO 3	At the end of the course students will be familiar with different types of data analysis techniques.
	CO 4	At completion of the course students can able to operate the statistical software to describe the data with proper presentation.

Semester V

Valvular and Aortic Heart Diseases (VAHD)	CO	Description
	CO1	To gain knowledge indepth of various Valvular and aortic heart diseases
	CO2	To understand the etiology, morphology and classifications of Valvular and aortic heart diseases
	CO3	To understand the hemodynamics and Pathophysiology of each Valvular and aortic heart diseases in detail
	CO4	To understand relevant screening and / or diagnostic tests with clinical findings appropriate for cardiovascular risk stratification
	CO5	To develop theoretical and practical skills to how to approach Valvular

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and aortic heart diseases by echocardiography

CO6 To understand and develop theoretical and practical skills in cardiac catheterization, Interventional and surgical Management

**Applied
Echocardiography
(APE)**

CO	Description
CO1	To Develop an understanding of the multi-disciplinary applications of echocardiography in structural heart disease interventions and its role as a vital procedural adjunct.
CO2	For the description and understanding of cardiologic problems almost always involves the echocardiographic findings
CO3	To understand the role of echocardiography in preoperative, intraoperative, postoperative hemodynamic evaluation
CO4	To understand the echocardiographic findings, appropriate for cardiovascular risk stratification
CO5	To develop theoretic and practical skills to how to approach heart diseases by echocardiography
CO6	Identify the major areas of innovations in echocardiography and Outline their clinical approach

**Cardiac
Catheterization
and Intervention
I (CCI -I)**

CO	Description
CO1	To understand the theoretical and technical aspects of cardiac Cath and intervention
CO2	To gain knowledge indepth of indications and to build the ability to assist independently for the interventional procedures
CO3	To understand in detail about equipment, materials,sequential approach for various procedures in Cath lab
CO4	To develop practical skill in how to manage situations during emergencies in Cath lab
CO5	Illustrate the role of ECG, echocardiography, hemodynamic assessment during and after the interventional procedures of various diseases
CO6	To understand the theoretical and technical aspects of cardiac pacemakers
CO7	To build the ability to assist the pacemaker

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- CO8 To build up the ability to perform the periodical analysis of pacemakers
- CO9 To identify the pacemaker malfunctions and to take corrective measurements

Semester VI

Ischemic, Myo - Pericardial heart diseases and Cardiac Masses (IMP& CM)	CO	Description
	CO1	Provide knowledge with a systematic approach to evaluate patients with different heart diseases like Ischemic, Myo - Pericardial heart diseases and Cardiac Masses
	CO2	To acquire knowledge on physiologic principles, Structural and functional abnormalities which governs the function of the heart
	CO3	To understand different etiologies, clinical presentations and types associated with disease states including Ischemic, Myo - Pericardial heart diseases and Cardiac Masses
	CO4	To acquire knowledge on hemodynamic abnormalities associated with disease states including Ischemic, Myo - Pericardial heart diseases and Cardiac Masses
	CO5	To understand the role of relevant screening and / or diagnostic tests appropriate for cardiovascular risk stratification
	CO6	To develop theoretical and practical skills to how to approach Ischemic, Myo - Pericardial heart diseases and Cardiac Masses by echocardiography
	CO7	To understand and develop theoretical and practical skills in Cardiac Catheterization, Interventional and surgical management of underlying pathologies

Advanced Echocardiography (ADE)	CO	Description
	CO1	To understand basic concepts of ultrasound physics of advanced techniques in echocardiography
	CO2	Develop an understanding of the multi-disciplinary applications of advanced techniques in clinical practice over conventional 2D imaging and its role as a vital procedural adjunct.

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- CO3 To acquire theoretical and practical knowledge of advantages and limitations of each technique in clinical application
- CO4 To acquire theoretical and practical knowledge on equipment and common source of errors of each technique and develop skills on how to overcome it in clinical applications
- CO5 To understand its role in qualitative and quantitative assessments of various heart diseases according to evidence-based guidelines
- CO6 To understand the utility and prerequisite of each technique in various areas including catheter based interventional techniques and during cardiac surgeries in diagnosis making

**Cardiac
Catheterization
and Intervention
II - T (CCI- II)**

- | CO | Description |
|-----|---|
| CO1 | To gain knowledge indepth of indications and timings of interventional procedures for various heart diseases |
| CO2 | To understand in detail about equipment, materials,sequential approach for various procedures in Cath lab |
| CO3 | To develop assisting interventionalist during each procedure independently |
| CO4 | To develop practical skill in how to manage situations during emergencies in Cath lab |
| CO5 | Innumerate the measures to be taken before, after and during the procedures |
| CO6 | Illustrate the role of ECG, Echocardiography, hemodynamic assessment during and after the interventional procedures of various diseases |
| CO7 | To build the ability to assist the pacemaker and ICD implantation procedures |
| CO8 | To build up the ability to perform the periodical analysis of pacemakers and ICDs |

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