



AMRITA

VISHWA VIDYAPEETHAM

A Multi Campus University with 'A++' Grade Accreditation by NAAC

AMRITA SCHOOL OF MEDICINE

Amrita Centre for Allied Health Sciences

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CURRICULUM

M.Sc Physician Associate - CVTS



A Super Specialty Tertiary Care Hospital Accredited by ISO 9001-2008, NABL & NABH

Our Chancellor



SPIRITUAL PRINCIPLES IN EDUCATION

“In the gurukulas of ancient rishis, when the master spoke it was love that spoke; and at the receiving end disciple absorbed of nothing but love. Because of their love for their Master, the disciples’ hearts were like a fertile field, ready to receive the knowledge imparted by the Master. Love given and love received. Love made them open to each other. True giving and receiving take place where love is present. Real listening and ‘sraddha’ is possible only where there is love, otherwise the listener will be closed. If you are closed you will be easily dominated by anger and resentment, and nothing can enter into you”.

“Satguru Mata Amritanandamayi Devi”

Introducing AIMS

India is the second most populous nation on earth. This means that India's health problems are the world's health problems. And by the numbers, these problems are staggering 41 million cases of diabetes, nearly half the world's blind population, and 60% of the world's incidences of heart disease. But behind the numbers are human beings, and we believe that every human being has a right to high-quality healthcare.

Since opening its doors in 1998, AIMS, our 1,200 bed tertiary care hospital in Kochi, Kerala, has provided more than 4 billion rupees worth of charitable medical care; more than 3 million patients received completely free treatment. AIMS offers sophisticated and compassionate care in a serene and beautiful atmosphere, and is recognized as one of the premier hospitals in South Asia. Our commitment to serving the poor has attracted a dedicated team of highly qualified medical professionals from around the world.

The Amrita Institute of Medical Sciences is the adjunct to the term "New Universalism" coined by the World Health Organization. This massive healthcare infrastructure with over 3,330,000 sq. ft. of built-up area spread over 125 acres of land, supports a daily patient volume of about 3000 outpatients with 95 percent inpatient occupancy. Annual patient turnover touches an incredible figure of almost 800,000 outpatients and nearly 50,000 inpatients. There are 12 super specialty departments, 45 other departments, 4500 support staff and 670 faculty members.

With extensive facilities comprising 28 modern operating theatres, 230 equipped intensive-care beds, a fully computerized and networked Hospital Information System (HIS), a fully digital radiology department, 17 NABL accredited clinical laboratories and a 24/7 telemedicine service, AIMS offers a total and comprehensive healthcare solution comparable to the best hospitals in the world. The AIMS team comprises physicians, surgeons and other healthcare professionals of the highest caliber and experience.

AIMS features one of the most advanced hospital computer networks in India. The network supports more than 2000 computers and has computerized nearly every aspect of patient care including all patient information, lab testing and radiological imaging. A PET (Positron Emitting Tomography) CT scanner, the first of its kind in the state of Kerala and which is extremely useful for early detection of cancer, has been installed in AIMS and was inaugurated in July 2009 by Dr. A. P. J. Abdul Kalam, former President of India. The most recent addition is a 3 Tesla Silent MRI.

The educational institutions of Amrita Vishwa Vidya Peetham, a University established under section 3 of UGC Act 1956, has at its Health Sciences Campus in Kochi, the Amrita School of Medicine, the Amrita Centre for Nanosciences, the Amrita School of Dentistry, the Amrita College of Nursing, and the Amrita School of Pharmacy, committed to being centres of excellence providing value-based medical education, where the highest human qualities of compassion, dedication, purity and service are instilled in the youth. Amrita School of Ayurveda is located at Amritapuri, in the district of Kollam. Amrita University strives to help all students attain the competence and character to humbly serve humanity in accordance with the highest principles and standards of the healthcare profession.

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Part I

Rules and Regulations

I. Post Graduate Programs (Master of Sciences)

1. Details of Post Graduate Courses :			
Sl. No.	Course	Duration	Eligibility for admission to the course
1	Medical Laboratory Technology (MLT)	2 years	Pass in B.Sc MLT (4 year regular courses only)
2	Neuro-Electro Physiology		B.Sc Neuro-Electro Physiology
3	Swallowing Disorders and Therapy		BASLP
4	Biostatistics		Graduates in Statistics/Mathematics with paper in Statistics
5	Respiratory Therapy		B.Sc Respiratory Therapy
6	M.Sc Diabetes Sciences		B.Sc Diabetes Sciences
7	M.Sc Cardiovascular Technology		B.Sc Cardiovascular Technology
8	M.Sc Trauma and Critical Care		B.Sc Emergency Medical Technology, B.Sc Respiratory Therapy, B.Sc Physician Assistant, B.Sc Anaesthesia Technology
9	M.Sc Physician Assistant – Medical Oncology		B.Sc Physician Assistant
10	M.Sc Physician Associate – CVTS		B.Sc Physician Assistant
11	M.Sc Dialysis Therapy		B.Sc Dialysis Therapy

I.2. Medium of Instruction:

English shall be the medium of instruction for all subjects of study and for examinations.

II.3. Eligibility:

Essential qualifications for eligibility are mentioned under clause No. I.

II. General Rules:

Admissions to the courses will be governed by the conditions laid down by the University from time to time and as published in the Regulations for admissions each year.

I.1. Duration of the Course

Duration details are mentioned under clause No.I of this booklet.

Duration of the course	: Mentioned under clause No. I
Weeks available per year	: 52 weeks
Holidays	: 5 weeks
Examination (including preparatory)	: 6 weeks
Extra curricular activities	: 2 weeks
Weeks available	: 39 weeks
Hours per week	: 40 hours
Hours available per academic year	: 1560 (39 weeks x 40 hours)

Internship wherever specified are integral part of the course and needs to be done in Amrita Institute of Medical Sciences, Centre for Allied Health Sciences, Kochi itself.

II.2. Discontinuation of studies

Rules for discontinuation of studies during the course period will be those decided by the Chairman / Admissions, and is published in the "Terms and Conditions" every year.

II.3. Educational Methodology

Learning occurs by attending didactic lectures, as part of regular work, from co-workers and senior faculty, through training offered in the workplace, through reading or other forms of self-study, using materials available through work, using materials obtained through a professional association or union, using materials obtained on students own initiative, during working hours at no cost to the student.

II.4. Academic Calendar

Semester Scheme

FIRST SEMESTER

Commencement of classes	– August
Sessional exam	– October
Pre-University Examination	- 01 January – 15 January
University exam (with practical)	– 15 January - 30 January

SECOND SEMESTER

Commencement of classes	– February
Sessional exam	– May
Pre-University Exam	- 01 July – 15 July
University exam (with practical)	– 15 July – 30 July

THIRD SEMESTER

Commencement of classes	– August
Sessional exam	– October
Pre-University Examination	- 01 January – 15 January
University exam (with practical)	– 15 January - 30 January

FOURTH SEMESTER

Commencement of classes	– February
Sessional exam	– May
Pre-University Exam	- 01 July – 15 July
University exam (with practical)	– 15 July – 30 July

III. Examination Regulations:

III.1. Attendance: 75% of attendance (physical presence) is mandatory. Medical leave or other types of sanctioned leaves will not be counted as physical presence. Attendance will be counted from the date of commencement of the session to the last day of the final examination in each subject.

III.2. Internal Assessment:

1. Regular periodic assessment shall be conducted throughout the course. At least one sessional examination in theory and preferably one practical examination should be conducted in each subject. The Pre-University examination should be of the same pattern of the University Examination. The marks obtained in assignments / oral / viva / practical shall be taken to calculate the internal assessment.
2. A candidate should secure a minimum of 50% marks in the internal assessment in each subject (separately in theory and practical) to be eligible to appear for the University examination.
3. The internal assessment will be done by the department once during the course and final model exam which will be the same pattern of University Examination.
4. Each student should maintain a logbook and record the procedures they do and the work patterns they are undergoing. It shall be based on periodical assessment, evaluation of student assignment, preparation for seminar, clinical case presentation, assessment of candidate's performance in the sessional examinations, routine clinical works, logbook and record keeping etc.
5. Day to day assessment will be given importance during internal assessment and weightage for internal assessment shall be 20% of the total marks in each subject.
6. Sessional examination as mentioned above and the marks secured by the students along with their attendance details shall be forwarded to the Principal.

III.3. University Examinations:

- University Examination shall be conducted at the end of every semester.
- A candidate who satisfies the requirement of attendance and internal assessment marks, as stipulated by the University shall be eligible to appear for the University Examination.
- One semester will be 6 months including the days of the University Examination. Year will be counted from the date of commencement of classes which will include the inauguration day.
- The minimum pass for internal assessment is 50% and for the University Examination is 50%. However the student should score a total of 50% (adding the internal and external examination) to pass in each subject (separately for theory and practical)
- If a candidate fails in either theory or practical paper, he/she has to re-appear for both the papers (theory and practical)
- Maximum number of attempts permitted for each paper is five (5) including the first attempt.
- The maximum period to complete the course shall not exceed 4 years.
- Number of candidates for practical examination should be maximum 12 to 15 per day
- One internal and external examiner should jointly conduct the theory evaluation and practical examination for each student during the final semester.

III.4. Eligibility to appear university Examination:

A student who has secured 50% marks for Internal Assessment is qualified to appear for University Examination provided he/she satisfies percentage of attendance requirement as already mentioned at the III (1) of the clause.

III.5. Valuation of Theory – Revaluation Papers:

1. Valuation work will be undertaken by the examiners in the premises of the Examination Control Division in the Health Sciences Campus.

2. There will be **Re-Valuation** for all the University examinations. Fees for re-valuation will be decided by the Principal from time to time.
3. Application for revaluation should be submitted within 10 days from date of result of examination declared and it should be submitted to the office with payment of fees as decided by the Principal.

III.6. Supplementary Examinations:

Every regular University examination will be followed by a supplementary examination which will normally be held within four to six months from the date of completion of the regular examination.

As stipulated under clause No. 2 under Internal Assessment, HOD will hold an internal examination three to four weeks prior to the date of the University Examination. Marks secured in the said examination or the ones secured in the internal examination held prior to the earlier University Examination whichever is more only will be taken for the purpose of internal assessment. HODs will send such details to the Principal ten days prior to the date of commencement of University examination.

Students who have not passed / cleared all or any subjects in the University examination will be permitted to attend the next semester classes. However, he / she can appear for the final semester University Examination, only if he / she clear all the subjects in the previous semester University examinations.

Same attendance and internal marks of the regular examination will be considered for the supplementary examination, unless the HOD furnishes fresh internal marks and attendance after conducting fresh examination.

Students of supplementary batches are expected to prepare themselves for the University Examinations. No extra coaching is expected to be provided by the Institution. In case at any time the Institution has to provide extra coaching, students will be required to pay fees as fixed by the Principal for the said coaching.

III.7. Rules regarding carryover subjects:

A candidate will be permitted to continue the next semester of the course even if he/she has failed in the previous semester University Examinations. However, he / she can appear for the final semester University Examination, only if he / she clear all

the subjects in the previous semester (first, second and third semester) University examinations.

IV. Criteria for Pass in University Examination - Regulations:

IV.1. Eligibility criteria for pass in University Examination:

In each of the subjects, a candidate must obtain 50% in aggregate for a pass and the details are as follows:

- A separate minimum of 50% for Internal Assessment
- 50% in Theory & 50% in Oral / Viva
- A separate minimum of 50% in aggregate for Practical / Clinics (University Examinations)
- Overall 50% is the minimum pass in subject aggregate (University Theory + Viva / Oral + Practical + Internal Assessment)

IV.2. Evaluation and Grade:

1. Minimum mark for pass shall be 50% in each of the theory and practical papers separately (including internal assessment) in all subjects.
2. A candidate who passes the examination in all subjects within aggregate of 50% marks and above and less than 65% shall be declared to have passed the examination in the second class.
3. A candidate who passes the examination in all subjects in the first attempt obtaining not less than 65% of the aggregate marks for all the three years shall be declared to have passed the examination with First Class.
4. A candidate who secures an aggregate of 75% or above marks is awarded distinction. A candidate who secures not less than 75% marks in any subject will be deemed to have passed the subject with distinction in that subject provided he / she passes the whole examination in the first attempt.
5. A candidate who takes more than one attempt in any subject and pass subsequently shall be ranked only in pass class.
6. A Candidate passing the entire course is placed in Second class / First class / Distinction based on the cumulative percentage of the aggregate marks of all the subjects in the I and final University Examinations
7. Rank in the examination: - Aggregate marks of all two year regular examinations will be considered for awarding rank for the M.Sc Graduate Examination.

V. General considerations and teaching / learning approach:

There must be enough experience to be provided for self learning. The methods and techniques that would ensure this must become a part of teaching-learning process. Proper records of the work should be maintained which will form the basis for the students' assessment and should be available to any agency that is required to do statutory inspection of the school of the course.

Research Activities:

The candidate has to maintain a record of research activities done by him/her and keeps a project record (to be submitted to the Principal before Part II examination).

Part II Syllabus

Scope of Practice:

Works collaboratively with other providers in the care of patients. Performs an accurate history and physical examination of patients. Conducts comprehensive or episodic health assessments and develops patient care plans. Performs procedures according to the clinical delineation of privileges. Provides prevention strategies and management of acute and chronic health problems. Orders and interprets tests, treatments, and therapies within the scope of practice. Prescribes medications, diet, supplies, prosthetic devices, and other home health aides or medication under the supervision of supervising physician/surgeon. Provides clear, concise, accurate, and legible documentation regarding patient care in the medical record. Provides education to patients, families, and significant others using established education materials. May provide other clinical duties within the scope of practice as directed under the emergency operation plan.

Professional:

Advocates for patients, families, co-workers, the community, and the nursing profession. Integrates evidence-based knowledge and clinical expertise in decision-making. Participates in peer review and competency assessment activities. Seeks experiences and formal and independent learning activities to maintain and develop clinical and professional skills and knowledge. Establishes an effective relationship with the entire care team. May advance the profession through presentations and publications. May lead and assist in research and evidence-based practice through participant selection, coordination of the protocol(s), data collection, and other associated activities. Demonstrates accountability for professional conduct. Advances professionalism by seeking opportunities to develop new skills and enhance current ones.

Teaching:

Provides comprehensive teaching strategies for patients and their families. May provide education and mentoring of undergraduate and graduate students and current and new employees, including but not limited to medical staff, residents, advanced practice providers, and nursing. May develop or participate in programs to meet continuing education needs of staff. Provides formal and/or informal education or mentorship to both internal and external groups pertinent to the area of specialty.

Communication & Leadership:

Demonstrates excellence in written and verbal communication, public speaking, presentation skills, critical thinking and decision-making skills. Clearly understands the implications of situations and uses sound judgment when dealing with multiple disciplines. Ability to foster a cooperative work environment and view success in relationship to group success. Participates in program development. Acts as a resource for clinical staff in the practice setting. Consults with management in assessment, problem-solving, decision-making, and evaluating clinical/system issues and models of care. Identifies and participates in quality improvement initiatives within the practice setting and initiates change as appropriate. Leads multidisciplinary teams to provide integrated delivery of patient care services. May participate in the development and

revision of protocols or guidelines to reflect evidence-based changes in care management. May participate in activities that influence policy-making bodies to improve patient care.

Perform the necessary invasive procedures for the Cardiothoracic Surgeon:

- Prepare the patient for surgical procedure.
- Harvest necessary bypass grafts: saphenous vein vs. radial artery.
- Assist in the maintenance of sterile field by applying principles of aseptic technique; informs the
- Surgeon/surgical team of infractions.
- Make necessary opening incisions.
- Assist the Cardiothoracic Surgeon in the operative procedures.
- Close the incision after the procedure is completed.
- Perform any necessary procedures such as arterial and central lines, chest tube insertion and other procedures requested by the surgeon.
- Performs physical examinations; Takes complex medical histories on patients.
- Orders laboratory test, x-rays, special imaging, studies and other diagnostic procedures;
- Orders and supervises the administration of blood products.
- Must take the initiative the in evaluation and performing both therapeutic and surgical procedures in the response to life-threatening situations.
- Must diagnostically interpret and or perform test/procedures, to the extent of recognizing deviations from the norm, common laboratory, radiologic, cardiographic and other diagnostic procedures used to identify pathophysiologic processes.
- Reaches diagnosis of medical, surgical and other conditions; Develops treatment plans in conjunction with attending physician to provide optimal patient medical management; Orders consultations and interacts with members of other specialty medical teams.
- Perform other related duties and participate in special projects as assigned.

SCHEME OF CURRICULUM

SEMESTER – I

(L - Lectures, T - Tutorials, P -Practicals, CL – Clinics)

Paper No	Course	Subjects	Hours		
			L/T	P /CL	Total
I	Basics of cardiovascular and Thoracic surgery	○ Introduction	5	-	190
		○ EMR	2	10	
		○ Anatomy and Physiology of the cardiovascular system	10	-	
		○ History and Physical Examination of the cardiovascular system	13	40	
		○ Diagnostics	10	20	
II	Cardiac Critical Care	○ Admission to ICU	10	20	550
		○ Monitoring in ICU	15	40	
		○ Critical care ad post-operative and management	20	60	
		○ Drugs	20	20	
		○ Early post-operative care	20	80	
		○ Mediastinal Bleeding	10	30	

		○ Respiratory Management	20	60	
		○ Cardiovascular management	25	100	
III	Research Methodology & Biostatistics	○ Introduction to Biostatistics & Research Methodology	2	-	40
		○ Sampling	2	-	
		○ Basic probability distribution and sampling distributions	2	-	
		○ Tests of Significance	6	-	
		○ Correlation and Regression	6	-	
		○ Sample size determination	4	-	
		○ Study Designs	4	-	
		○ Multivariate analysis	4	-	
		○ Reliability and validity evaluation of Diagnostic Tests	4	-	
		○ Format of Scientific documents	6	-	
		TOTAL HOURS	230	550	780

SEMESTER – II

Paper No	Course	Subjects	Hours		
			L/T	P /CL	Total
IV	Basics of CPB and Anaesthesia	○ The CPB console and Circuit	10	20	300
		○ Cannulation Venting the heart	5	30	
		○ Conduct of CPB	10	30	
		○ Mechanical Circulatory support	7	20	
		○ Complications of CPB	8	15	
		○ ECMO	10	25	
		○ Myocardial Protection	10	20	
		○ Cardiac Anesthesia	30	50	
V	Congenital Cardiac Surgery	○ Introduction	5	-	480
		○ Evaluation	15	30	
		○ Pathophysiology	10	30	
		○ Perioperative care	10	80	
		○ Postoperative care	10	80	
		○ Postoperative complications	15	85	
		○ Surgery for specific congenital heart defects	10	100	
		TOTAL HOURS	165	615	780

(L - Lectures, T - Tutorials, P -Practicals, CL – Clinics)

SEMESTER – III

Paper No	Course	Subjects	Hours		
			L/T	P /CL	Total
VI	Ischemic Heart Diseases	○ Introduction	5	-	370
		○ Clinical features and diagnostic criteria	10	60	
		○ Surgery for CAD	10	90	
		○ Left Ventricular aneurysm	10	90	
		○ Post infarction VSD	15	80	
VII	Valvular Heart Surgery	○ Anatomy and Physiology	5	-	375
		○ Mitral Valve Diseases	10	60	
		○ Aortic Valve Diseases	10	90	
		○ Tricuspid valve Diseases	10	90	
		○ Infective endocarditis	10	90	
VIII	Healthcare Management	○ Principles of Management	7	-	35
		○ Health Economics & Marketing	8	-	
		○ Hospital Services & Planning	10	-	

		○ Hospital Information System & Quality Assurance	10	-	
		TOTAL HOURS	130	650	780

(L - Lectures, T - Tutorials, P -Practicals, CL – Clinics)

SEMESTER – IV

Paper No	Course	Subjects	Hours		
			L/T	P/CL	Total
IX	Thoracic and Vascular surgery	<ul style="list-style-type: none"> ○ Anatomy ○ Vascular ○ Pulmonary ○ Tracheal conditions ○ Pleural and Parietal conditions ○ Esophageal conditions ○ Mediastinal conditions 	65	225	290
X	Heart failure and Advances in Cardiac surgery	<ul style="list-style-type: none"> ○ Pericardium and constructive Pericardium ○ Cardiomyopathy ○ Left Ventricular Assist Devices and Total artificial heart ○ Heart Transplantation ○ Heart Lung transplantation ○ Robotic and minimally invasive cardiac surgery <p>Innovative therapies and technologies</p>	75	215	290
XI	Thesis		-	200	200

		TOTAL HOURS	140	640	780
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(L - Lectures, T - Tutorials, P -Practicals, CL – Clinics)

Course content (syllabus) Theory

Semester I

Paper I: Basics of cardiovascular and Thoracic surgery

Unit No	Unit title	Content	Hours		
			L/T	P/CI	Total
1	Orientation and introduction to the course	<ul style="list-style-type: none"> • Orientation to the Cardiothoracic department OPD, Ward, ICU, Operation Theatre • Orientation to Adult Cardiology, Pediatric cardiology, Cathlab, Echo room, Blood bank, CSSD, Radiology 	1	4	5
2	Introduction to EMR	<ul style="list-style-type: none"> • Introduction to Electronic medical records • Introduction to Amrita HIS 	1	2	3
3	Cardiovascular Anatomy and Physiology	<ul style="list-style-type: none"> • Surgical Anatomy of the heart • Chambers of the heart • Valves of the heart • Cardiac Physiology • Major Blood vessels • Coronary Arteries • Cardiac Lymphatic system • Basic Myocyte Physiology • Myocardial Contractile function • Cardiac Pump Function • Cardiac output • Preload • Afterload • Cardiac Cycle • Coronary Blood flow 	10	-	10

		<ul style="list-style-type: none"> • Auto regulatory Mechanisms of Coronary Blood Flow • Myocardial Ischemia • Myocardial Infraction • "Stunned" Myocardium • "Hibernating "Myocardium • Electrical control of cardiac Muscle • Basics of ECG 			
4	History taking & Physical examination	<ul style="list-style-type: none"> • History and Physical Examination of cardiovascular system • Symptoms of heart diseases • Cardiac examination: Inspection, Palpation, Auscultation • Arterial pulse • Pre-operative evaluation • Pre-operative workup for a cardiac patient 	2	4	6
5	Diagnostics	<ul style="list-style-type: none"> • Laboratory Assessment • Chest X-ray • Pulmonary Function test (PFT) • Carotid Doppler/Ultrasound Study • Ankle-Brachial Index • ECG • Exercise stress testing • Surface Echocardiography • Trans-esophageal echocardiogram • Coronary Angiography • Cardiac catheterization • CT • MRI • Nuclear Imaging 	5	13	18

6	Cardiac Operation Theatre	<ul style="list-style-type: none"> • Personnel: Who is who in Operation Theatre • Design of cardiac surgery operation theatre • Medical and electronic equipment in cardiac operation theatre • Hybrid operation theatre • Instruments used in Cardiac Surgery • Basic of Robotics • Cardiac surgery operating room preparation 	8	-	8
Total					

Paper-II: Cardiac Critical Care

Unit No	Unit title	Content	Hours		
			L/T	P/CL	Total
1.	Admission to the ICU	<ul style="list-style-type: none"> • Initial Evaluation of the Patient in the Intensive Care Unit 	1	1	2
2.	Monitoring in the ICU	<ul style="list-style-type: none"> • ECG display • Arterial lines • Central venous pressure (CVP) • Venous oxygen saturation • Swan-Ganz pulmonary artery catheters • Cardiac output monitoring. • Left atrial (LA) lines • Chest tubes • Urine Output • Nasogastric tubes • Pacing wires. • Removal of Monitoring lines 	2	1	3

3	Critical care and post-operative management	<ul style="list-style-type: none"> • Basics of mechanical ventilation • ABG analysis • Fluid and electrolyte imbalance • Low cardiac output • Cardiac Arrhythmias • Cardiac tamponade • IABP • CPR • Sepsis • Wound care 	5	14	19
4	Drugs	<ul style="list-style-type: none"> • Inotropes • Vasodilators • Antiplatelets • Anticoagulants • Hemostatic agents • Anti-hypertensives • Statins • Diuretics 	8	2	10
5	Early Postoperative Care	<ul style="list-style-type: none"> • Warming from hypothermia • Control of mediastinal bleeding • Weaning and extubation • Analgesia and sedation • Fluid administration • Electrolytes and acid–base balance • Effects of CPB and Off-Pump Surgery on Renal Function • Hyperkalemia • Hypokalemia • Hypocalcemia • Hypomagnesemia • Metabolic Acidosis • Metabolic Alkalosis. • Hyperglycemia 	10	3	13
6	Mediastinal Bleeding	<ul style="list-style-type: none"> • Etiology of Mediastinal Bleeding • Blood Conservation Measures • Assessment of Bleeding in the ICU • Management of Mediastinal Bleeding • Blood Transfusions 	7	3	10

		<ul style="list-style-type: none"> • Mediastinal Re-exploration for Bleeding or Tamponade • Technique of Emergency Sternotomy 			
7	Respiratory Management	<ul style="list-style-type: none"> • Basic Concepts of Oxygenation • Basic Concepts of Alveolar Ventilation • Ventilatory Weaning and Extubation • Post extubation Respiratory Care • Methods of Ventilatory Support 	5	5	10
8	Cardiovascular Management	<ul style="list-style-type: none"> • Low Cardiac Output Syndrome • Intra-aortic Balloon Counterpulsation • Mechanical Circulatory Support. • Inotropic and Vasoactive Drugs • Vasodilators and Antihypertensive Medications in the ICU • Perioperative Myocardial Infarction • Coronary Vasospasm. • Systemic Hypertension • Cardiac Arrest • Pacing Wires and Pacemakers • Cardiac Arrhythmias • Antiarrhythmic Medications. • Cardiopulmonary Resuscitation 	7	7	14

Paper III: Research Methodology & Biostatistics

Unit No	Unit title	Content	Hours
1	Introduction	<ul style="list-style-type: none"> • Introduction to Biostatistics & Research Methodology, types of variables & scales of measurements, measures of central tendency and dispersion, Skewness and Kurtosis Rate, ratio, proportion, incidence & prevalence and their meaning. 	4
2	Sampling	<ul style="list-style-type: none"> • Random & non random sampling, various methods of sampling- simple random, stratified, systematic, cluster and multistage. Sampling and non-sampling 	4

		errors.	
3	Basic probability distribution and sampling distributions	<ul style="list-style-type: none"> • Concept of probability distribution, normal, Poisson and Binomial distributions, parameters and applications. Concept of sampling distributions. Standard error and confidence intervals. 	6
4	Tests of Significance	<ul style="list-style-type: none"> • Basics of testing of hypothesis - Null and alternate hypothesis, type I and type II errors, level of significance and power of the test, p value. Tests of significance (Parametric) T - test (paired & unpaired), Chi square test and test of proportion, one way analysis of variance. Repeated measures analysis of variance. Tests of significance (nonparametric) - Mann Whitney U Test, Wilcoxon Test, Kruskal - Wallis analysis of variance Friedmann's analysis of variance 	10
5	Correlation and Regression	<ul style="list-style-type: none"> • Simple correlation-Pearson's and Spearman's methods; testing the significance of correlation co-efficient simple and multiple linear regression. 	4
6	Sample size determination	<ul style="list-style-type: none"> • General concept Sample size for estimating means and proportion, testing of difference in means and proportions of two groups and more than two groups 	4
7	Study Designs	<ul style="list-style-type: none"> • Descriptive epidemiological methods - case series analysis and prevalence studies. Analytical epidemiological methods - case control and cohort studies, Clinical trials / intervention studies, odds ratio and relative risk, stratified analysis. 	10
8	Multivariate analysis	<ul style="list-style-type: none"> • Concept of multivariate analysis, introduction to logistic regression and survival analysis 	6
9	Reliability and validity evaluation of Diagnostic Tests	<ul style="list-style-type: none"> • Cronbach's alpha and Test - retest methods 	4
10	Format of Scientific documents	<ul style="list-style-type: none"> • Structure of Research protocol, the structure of thesis/research report, formats of reporting in scientific journals. Systematic review and meta-analysis. 	8

Reference Book:

1. Research Methodology and Biostatistics, A comprehensive guide for Health Care Professionals – Suresh K Sharma
2. Research Methodology: Methods and techniques – CR Kothari

Clinical Posting Schedule – Semester I**Week 1-2: CVTS Outpatient Department (OPD)**

Days 1-2: Overview of the OPD, patient assessment, and management of pre-operative patients

Days 3 onward: Observing and assisting in the care of CVTS patients in the OPD

Week 3-4: Inpatient Wards

Days 1-2: Overview of the post-operative care, patient assessment, and management of post-operative complications

Days 3 onwards: Observing and assisting in the care of CVTS patients in the wards

Week 5-6: Intermediate ICU

Days 1-2: Overview of the intermediate care for post-operative CVTS patients

Days 3 onwards: Observing and assisting in the care of CVTS patients in the Intermediate ICU

Week 7-8: ICU

Days 1-2: Overview of the ICU, monitoring techniques, and critical care management of CVTS patients

Days 3 onwards: Observing and assisting in the care of CVTS patients in the ICU

Week 9-14: CVTS Operating Room (OR)

Days 1-2: Overview of the conduct of CPB and mechanical circulatory support

Days 3 onwards: Observing CVTS surgeries and understanding the surgical process.

Note: *This schedule can be adjusted according to the needs and schedule of the program. Additionally, the rotation between the clinical posting areas can be altered as needed.*

Semester II

Paper IV: Basics of CPB and Anesthesia

Unit No	Unit title	Content	Hours		
			L/T	P/CL	Total
1	History	<ul style="list-style-type: none"> Development of Cardiopulmonary Bypass 	1	-	1
2	The Cardiopulmonary Bypass console and Circuit	<ul style="list-style-type: none"> Basic CPB circuit Components CPB console Tubing and connectors Pumps - Centrifugal pump, Roller pump Membrane Oxygenator, Types of oxygenators Heat exchangers, Venous Reservoir Types and Sizes of Cannulae Filed Suction, cardiotomy, Cell salvage system, Filter and bubble traps, Haemoconcentrator / Ultrafiltration 	1	5	6
3	Cannulation	<ul style="list-style-type: none"> Cannulation to the patient - Venous cannulation and Drainage Methods of venous Cannulation Peripheral venous cannulation Augmented venous drainage Arterial cannulation Cannulation sites – Ascending aorta, Femoral Arteries, Abdominal aorta, Axillary/ subclavian arteries, Innominate artery, Brachial artery, Common carotid artery, LV apex 	1	3	4
4	Venting the heart	<ul style="list-style-type: none"> Venting the right heart, Venting the left heart 	1	1	1
5	Conduct of CPB	<ul style="list-style-type: none"> Priming, Initiation of CPB, Anti-coagulation, Temperature Management, Weaning 	1	4	5

6	Mechanical Circulatory Support	<ul style="list-style-type: none"> • Short term Mechanical circulatory support • Long term mechanical circulatory support • LVAD 	1	2	3
7	Complications	<ul style="list-style-type: none"> • Mechanical complications, Systemic complications, Complications according to Physiological derangement 	3	-	3
8	Extracorporeal Membrane Oxygenation (ECMO)	<ul style="list-style-type: none"> • Evolution of ECMO, Clinical indications and contraindications for the institution of ECMO, Indications of ECMO for respiratory support, Techniques, • Venoarterial and Venovenous ECMO, ECMO complications, Medical complications, Organ management in ECMO patient 	5	5	10
9	Myocardial Protection	<ul style="list-style-type: none"> • Basics of Myocardial Protection • Minimize Myocardial Injury During Cardiac Surgical Procedures • Principles of Cardioplegia • Types of cardioplegia • Temperature • Route of delivery • Modified reperfusion • Cardioplegia delivery system • Antegrade and retrograde cardioplegia 	5	5	5
10	Cardiac Anaesthesia	<ul style="list-style-type: none"> • Preoperative Medications • Operative Preparation of the Patient for Heart- Surgery: Airway and Ventilation, Vascular Access and Monitoring • Induction and Maintenance of Anaesthesia • Drugs • Pre bypass Considerations • Anticoagulation for cardiopulmonary bypass - Heparin dosing, Heparin , Reversal of Anticoagulation monitoring, Heparin resistance, Heparin-induced 	4	4	8

		thrombocytopenia (HIT) <ul style="list-style-type: none"> • Considerations During Cardio-pulmonary Bypass 			
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Paper V: Congenital Cardiac Surgery

Unit No	Unit title	Content	Hours
1	Introduction	<ul style="list-style-type: none"> • Development of Heart and Great vessels • Nomenclature and classification of Pediatric and congenital heart diseases • Physiology of the fetal and neonatal circulation 	4
2	Basic Tools in Routine Evaluation of Cardiac Patients	<ul style="list-style-type: none"> • History Taking • Physical Examination - Growth Pattern, Palpation, Blood Pressure Measurement, Auscultation, • Electrocardiography • CXR 	6
3	Pre-operative diagnostic evaluation	Non-invasive Imaging Tools <ul style="list-style-type: none"> • Echocardiography • MRI and CT Invasive Procedures <ul style="list-style-type: none"> • Cardiac Catheterization and Angiocardiology 	4
4	Pathophysiology	Left-to-Right Shunt Lesions <ul style="list-style-type: none"> • ASD • VSD • PDA Obstructive Lesions <ul style="list-style-type: none"> • Pulmonary Stenosis • Aortic Stenosis • Coarctation of the Aorta • Interrupted Aortic Arch Cyanotic Congenital Heart Defects <ul style="list-style-type: none"> • Complete Transposition of the Great Arteries, Congenitally Corrected Transposition of the Great Arteries, Tetralogy of Fallot, Total Anomalous Pulmonary Venous Return, Tricuspid Atresia, Hypoplastic Left Heart Syndrome, Single Ventricle 	9

5	Perioperative care	<ul style="list-style-type: none"> • Pre-operative preparation • Intraoperative care • Temperature monitoring • Oxygen saturation • Arterial Catheter • Venous Catheters • Near-Infrared Spectroscopy • Pacemaker • Chet tubes • Nasogastric tubes • Urinary Catheter 	4
6	Post-Operative care	<ul style="list-style-type: none"> • Transport to the intensive care • Airway and breathing • Fluid and electrolyte Replacement • Hyperglycemia • Arrhythmia • Nutrition • Infection prophylaxis 	4
7	Postoperative Complications	<ul style="list-style-type: none"> • Cardiac output, Heartrate, Preload, After-load, Contractility • Bleeding, Cardiac Tamponade • Pulmonary hypertensive crisis • Cardiac Arrest • Pulmonary dysfunction • Renal Failure 	6
8	Surgery for congenital heart defects	<ul style="list-style-type: none"> • Palliate procedure • PDA • Vascular Rings • Interrupted aortic arch • ASD, PAPVC • VSD • AV Canal Defect • Truncus Arteriosus • AP Window • TOF • Pulmonary atresia with VSD • Ventricular to Pulmonary artery conduit • Double outlet ventricles • Transposition of Great Vessels • CCTGA • Functionally univentricular hear and Fontan's operation • Ebstein's anomaly • Hypoplastic left heart syndrome 	44

		<ul style="list-style-type: none"> • Total anomalous venous connection • Sinus of Valsalva aneurysm 	
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Clinical Posting Schedule – Semester II:

Week 1 – 4: CVTS OT – Adult

Focus on the CPB console and circuit.
Learn about cannulation and venting the heart.

Week 4 – 8 : CVTS OT Congenital and Pediatrics

Focus on congenital heart defects and pathophysiology
Learn about perioperative and postoperative care

Week 9: Perfusion Division

Focus on the conduct of CPB
Learn about mechanical circulatory support

Week 10 – 14 : Cardiac Anaesthesia

Focus on complications of CPB and ECMO
Learn about myocardial protection
Focus on cardiac anesthesia
Learn about conducting CPB

Posting Areas:

CVTS OT - Adult: This posting will provide hands-on experience in adult cardiac surgery. The focus will be on the CPB console and circuit, cannulation and venting the heart, and conducting CPB.

CVTS OT Congenital and Pediatrics: This posting will provide exposure to congenital heart defects and the pathophysiology involved. Students will learn about perioperative and postoperative care, postoperative complications, and surgery for specific congenital heart defects.

Perfusion Division: This posting will provide exposure to the conduct of CPB, including mechanical circulatory support. Students will learn about the techniques used in perfusion and how it affects the patient's condition.

Cardiac Anaesthesia: This posting will provide exposure to complications of CPB and ECMO. Students will learn about myocardial protection and cardiac anesthesia. They will also get hands-on experience in conducting CPB.

Semester III

Paper VI: Ischemic heart Diseases

Unit No	Unit title	Content	Hours
1	Introduction	<ul style="list-style-type: none">• Surgical Anatomy of Coronary Arteries• Left Main Coronary Artery• Left Anterior Descending Coronary Artery• Left Circumflex Coronary Artery• Right Coronary Artery• Coronary Arterial Supply to Specialized Areas of the Heart• Morphology - Development of Coronary Artery Stenosis, Myocardial Infarction and Morphologic Sequelae, Atherosclerotic Plaque Rupture and Thrombosis• Stable angina, NYHA classification, Unstable angina• Myocardial Infarction	10
2	Clinical Features and Diagnostic Criteria	<ul style="list-style-type: none">• ECG, CXR• Exercise Stress Tests• Coronary Angiography• Left ventricular Function test• Coronary CT Angiography• Medical management	10
3	Surgery for CAD	<ul style="list-style-type: none">• Indications for Operation• Coronary artery bypass grafting (CABG)• Preoperative Preparation• Conduits<ul style="list-style-type: none">○ Vein Graft○ Arterial Grafts○ Internal Thoracic Artery○ Radial Artery○ Inferior Epigastric Artery○ Right Gastroepiploic Artery• On Pump CABG• OPCAB• Distal Anastomoses• Coronary Artery Endarterectomy• Proximal Anastomoses• Reoperation	10
4	Left Ventricular Aneurysm	<ul style="list-style-type: none">• Clinical features and diagnostic criteria• Surgical management	10

5	Post Infarction Ventricular septal defect	<ul style="list-style-type: none"> • Clinical features and diagnostic criteria • Surgical management 	5
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Paper VII: Valvular Heart Surgery

Unit No	Unit title	Content	Hours
1	Anatomy	<ul style="list-style-type: none"> • Mitral Valve • Tricuspid valve • Aortic Valve • Pulmonary Valve 	5
2	Mitral Valve Disease	<ul style="list-style-type: none"> • Mitral Stenosis • Mitral Regurgitation • Clinical features and diagnostic criteria • Mitral valve replacement • <i>Mechanical Mitral Valve Replacement Devices</i> • <i>Bioprosthetic Mitral Valve Replacement Devices</i> • Mitral Valve Repair • Percutaneous mitral Commissurotomy 	10
3	Aortic Valve Disease	<ul style="list-style-type: none"> • Aortic Valve Stenosis • Aortic Valve Regurgitation • Clinical features and diagnostic criteria • Aortic valve replacement <ul style="list-style-type: none"> ○ Isolated aortic valve replacement ○ Prosthetic Aortic Valve • Replacement of aortic valve and ascending aorta • Aortic valve repair • Indications for operation • Principles and management of: <ul style="list-style-type: none"> ○ Aortic root surgery ○ Ascending aortic surgery ○ Aortic arch repair ○ Thoracoabdominal aneurysm repair ○ Abdominal aortic surgery • Endovascular aortic repair 	10

4	Tricuspid Valve Disease	<ul style="list-style-type: none"> • Tricuspid Regurgitation • Tricuspid stenosis • Tricuspid valve annuloplasty • Annuloplasty Ring Technique • De Vega Technique • Tricuspid valve Replacement • Indications for Operation 	10
5	Infective Endocarditis	<ul style="list-style-type: none"> • Clinical Features and Diagnostic Criteria 	5

Paper VIII - Healthcare Management

Unit No	Unit title	Content	Hours
1	Principles of Management	<ul style="list-style-type: none"> • Process of Management – Introduction to Management, History of Management, Fundamentals of Planning, Organising, Fundamentals of Staffing, Leading, Control System and Process • Management of Organizational Behavior – Fundamental Concepts of Organizing, Organizing Process, Organizational Behavior, Motivation and Behavior, Groups in Organization, Committees as an Organizational Tool • Material Management – Material Management in Hospitals, Introduction to Inventory Control, Supply Chain Management • Human Resource Management – The Nature of Human Resource Management Roles, Performance Appraisal, Recruitment and Selection, Reward Management, Training and Development, Labor Laws, Employee Termination & Separation, Pay Leave & Compensation • Operations Management – Operations Management 	7
2	Health Economics & Marketing	<ul style="list-style-type: none"> • Health & Hospital Economics – Economics in Healthcare, Basics of Hospital Budgeting, Introduction to Health Insurance, Insurance Claims – Life Cycle, Insurance Contracts, Managed Health 	8

		<p>Care</p> <ul style="list-style-type: none"> • Marketing of Hospital and Health Services – The Role of Marketing in a Modern Era, Patient’s Preference and Choice, Market Segmentation and Target Group, Market Research – An Effective Tool • Marketing of Hospital and Health Services – Marketing Strategies, The Pricing Policy, Promotional Policy and Practices, The Marketing Environment • Accounting for Hospitals – General Principles of Accounting, Preparation of Financial Statements, Analysis and Interpretation of Financial Statements, Introduction to Cost Accounting 	
3	Hospital Services & Planning	<ul style="list-style-type: none"> • Hospital Organization – Hospital as an Organization, Business Communication, Change Management, Conflict Resolution in Hospitals, Time Management, Hospital Committees, Health Education, The Role of Hospital Administrator • Hospital Functions and Services – Introduction to Hospital Functions and Services, Emergency Services, Disaster Management, Outpatient Services, Nursing Services, Laboratory Services, The Operating Department, Dietary • Hospital Functions and Services – Services, Central Sterilization And Supply Department, Laundry Service, Radiologic Services, Hospital Waste Management, Hospital Hygiene and Infection Control, Public Relations, Safety In Hospitals • Hospital Planning – History and Classification of Hospitals, Planning of Hospital, The Nursing Unit (Ward), Planning of Radiology Departments, Planning of Administrative Departments 	10
4	Hospital Information System & Quality Assurance	<ul style="list-style-type: none"> • Information Technology in Hospitals – Introduction • Quality Assurance in Hospitals – Introduction • Techniques of Quality Assurance – 	10

		<p>Benchmarking, Business Process Reengineering, Plan, Do, Study, Act (PDSA) Methodology, Six Sigma, Quality Circles, Kaizen, Overview of the ISO System, Accreditation in Health Care Organisations</p> <ul style="list-style-type: none"> • Medical Records – Introduction • Medical Audit – Introduction • Medical Coding – Introduction • Hospital Laws – Laws Applicable to Hospitals & Medical Practice • Medical Ethics – Laws Applicable to Hospitals & Medical Practice 	
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Reference Books:

1. Introduction to Health Care Management - Sharon B. Buchbinder
2. Hospital Management: Text & Cases, 1e. by Ramani
3. Hospital Administration by D.C.Joshi
4. Hospital Administration Principles & Practice by Sharma Yashpal
5. Hospital Administration And Management:A Comprehensive Guide, J.D.Gupta
6. Hospital Management: Vol. 1 by Manisha Saxena
7. Hospital Management: Vol. 2 by Manisha Saxena

Clinical Posting Schedule – Semester III:

Week 1-2: Adult Cardiac Surgery OR

Observation and participation in surgeries for Ischemic Heart Diseases, including CAD surgery and post-infarction VSD.

Week 3-4: ICU/IMCU

Observation and participation in the management of patients with cardiac conditions, including post-operative care.

Week 5-6: Hospital Administration

Exposure to the principles of healthcare management, health economics and marketing, hospital services and planning, and hospital information systems and quality assurance.

Week 7-8: Thesis Preparation

Dedicated time for thesis preparation and research.

Week 9-10: Adult Cardiac Surgery OR

Observation and participation in surgeries for Valvular Heart Diseases, including mitral, aortic and tricuspid valve surgeries and infective endocarditis.

Note: It is important to note that this schedule may vary depending on the availability of cases and the needs of the department. The students should also attend ward rounds and clinical meetings as part of their learning experience.

Semester IV

Paper IX: Thoracic and Vascular surgery

Unit No	Unit title	Content	Hours
1	Introduction	<ul style="list-style-type: none"> Anatomy of Chest wall Diaphragm, Lungs, Esophagus, Great vessels and branches Thoracic incisions VATS 	5
2	Vascular	<ul style="list-style-type: none"> Acute limb ischemia, Chronic limb ischemia, Thoracic outlet syndrome, Vascular grafts. 	2
3	Pulmonary	<ul style="list-style-type: none"> Lung resection Benign tumors of the lung Carcinoma of lung Lung abscess, Bronchiectasis Bullous lung disease Emphysema Pulmonary tuberculosis Hydatid cyst of lung Sequestration Pulmonary arteriovenous malformation, Aspergilloma of lung High-frequency jet ventilation Conduct of anesthesia for pulmonary operations Bronchoscopy. 	10
4	Tracheal Conditions	<ul style="list-style-type: none"> Tracheal injuries Tracheal tumors Tracheostomy Tracheal operations. 	5

5	Pleural and Parietal conditions	<ul style="list-style-type: none"> • Empyema • Pneumothorax • Hemothorax, • Fibrothorax • Fracture of ribs & sternum • Chest wall and Sternal deformities • Diaphragmatic paralysis & hernia • Chest wall tumors. 	10
6	Esophageal conditions	<ul style="list-style-type: none"> • Esophageal trauma • Esophageal stricture • Benign esophageal tumors • Esophageal cancer • Gastro-esophageal reflux disease • Esophageal diverticula • Surgical palliation • Esophageal inflammatory diseases • Esophageal motility disorders. 	10
7	Mediastinal conditions	<ul style="list-style-type: none"> • Mediastinal tumors • Mediastinal cysts. 	2

Paper X: Heart failure and Advances in Cardiac surgery

Unit No	Unit title	Content	Hours
1	Pericardium and constrictive pericarditis	<ul style="list-style-type: none"> • Pathophysiology of pericardial effusion • Cardiac tamponade • Constrictive pericarditis • Cardiac tamponade 	2
2	Cardiomyopathy	<ul style="list-style-type: none"> • Dilated cardiomyopathy – Morphology, pathophysiology, surgical treatment • Hypertrophic cardiomyopathy– Morphology, pathophysiology, surgical treatment 	4
3	Left ventricular Assist Devices and Total Artificial heart	<ul style="list-style-type: none"> • Historic perspective • Implant strategies for Mechanical Circulatory support • Bridge to transplant • Destination therapy • Bridge to candidacy • Bridge to recovery • Types of Devices • Short term Mechanical Circulatory support • Long term mechanical circulatory support • Total Artificial heart 	10

<p>4</p>	<p>Heart Transplantation</p>	<ul style="list-style-type: none"> • Historical background • Indication and Evaluation for heart transplantation • Organ procurement and preservation <ul style="list-style-type: none"> ○ Donor Selection ○ Donor Management ○ Donor and recipient matching ○ Donor Operative techniques ○ Organ Preservation • Recipient Operative techniques <ul style="list-style-type: none"> ○ Orthotropic standard technique ○ Orthotropic bicaval technique ○ Orthotropic Total technique ○ Heterotopic technique • Recipient Post-operative management – maintenance of Immunosuppression • Complications • Hyperacute rejection • Acute rejection • Acute cellular rejection • Antibody mediated rejection 	<p>10</p>
<p>5</p>	<p>Heart Lung transplantation</p>	<ul style="list-style-type: none"> • Indications for heart-lung Transplantation • Heart-lung preservation • Operative procedure • Complications 	<p>10</p>
<p>6</p>	<p>Robotic and Minimally Invasive cardiac surgery</p>	<ul style="list-style-type: none"> • Robotic systems • Minimally invasive cardiac surgery • Minimally Invasive Direct Coronary Artery Bypass grafting (MIDCAB) • Cannulation for Minimally Invasive cardiac surgery • Robotic-Assisted Cardiac Surgery • Mitral valve repair • Mitral valve replacement • CABG • AS Closure • Removal of Cardiac Tumors • Tricuspid valve repair • Robotic mitral valve surgery • Limitations 	<p>10</p>
<p>7</p>	<p>Innovative therapy and technology</p>	<ul style="list-style-type: none"> • Radiofrequency ablation • Trans myocardial laser revascularization • Hybrid Cardiac surgeries • Regenerative Cell based therapy for the treatment of Cardiac Diseases 	<p>5</p>

Reference books:

1. Manual of Perioperative Care in Adult Cardiac Surgery by Robert M Bojar
2. Sabiston and spencer surgery of the Chest
3. Pediatric Cardiac Surgery by Constantine Mavroudis
4. Cardiopulmonary Bypass: Principles and Practice – Glenn P. Gravlee
5. Kirklin/Barratt-Boyes cardiac Surgery: Morphology, Diagnostic criteria, Natural history, Techniques, Results and Indications.

Clinical Posting Schedule – Semester IV

Week 1-2: Thoracic Operation Room (OR)

Focus on anatomy and surgical procedures for thoracic and vascular conditions, including pulmonary, tracheal, pleural and parietal, and esophageal conditions.

Week 3-4: Adult cardiac surgery OR

Focus on surgical procedures for heart failure and advances in cardiac surgery, including pericardium and constructive pericardium, cardiomyopathy, and left ventricular assist devices and total artificial heart.

Week 5-6: Robotic surgery

Focus on the use of robotic technology in cardiovascular and thoracic surgery, including minimally invasive cardiac surgery and innovative therapies and technologies.

Week 7-8: Heart failure clinic

Focus on managing heart failure patients, including heart and heart-lung transplantation.

Weeks 9-15: Thesis preparation

Allot time for the students to work on their thesis projects, which can be related to any of the topics covered in the curriculum.

Note: *This schedule can be adjusted based on the needs and availability of the students and the facilities.*

SCHEME OF EXAMINATION

M.Sc Physician Associate – CVTS Examination Distribution of Marks for each subject

Pa- per Code	Subject Name	University	Inter- nal	Ora l	Sub- ject Total	Total	Aggre- gate
FIRST SEMESTER							1750
I	Basics of cardiovascular and Thoracic Surgery	100	20	30	150	450	
II	Cardiac Critical Care	100	20	30	150		
III	Research Methodology & Biostatistics	100	20	30	150		
SECOND SEMESTER							
IV	Basics of CPB and Anaesthesia	100	20	30	150	300	
V	Congenital Cardiac Surgery	100	20	30	150		
THIRD SEMESTER							
VI	Ischemic Heart Diseases	100	20	30	150	450	
VII	Valvular Heart Surgery	100	20	30	150		
VIII	Healthcare Management	100	20	30	150		
FOURTH SEMESTER							
IX	Thoracic and Vascular surgery	100	20	30	150	550	
X	Heart failure and Advances in Cardiac surgery	100	20	30	150		
XI	Thesis	100	-	-	100		
XII	Practical +Viva (150 + 50)	100	-	-	150		

IMPORTANT TELEPHONE NUMBERS

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