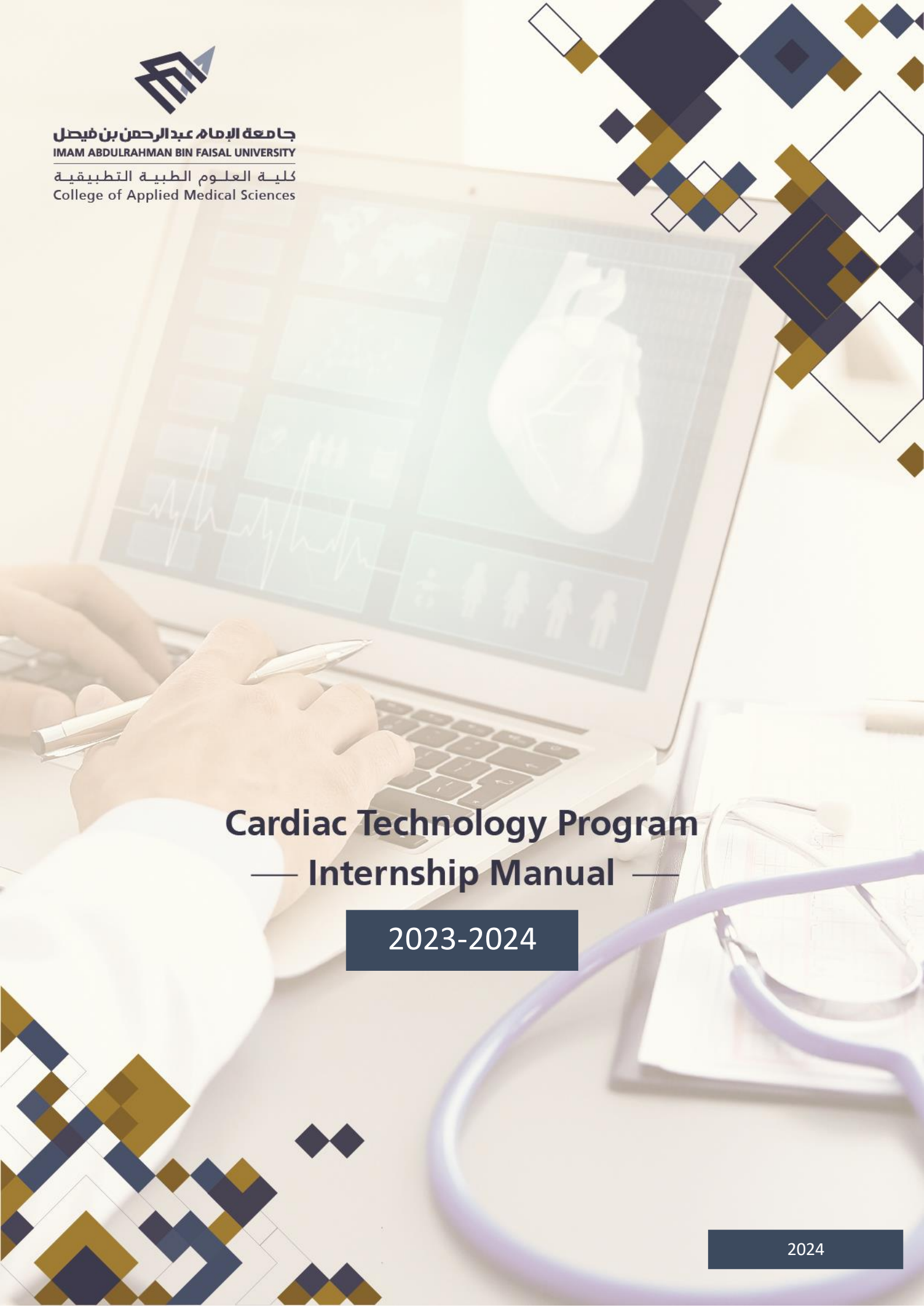
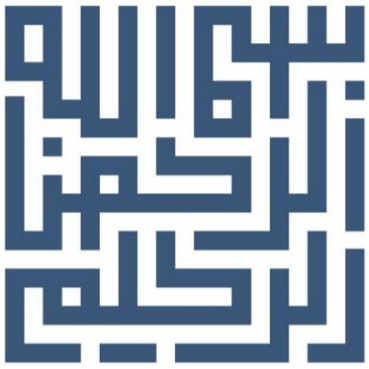
جامعة الإمام عبد الرحمن بن فيصل
IMAM ABDULRAHMAN BIN FAISAL UNIVERSITY
كلية العلوم الطبية التطبيقية
College of Applied Medical Sciences



Cardiac Technology Program
Internship Manual

2023-2024

2024



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MESSAGE FROM THE VICE DEAN OF TRAINING AFFAIRS

Internship period is considered the core of the academic journey, and the transitional phase from the theoretical learning to the practical application in institutions that might be the future working places. Therefore, the impression you leave at the hospital is crucial and taken into consideration with the GPA and other qualifications during recruitment. Employers usually seek commitment, morals, and ethics in their future employee through the training centers. Based on that, interns should take responsibility and demonstrate integrity and honesty. In addition to hard work, persistence, dedication, discipline, mutual respect, time, and instruction adherence. This will guarantee the obtainment of the intended outcomes, which will reflect an honorable image for the department and university. Moreover, serving the community and contributing to the development of this nation will be rewarded by Allah. Lastly, I pray for success and grant us loyalty and wisdom in decision making.

Sincerely,

Vice Dean of Training Affairs

MESSAGE FROM THE HEAD OF CARDIAC TECHNOLOGY DEPARTMENT

Congratulations on reaching this most exciting stage in your academic journey!

We hope that you will have a rewarding and successful internship year. Our program is designed to facilitate the professional growth of our interns who are in the process of becoming practicing cardiac technologists. The aim of the internship year is to assist you to become more skilled in the breadth and techniques of assessment and intervention with cardiac patients. We aim to enable you to gain the experience you need to become a skilled cardiac technologist by the completion of this year.

This manual contains information on what the expectations are, how you will be evaluated, and what the overall goals of the experience are. You can also review the evaluation form that will be used by your attending at the end of the rotation. You will see that the evaluation is specific, and related to the skills that make an intern different from a fourth-year cardiac technologist student. You will be expected to organize your day, interpret tests, make management decisions, and become a more self-directed learner.

Sincerely,

Dr Lamia Al Saikhan, PhD, FEACVI, RCS, AFHEA, MiSKF
Assistant Professor of Cardiovascular Medicine
Chairperson of the Department of Cardiac Technology
College of Applied Medical Sciences
Imam Abdulrahman bin Faisal University

CARDIAC TECHNOLOGY PROGRAM

Introduction

Cardiac technology is an allied health profession specifically focused on the diagnosis, to assist in the management of patients with cardiovascular disease. Cardiac Technology Specialists are highly skilled professionals qualified to provide patient care using diagnostic (Echo) technology or by assisting with cardiac catheterization either diagnostically or through intervention. The Cardiac Technology program at Imam Abdulrahman bin Faisal University, College of Applied Medical Sciences (CAMS) was established during the academic year 2008-2009. The program duration is four years, including the preparatory year, and is followed by an internship year in a variety of approved hospitals.

Program Vision

A leading program of academic excellence for cardiac technology education and research nationally and internationally.

Program Mission

Graduate cardiac technologists who are competent in evidence-based knowledge and practice, innovative research skills, and effective community service compatible with the best ethical values of the profession.

Program Goals

- Provide quality education, and continuously improve learning standards with the best clinical experience.

- Graduate qualified cardiac technologists of national and international standards to fulfil labor markets' needs.
- Promote scientific research in the field of cardiac technology.
- Maintain effective community service and partnership.

Program Values

- Excellence.
- Loyalty.
- Teamwork.
- Initiative.
- Responsibility.
- Transparency.
- Creativity.

Program Graduate Attributes

1. **Deep knowledge and intellectual breadth**

   Graduates have comprehensive knowledge and understanding of the field of cardiac technology and have the ability to apply their knowledge in practice including in multi-disciplinary and/or multi-professional contexts.

2. **Critical thinking and problem solving**

   Graduates are effective problem-solvers, able to apply critical and creative thinking to conceive innovative research ideas and responses to challenges.

3. **Teamwork and communication skills**

Graduates convey ideas and information effectively to a range of audiences for a variety of purposes and contribute in a positive and collaborative manner to achieving common goals.

4. **Professionalism and leadership readiness**

   Graduates engage in a professional behavior and have the responsibility for continuous professional development and have the potential to take leadership roles in their chosen careers and communities.

5. **Intercultural and ethical competency**

   Graduates are responsible and accountable citizens whose personal values and practices are consistent with the Islamic identity and values as responsible members of the society.

6. **Digital capabilities**

   Graduates are well prepared for living, learning, and working in a digital society.

7. **Self-awareness and emotional intelligence**

   Graduates are self-aware and reflective, flexible, and resilient, and have the capacity to accept and give constructive feedback, being able to act with integrity and take responsibility for their actions.

CAREER OPPORTUNITIES

There is an increasing demand for cardiac technology graduates in hospitals and cardiac centers across the Kingdom. The career path for our graduates goes even beyond working only in health sector. Industry and Medical Device Innovation are promising and growing sectors where our graduates can have opportunities for employment. Education and Academia sector is also a potential career path especially for the highly talented graduates. Lastly, engagement in research and postgraduate programs can also play a role in enhancing our graduate's employability.

Hospitals

Industry

Research

CARDIAC TECHNOLOGY INTERNSHIP PROGRAM GENERAL DESCRIPTION

The Cardiac Technology Internship Program is a 12 months program, that provides interns with the opportunity to apply the previously acquired knowledge and skills in real clinical settings. During the internship, interns will have the chance to learn about various cardiac diagnostic procedures, equipment, and technologies used in the cardiology field. They will have the chance to assist in the performance of ECGs, stress tests, echocardiograms, and cardiac catheterization under the guidance of expert professionals. Interns will also have the chance to familiarize themselves with medical software and data management systems used in cardiac technology. They will learn how to analyze and interpret test results, document patient information, and prepare reports. Additionally, interns may be involved in research projects and quality improvement initiatives in the cardiac technology field if they succeed in showing punctuality, and interest. This could include data collection, analysis, and participation in multidisciplinary team meetings to discuss patient cases and treatment plans. By the end of the program, interns will have gained valuable practical experience in cardiac technology and improved their understanding of cardiac diagnostics, interventions, and patient care. Internship year can serve as a steppingstone towards a career in the field of cardiac technology, providing a strong foundation for further professional development.

BEFORE STARTING YOUR INTERNSHIP …

Before starting your cardiac technology internship program, here are a few instructions to keep in mind:

1. **Cardiac Technology Basics**: Make sure you have a solid understanding of the anatomy and physiology of the heart, as well as common cardiovascular conditions and procedures. This foundation will help you succeed during your internship.
2. **Rules and Regulations:** Make sure that you familiarize yourself with rules and regulations of the internship program mentioned in this manual, and training rules and regulations of each hospital you have a rotation in.
3. **Orientation Programs:** Attend all necessary orientation programs on different levels.

   3.1. Program Level: This orientation program is organized by internship coordinator from cardiac technology department.

   3.2. Collage Level: This orientation program is organized by CAMS training affairs.

   3.3. Hospital Level: Each hospital/training site will be responsible to notify you by the dates of hospital orientation programs that should be conducted regularly for new employees and interns.
4. **Dress Code and Appearance:** Find out the dress code requirements for the hospital/training site according to their rules and regulations. Dress professionally and maintain a neat appearance. It's important to project a positive and responsible image in a healthcare setting.
5. **Punctuality and Attendance:** Be punctual and reliable. Arrive on time every day and inform your supervisor if you're unable to attend due to unforeseen circumstances. Consistent attendance demonstrates your commitment and reliability.
6. **Communication Skills:** Develop good communication skills, both verbal and written. Clear communication with patients, supervisors, and fellow healthcare professionals is crucial in providing quality patient care and enhancing your internship experience.

7. **Professional Conduct:** Maintain a high level of professionalism throughout the internship. Respect patient confidentiality, adhere to ethical standards, and always prioritize patients' well-being. Strive to be courteous, empathetic, and respectful to everyone you encounter.

8. **Take Initiative:** Show initiative and eagerness to learn. Actively seek opportunities to expand your knowledge and skills. Offer assistance when needed, and ask questions to deepen your understanding.

9. **Safety Protocols:** Familiarize yourself with the safety protocols specific to your hospital/training site. Pay attention to infection control measures, use personal protective equipment (PPE) as required, Environmental safety and emergency plans , and follow established procedures to ensure the well-being of both patients and yourself.

10. **Documentation Accuracy:** Develop good documentation skills. Accurate and thorough documentation is essential for patient care and serves as a legal record.Pay attention to detail and ensure your documentation reflects patient information accurately.

11. **Teamwork and Collaboration:** Embrace teamwork and collaboration with other healthcare professionals. Respect the expertise of others and communicate effectively to provide comprehensive patient care. Take advantage of opportunities to learn from experienced professionals in your field.

12. **Continual Learning:** Approach the internship program as an opportunity for continual learning. Stay curious, stay updated with the latest medical advancements, and seek feedback from your supervisors to further improve your skills.

Remember, the internship program is an excellent avenue for practical learning and professional growth. Embrace the experience, be proactive, and make the most of this opportunity to enhance your knowledge and skills in cardiac technology.

AREAS FOR INTERNSHIP ROTATIONS

Shared Rotation for both Subspecialities

1. *Non-invasive (ECG, Holter, BP monitoring, and Stress test) Rotation*

The non- invasive rotation focuses on various diagnostic procedures used in cardiac technology, and it provides interns with hands-on experience in performing and interpreting electrocardiograms (ECGs), Holter monitoring, ambulatory blood pressure monitoring, and stress tests.

Duration: 3 months for both Cardiac Catheterization and Echocardiography interns.

In this rotation interns will apply their acquired knowledge, skills, and values to:

1. Perform ECGs and learn how to properly operate different ECG machines, and execute troubleshooting whenever is needed.
2. Assist in different types of stress tests such as treadmill stress test, and dobutamine stress test. The assistance including patient preparation, suggest suitable stress test protocols, monitor patients' vital signs during the procedure, and help with the interpretation of the test results.
3. Hock Holter Monitor, and Blood Pressure monitoring devices for patients.
4. Analyze and report Holter Monitor, and Blood pressure results.
5. Use various medical software and data management systems to book appointments, analyze, and report tests.
6. Communicate appropriately with patients by explaining different procedures and required instructions.
7. Be an effective and responsible team member.

Invasive Technology (Cardiac Catheterization) Rotations

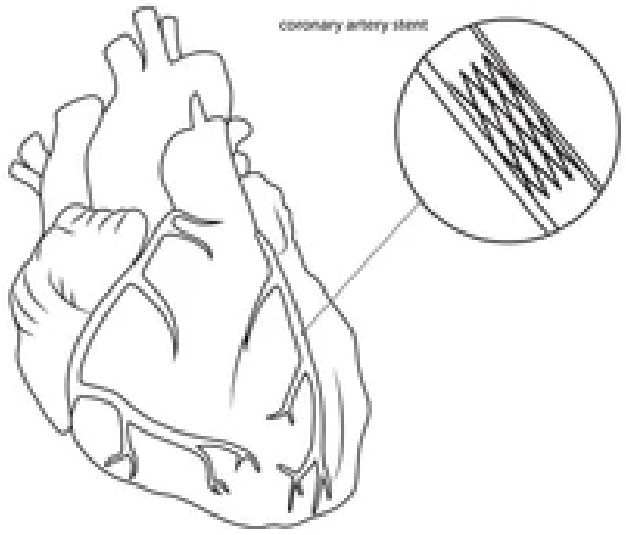
2. *Adult Cardiac Catheterization I Rotation*

This rotation provides Cardiac Catheterization interns with the opportunity to gain experience in diagnostic and interventional cardiac catheterization procedures for adult patients. During this rotation, Cardiac Catheterization interns will be exposed to a variety of procedures, such as diagnostic coronary angiography, percutaneous coronary intervention (PCI) including balloon angioplasty, stent placement, structural procedures, and other adjacent procedures.

Duration: 3 months for Cardiac Catheterization interns.

In this rotation interns will apply their acquired knowledge, skills, and values to:

1. Prepare patients for cardiac catheterization and assist interventionalists as scrubbing assistant, by sterilizing the area around the puncture site, and preparing Cath table with the necessary tools and medications.
2. Closely monitor and record patients' blood pressure and heart rhythm with special hemodynamic monitoring equipment during the invasive procedures and notify the physician about any hemodynamic changes noted.
3. Assist in obtaining angiographic views, performing physiological and anatomical assessment to reach diagnosis and plan intervention if needed.
4. Write a preliminary report of the angiographic findings and interventional data.
5. Be familiar with invasive hemodynamic monitoring, arterial lines, intravenous lines, medications, patients transfer techniques, and the interpretation of lab results necessary before performing cardiac catheterization.
6. Develop essential communication skills in working with patients and their families during stressful situations. Interns will learn to provide emotional support and education to patients regarding their conditions and treatment plans.
7. Work closely with Cath lab team, including interventionalist, nurses, radiographers, and healthcare professionals.



3. *Adult Cardiac Catheterization II Rotation (Electrophysiology)*

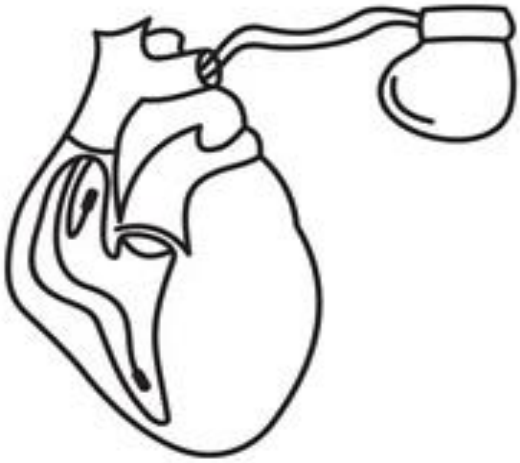
This rotation provides Cardiac Catheterization interns with the opportunity to observe and participate in Cardiac electrophysiology studies, ablation, implantation of pacemakers and defibrillators, and cardiac mapping.

Duration: 3 months for Cardiac Catheterization interns.

In this rotation interns will apply their acquired knowledge, skills, and values to:

1. Prepare patients for cardiac electrophysiology studies and assist electrophysiologists as scrubbing assistant, by sterilizing the area around the puncture or pocket site and preparing Cath table with the necessary tools and medications.
2. Closely monitor and record patients' blood pressure and heart rhythm with special hemodynamic monitoring equipment during the cardiac electrophysiology procedures and notify the electrophysiologist about any hemodynamic changes noted.
3. Assist in obtaining angiographic views, record and analyze cardiac electrophysiology tracings, setup implemented devices, and follow-up care.
4. Contribute to program pacemakers and implanted devices for optimal function under the supervision of the attending cardiologist.
5. Write a preliminary report of the cardiac electrophysiology study or device implantation procedures.
6. Develop essential communication skills in working with patients and their families. Interns will learn to provide education to patients regarding their conditions and treatment plans.

7. Work closely with Cath lab team, including electrophysiologists, nurses, radiographers, and healthcare professionals.



4. *Pediatric Cardiac Catheterization Rotation*

This rotation allows Cardiac Catheterization interns to develop a solid foundation in the assessment and management of pediatric cardiac conditions using invasive techniques.

Duration: 3 months for Cardiac Catheterization interns.

In this rotation interns will apply their acquired knowledge, skills, and values to:

1. Prepare pediatric patients for cardiac catheterization and assist interventionalists as scrubbing assistant, by sterilizing the area around the puncture site, and preparing Cath table with the necessary tools, defects closure devices, and medications.
2. Assist in obtaining angiographic views, record and analyze pressure tracings, oxygen levels, and collect blood samples from different parts of the heart.
3. Perform pressure measurements by applying specific equations in right heart catheterization.
4. Develop essential communication skills in working with patients and their families. Interns will learn to provide education to patients regarding their conditions and treatment plans.
5. Work closely with Cath lab team, including interventionalists, intensivists, anesthesia team, nurses, radiographers, and healthcare professionals.

Summary

Rotation	Duration	Area/Unit
Adult Cardiac Catheterization I	3 months	Cath Lab
Adult Cardiac Catheterization II (Electrophysiology)	3 months	Cath Lab
Pediatric Cardiac Catheterization	3 months	Cath Lab
Non-invasive (ECG, Holter, BP monitoring, and Stress test)	3 months	ECG Lab

Noninvasive Technology (Echocardiography)

2. *Adult Echocardiography I Rotation*

This rotation allows echocardiography interns to assess the structure and function of the heart in adult patients using echocardiography, as a non-invasive imaging technique. During this rotation, echocardiography interns work alongside experienced cardiologists and echocardiographers to gain practical experience in performing and interpreting echocardiograms.

Duration: 3 months for Echocardiography interns.

In this rotation interns will apply their acquired knowledge, skills, and values to:

1. Perform a cardiac ultrasound imaging scan of adult patients, using multiple views to scan the heart.
2. Obtain basic and advanced heart structure and function parameters relevant to adult patients' pathological condition.
3. Evaluate the findings to identify and grade the severity of a spectrum of heart diseases.
4. Write a preliminary report of the heart structure and function.
5. Select appropriate equipment settings and changing the patient's position as necessary.
6. Assist cardiologists in performing stress and transesophageal echocardiography procedures if requested.
7. Develop essential communication skills in working with adult patients.
8. Work closely with a multidisciplinary team, including cardiologists, nurses, and other healthcare professionals.

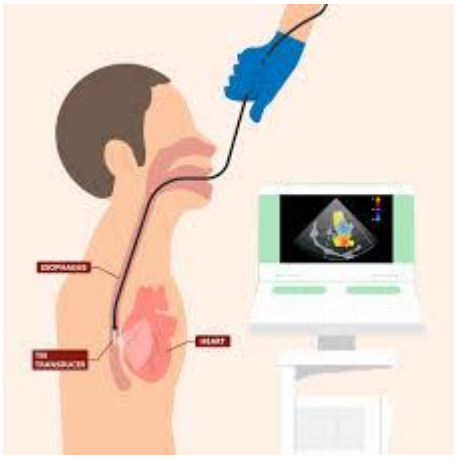
3. *Adult Echocardiography II Rotation*

This rotation allows echocardiography interns to assess the structure and function of the heart in adult patients using trans-esophageal echocardiography (TEE), as a safe invasive imaging modality and use the stress TTE as a non-invasive echo modality to assess the function and regional wall motion abnormalities. During this rotation, echocardiography interns work alongside experienced cardiologists and echocardiographers to gain practical experience in performing and interpreting echocardiograms.

Duration: 3 months for Echocardiography interns.

In this rotation interns will apply their acquired knowledge, skills, and values to:

1. Perform a cardiac ultrasound imaging scan of adult patients, using multiple views to scan the heart.
2. Obtain basic and advanced heart structure and function parameters relevant to adult patients' pathological condition.
3. Evaluate the findings to identify and grade the severity of a spectrum of heart diseases.
4. Select appropriate equipment settings and changing the patient's position as necessary.
5. Assist cardiologists in performing stress and transesophageal echocardiography procedures.
6. Assist operators in contrast echo modality.
7. Develop essential communication skills in working with adult patients.
8. Work closely with a multidisciplinary team, including cardiologists, nurses, and other healthcare professionals.



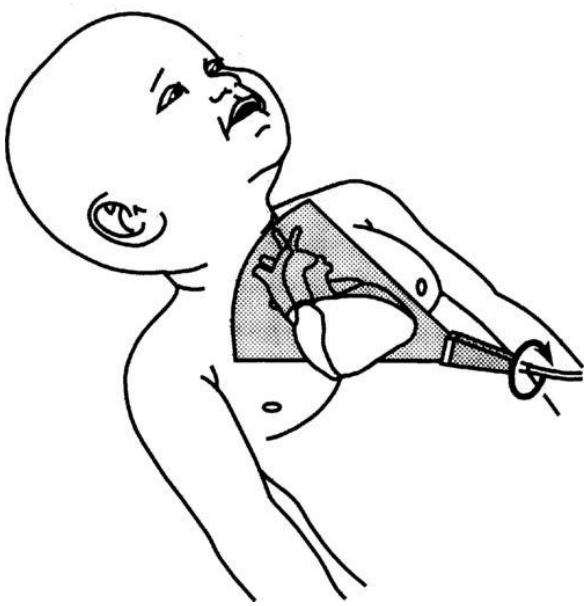
4. *Pediatric Echocardiography Rotation*

This rotation allows echocardiography interns to assess the structure and function of the heart in pediatric patients using echocardiography, as a non-invasive imaging technique. During this rotation, echocardiography interns work alongside experienced pediatric cardiologists and pediatric echocardiographers to gain practical experience in performing and interpreting pediatric echocardiograms.

Duration: 3 months for Echocardiography interns.

In this rotation interns will apply their acquired knowledge, skills, and values to:

1. Perform a cardiac ultrasound imaging scan of pediatric patients, using multiple views to scan the heart.
2. Obtain basic and advanced heart structure and function parameters relevant to pediatric patients' pathological condition.
3. Evaluate the findings to identify and grade the severity of a spectrum of congenital and acquired heart diseases.
4. Write a preliminary report of the heart structure and function.
5. Select appropriate probe, equipment settings, and changing the patient's position as necessary.
6. Develop essential communication skills in working with pediatric patients, and guardians.
7. Work closely with a multidisciplinary team, including cardiologists, nurses, and other healthcare professionals.



Summary

Rotation	Duration	Area/Unit
Adult Echocardiography I	3 months	ECHO Lab
Adult Echocardiography II	3 months	ECHO Lab
Pediatric Echocardiography	3 months	ECHO Lab
Non-invasive (ECG, Holter, BP monitoring, and Stress test)	3 months	ECG Lab

RULES AND REGULATIONS

1. *Internship Training Administrative Structure*

1.1. Internship training is directed and supervised by the Vice Dean for Training Affairs and at least one representative from each academic department.

1.2. Department representative for internship affairs is assigned by the Chairman of the respective department.

2. *Admission Requirements*

2.1. To be admitted to the College of Applied Medical Sciences Internship training program, the intern must be an IAU, Applied Medical Sciences College graduate who has satisfied all the graduation requirements, and graduation has been approved by the Faculty Board.

2.2. Graduates from other recognized Allied Medical Sciences Colleges may be accepted upon approval from Vice Dean for Training Affairs and Faculty Board. Acceptance is contingent to availability of training positions.

2.3. Provided that the above requirements are met, priority of admission to internship training program will be as follows:

2.3.1. IAU-College of Applied Medical Sciences College Graduates.

2.3.2. Graduates from other Saudi Universities.

2.3.3. Graduates from non-Saudi Universities.

2.4. All interns must pass the medical examination and have the required vaccinations as required by each academic department.

3. *Training Period*

3.1. The duration of the program is one continuous year.

3.2. Interns training commences at the beginning of new academic year or on date approved by the Vice Dean for Training Affairs.

4. Training Sites

4.1. Internship training is conducted at recognized governmental or private institutions.

4.2. Training sites are determined by respective academic departments based on criteria ensuring the highest standards.

5. Training Program Requirements

5.1. Internship training is conducted through rotations/sections specific for each specialty as determined by respective academic departments.

5.2. Interns are required to follow affiliate institution working hours and meet the internship affairs minimum required working hours of 8 hours a day, 5 days a week.

5.3. An internship manual is prepared by each academic department to include requirements, rules and regulations, and evaluation forms specific to each specialty. The internship manual is updated on regular basis.

5.4. Interns are required to perform duties as assigned to them by supervisors and staff at the training sites.

5.5. Rotations are scheduled in such a way that it meets IAU requirements for Internship training.

5.6. Interns must abide by the approved Internship training rules and regulations of IAU – College of Applied Medical Sciences, and rules and policies set by the institution.

5.7. Visits to training sites are scheduled to make sure that training is conducted as planned.

6. Attendance/Leaves/Vacations

6.1. Interns are entitled to official vacation days (Eid Aladha, Eid AlFitr, the National day, and the Foundation Day).

6.2. Start and end of vacations are determined by the Vice Dean for Training Affairs in an official correspondence with institutions and interns.

6.3. Sick leaves can be exceptionally granted, provided that legitimate medical report is submitted.

6.4. Sick leaves of more than two days during one rotation must be compensated.

6.5. All leaves of 25% or more of rotation period will result in repeating the entire period of the rotation.

6.6. Interns must sign in and out attendance sheet, or time-keeping schedule.

6.7. Frequent tardiness may result in the followings disciplinary actions:

6.7.1. Written warning letter.

6.7.2. Repeating part of the rotation.

6.7.3. Repeating the entire rotation.

6.8. Interns may attend symposium/workshops related to their specialty, and time is counted towards training period provided that:

6.8.1. Attendance does not affect continuity of training.

6.8.2. Approval from training site.

6.8.3. Approval from Vice Dean for Training affairs after reviewing scientific program of the symposium.

6.8.4. Submission of attendance certificate.

7. Evaluation and Certification

7.1. Interns' performance is assessed at the conclusion of each rotation using standards evaluation Form designed by respective academic departments.

7.2. Evaluation of intern's performance is done by a person who has been directly supervising the intern at the training site.

7.3. Evaluation reports are to be submitted to the Vice Dean for Training Affairs.

7.4. Unsatisfactory performance in particular rotation period requires repeating that rotation.

7.5. Satisfactory performance is defined as grade GOOD or better.

7.6. Interns who have satisfactorily completed the Internship training period (1 year) will be granted a Certificate of Completion.

APPENDICES

APPENDIX 1

Form 1. CONFIDENTIALITY STATEMENT FORM

By signing below, I agree to comply with the following terms during my training period as an intern:

1. To maintain the confidentiality and privacy of all patients and employees as well as all confidential information of the training institution.
2. To perform my job and assigned tasks with honesty and loyalty according to professional rules and ethics consistent with the rules and regulations of the assigned training institution.
3. To adhere to professional ethics when dealing with colleagues, preceptors, department heads and all co-workers at the institution always during my training period.
4. I will not request any change in my internship training plan after finalization of the internship program plan.
5. I am fully responsible of reading, understanding, and following the rules and guidelines of the internship year and other administrative forms and procedures as clarified in the internship manual.

I have read and understood the above terms and agree to be restricted by them:

Student name	
Student ID	
Date	
Signature	

APPENDIX 2

Form 2. INTERNSHIP REQUIREMENTS CHICKLIST FORM

Student name		**Student ID**	

	Document Required
	1. Received an Electronic version of Internship manual.
	2. Prepared a copy of a valid National ID / Iqama.
	3. Prepared a copy of a valid Passport.
	4. Prepared a copy of recent bank statement that includes student's name and IBAN number.
	5. Prepared a signed copy of Confidentiality statement (Appendix 1).
	6. Prepared a signed copy of hospital / rotation selection form (Appendix 3).
	7. Prepared a signed copy of

These documents were received and approved by cardiac technology internship coordinator:

Internship Coordinator Name:

Signature:

APPENDIX 3

Form 3. HOSPITAL / ROTATION SELECTION FORM

Student name		**Student ID**	

- **Please write hospital name / rotation according to your preference …**

Order	Hospital / Rotation	City
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

Important notes:

1. **Fulfillment of students' preference depends on the availability of training opportunities in hospitals.**
2. **There must be at least one rotation in one of the approved governmental hospitals.**
3. **When sorting the requests, priority will be given to fulfil the students' preference based on cumulative GPA.**
4. **No request to change Hospital/ Rotation will be accepted after the final internship schedule is issued.**

Signature		**Date**	

APPENDIX 4

Form 4. GRADUATE INFORMATION FORM

Student Name (Identical to what is written in the passport, for studying abroad purposes)				
Language	**First Name**	**Father Name**	**Grandfather Name**	**Family Name**
Arabic				
English				

Student University ID									

Birthplace	
Country:	**City:**

Birthdate	
Hijiri:	**AD:**

National ID Information										
Type	**National ID** ☐					**IQAMA** ☐				
National ID Number										
Issue Place	**Country:**					**City:**				
Issue Date	**Hijiri**					**AD**				
Expiry Date	**Hijiri**					**Hijiri**				

Contact Information										
Mobile Number										
Phone Number										
Email										
Signature						**Date**				

APPENDIX 5

Form 5. INTERNSHIP ATTENDANCE FORM

Internship Centre:	
Intern University ID:	
Intern Name:	

Date	Time In	Intern Signature	Time Out	Intern Signature

APPENDIX 6

Form 6. APPLICATION FOR EMERGENCY LEAVE FORM

Date Submitted	
Intern Name:	
Intern University ID:	
Specific Reasoning	
From	
To	
Hospital Name	
Name & Signature of Person in Charge	

Please Fax this form to: 013 – 8572872

For University official Use ONLY

Intern to compensate leave: YES: _____ NO: _____

Revised **Approved**

_____	_____
Coordinator	**Vice Dean for Training Affairs**
Cardiac Technology Internship Training	**IAU**
IAU	

APPENDIX 7

Form 7. INTERNSHIP COMPETENCIES CHECKLIST FORMS

Cardiac Technology Department

Internship Non-Invasive Competencies

Student Name		**ID#**	**Student Name**	**Training Institute Name**	**ID#**	**Preceptor Name**	**Training Institute Name**	**Sign.**	**Preceptor Name**

Item	Achieved	Not Achieved	Preceptor Signature
GENERAL GUIDELINES, POLICIES AND PROCEDURES			
• Hospital Chart, Mission, Vision & Values	☐	☐	
• Review and adhere to policies and procedures	☐	☐	
• Work attendance ethics	☐	☐	
• Reprint labels	☐	☐	
NON-INVASIVE LAB			
• Read and understand Laboratory Safety Policies and Procedures	☐	☐	
• Read, use and locate Safety Data Sheet (SDS)	☐	☐	
• Safe handling of the echo machines, equipment, and probe	☐	☐	

Item	Achieved	Not Achieved	Preceptor Signature
• Personal Protective Equipment (PPE)	☐	☐	
• Emergency Codes	☐	☐	
PATIENT PREPARATION			
• Consent in EST	☐	☐	
• Explanation of the procedure in different NI techniques.	☐	☐	
• Patient exposure (expose area of interest till the waist)	☐	☐	
• Patient positioning: Demonstrate ability to position patients ensuring satisfactory recording.	☐	☐	
• Attach ECG electrodes: Demonstrate correct placement of ECG electrodes.	☐	☐	
• Enter patient demographic details	☐	☐	
• **BLS and ACLS**	☐	☐	
12 LEAD ECG			
• Know the principles of electrocardiography and the use of instruments to acquire, display, and store ECGs.	☐	☐	
• Know the normal values for electrical axis and ECG intervals and voltage.	☐	☐	
• Demonstrate correct cleaning, storage and restocking of ECG machine.	☐	☐	
• Work under supervision.	☐	☐	
• Demonstrate procedure for reporting malfunctioning of equipment.	☐	☐	
• Demonstrate accuracy in labelling recordings with Name, Date, Time, and any additional observations.	☐	☐	
• Demonstrate understanding of and appropriate use of machine settings i.e. gain, paper speed etc.	☐	☐	
• State procedure for storing completed recordings as per department policy.	☐	☐	
• Ensures ECG recordings are shown to senior for review.	☐	☐	
• Recognize and troubleshoot types of artefacts.	☐	☐	
• Technical skill to interpret standard 12-lead ECG tracings and to incorporate the findings in patient care.	☐	☐	
• Technical skill to interpret Tachyarrhythmias.	☐	☐	
• Technical skill to interpret Bradyarrhythmia.	☐	☐	
• Technical skill to interpret IHD.	☐	☐	

Item	Achieved	Not Achieved	Preceptor Signature
• Technical skill to interpret Pacemaker ECG.	☐	☐	
STRESS ECG TEST			
• Knowledge of appropriate indications for exercise testing.	☐	☐	
• Knowledge of alternative physiological cardiovascular tests.	☐	☐	
• Knowledge of appropriate contraindications, risks, and risk assessment of testing (not limited to Bayes' theorem and sensitivity/specificity, including concepts of absolute and relative risk).	☐	☐	
• Knowledge to promptly recognize and treat complications of exercise testing.	☐	☐	
• Knowledge of various exercise protocols and indications for each.	☐	☐	
• Knowledge of basic cardiovascular and exercise physiology, including hemodynamic response to exercise.	☐	☐	
• Knowledge of cardiac arrhythmias and the ability to recognize and treat serious arrhythmias.	☐	☐	
• Knowledge of cardiovascular drugs and how they can affect exercise performance, hemodynamics, and the ECG.	☐	☐	
• Knowledge of the effects of age and disease on hemodynamic and ECG responses to exercise.	☐	☐	
• Knowledge of principles and details of exercise testing, including proper lead placement and skin preparation.	☐	☐	
• Knowledge of end points of exercise testing and indications to terminate exercise testing.	☐	☐	
• Knowledge of specificity, sensitivity, and diagnostic accuracy of exercise testing in different patient populations.	☐	☐	
• Knowledge of how to apply Bayes' theorem to interpret test results.	☐	☐	
• Knowledge of electrocardiography and changes in the ECG that may result from exercise, hyperventilation, ischemia, hypertrophy, conduction disorders, electrolyte disturbances, and drugs.	☐	☐	

Item	Achieved	Not Achieved	Preceptor Signature
• Knowledge of conditions and circumstances that can cause false-positive, indeterminate, or false-negative test results.	☐	☐	
• Knowledge of alternative or supplementary diagnostic procedures to exercise testing and when they should be used.	☐	☐	
• Knowledge of the concept of metabolic equivalent (MET) and estimation of exercise intensity in different modes of exercise.	☐	☐	
• Measure blood pressure and related vital signs.	☐	☐	
• Avoid stress ECG pitfalls.	☐	☐	
• Print SET on papers for documentation before sending to the medical doctor for reporting.	☐	☐	
HOLTER ECG			
• Maintain the patient's privacy and dignity throughout procedure.	☐	☐	
• Complete preparation of patient's skin for electrode placement as required.	☐	☐	
• Position the patient correctly and comfortably and place electrodes in accordance with client's needs and current standards.	☐	☐	
• Attach leads correctly and double check lead placement.	☐	☐	
• Take a trial trace and check for interference, wandering baseline and amplitude.	☐	☐	
• Advise supervisor or an appropriate person if you think a client may be at risk.	☐	☐	
• Remove the Holter monitor from the patient.	☐	☐	
• Review and correct the computer analysis of Holter tape.	☐	☐	
• Identify abnormal ECG patterns which require immediate medical attention	☐	☐	
• Print the full report and submit to cardiologist for review.	☐	☐	
• Print final report printed and send to requesting medical officer	☐	☐	

Item	Achieved	Not Achieved	Preceptor Signature
• Take a trial trace and check for interference, wandering baseline and amplitude.	☐	☐	
• Advise supervisor or an appropriate person if you think a client may be at risk.	☐	☐	
• Remove the Holter monitor from the patient.	☐	☐	
• Review and correct the computer analysis of Holter tape.	☐	☐	
• Identify abnormal ECG patterns which require immediate medical attention	☐	☐	
• Print the full report and submit to cardiologist for review.	☐	☐	
• Print final report printed and send to requesting medical officer	☐	☐	

COMMENTS:

This table is to be filled by students:

Student Name _____ Sign. _____ Date _____

Non-Invasive Rotation EVALUATION	Always (5)	Usually (4)	Sometimes (3)	Seldom (2)	Never (1)
▪ Did you clearly understand what was expected of you?					
COMMENTS:					
▪ Was supervision available to you in case you needed help in the middle of a procedure?					
COMMENTS:					
▪ Was the echo lab preceptor responsive to your questions?					
COMMENTS:					
▪ Did you have enough opportunity to demonstrate your knowledge and skill?					
COMMENTS:					
▪ Were the expectations appropriate for your level of training?					
COMMENTS:					
▪ Was the communication with your supervisor sufficient to meet your needs?					

COMMENTS:

Cardiac Technology Department

Internship Adult Cardiac Catheterization I Competencies

Student Name		ID#		Training Institute Name		Preceptor Name		Sign.	

Item	Achieved	Not Achieved	Preceptor Signature
GENERAL GUIDELINES, POLICIES AND PROCEDURES			
• Hospital Chart, Mission, Vision & Values	☐	☐	
• Review and adhere to policies and procedures	☐	☐	
• Work attendance ethics	☐	☐	
• Reprint labels	☐	☐	
CATH LAB SAFTY			
• Read and understand Laboratory Safety Policies and Procedures	☐	☐	
• Read, use and locate Safety Data Sheet (SDS)	☐	☐	
• Safety handling of the tools - Puncture needles - Wires - Catheters	☐	☐	
• Safe handling of the imaging machine	☐	☐	
• Personal Protective Equipment (PPE) • Radiation safety - Lead equipment (lead apron and thyroid collar) • Geiger counter (personal radiation detector)	☐	☐	
• Emergency Codes	☐	☐	
LOCATE AND USE			

Item	Achieved	Not Achieved	Preceptor Signature
• Fire Extinguisher	☐	☐	
• Eye Wash	☐	☐	
• Safety Shower	☐	☐	
• Biohazard Spill kit	☐	☐	
• Chemical Spill kit	☐	☐	
• First Aid kit	☐	☐	
• Incident Report protocol	☐	☐	
PATIENT PREPARATION			
• Consent	☐	☐	
• Laboratory tests	☐	☐	
• Explanation of the procedure	☐	☐	
• Enter patient demographic details (and, ideally, details of body size) onto the machine.	☐	☐	
• Alens test for radial access	☐	☐	
• Patient exposure and wearing hospital gown	☐	☐	
• Scrubbing of the femoral and radial area and covering the patient with disposable sterile towels and sheets	☐	☐	
• Supine position	☐	☐	
• Attach ECG electrodes	☐	☐	
• Check the defibrillator	☐	☐	
• **Emergency Life Support**	☐	☐	
CARDIAC CATH LAB EQUIPMENT			
• Physiologic equipment - ECG/pressure recorder/analyzer (with or without computer interface) - Pressure transducers - Electrocardiography - Cardiac output thermodilution computer • e. Blood gas and oxygen content and saturation analyzer	☐	☐	
• Angiographic equipment	☐	☐	
• Temporary pacemaker	☐	☐	

Item	Achieved	Not Achieved	Preceptor Signature
• IABP consoles	☐	☐	
• Emergency cart equipment	☐	☐	
HANDLING OF MATERIALS			
• Handling of the tools - Puncture needle - Wires - Catheters - PCI tools	☐	☐	
• Flushing of the tools	☐	☐	
• Sterile preparations	☐	☐	
• Infection control	☐	☐	
BASIC CATH VIEWS			
• Right and left anterior oblique	☐	☐	
• Anteroposterior	☐	☐	
• Caudal and cranial angulation	☐	☐	
• Lateral	☐	☐	
ADDITIONAL VIEWS			
• Extreme lateral	☐	☐	
• Right lateral	☐	☐	
TECHNIQUES FOR EACH VIEW			
• Machine movement for each angiographic view e.g. (RAO 30 CAUDAL 30)	☐	☐	
ASSESSMENT OF CORONARY LESIONS			
• Angiographically	☐	☐	
• Physiologically (FFR)	☐	☐	
• Intravascular imaging (IVUS, OCT)	☐	☐	
• **Assessment of LV function**	☐	☐	
• **Assessment of wall movement**	☐	☐	
• **Assessment of mitral regurgitation**	☐	☐	
• **Aortography**	☐	☐	
POST-PROCEDURE CARE			
• Access site management (manual/mechanical access site compression)	☐	☐	

This table is to be filled by students:

Student Name _____ Sign. _____ Date _____

Adult Cath I Rotation EVALUATION	Always (5)	Usually (4)	Sometimes (3)	Seldom (2)	Never (1)
▪ Did you clearly understand what was expected of you?					
COMMENTS:					
▪ Was supervision available to you in case you needed help in the middle of a procedure?					
COMMENTS:					
▪ Was the Cath lab preceptor responsive to your questions?					
COMMENTS:					
▪ Did you have enough opportunity to demonstrate your knowledge and skill?					
COMMENTS:					
▪ Were the expectations appropriate for your level of training?					
COMMENTS:					
▪ Was the communication with your supervisor sufficient to meet your needs?					
COMMENTS:					

Cardiac Technology Department

Internship Adult Cardiac Catheterization II Competencies

Student Name		ID#		Training Institute Name		Preceptor Name		Sign.	

Item	Achieved	Not Achieved	Preceptor Signature
GENERAL GUIDELINES, POLICIES AND PROCEDURES			
• Hospital Chart, Mission, Vision & Values	☐	☐	
• Review and adhere to policies and procedures	☐	☐	
• Work attendance ethics	☐	☐	
• Reprint labels	☐	☐	
CATH LAB SAFTY			
• Read and understand Laboratory Safety Policies and Procedures	☐	☐	
• Read, use and locate Safety Data Sheet (SDS)	☐	☐	
• Safety handling of the tools - Puncture needles - Wires - Catheters	☐	☐	
• Safe handling of the imaging machine	☐	☐	
• Personal Protective Equipment (PPE) • Radiation safety - Lead equipment (lead apron and thyroid collar) • Geiger counter (personal radiation detector)	☐	☐	
• Emergency Codes	☐	☐	
LOCATE AND USE			
• Fire Extinguisher	☐	☐	
• Eye Wash	☐	☐	
• Safety Shower	☐	☐	
• Biohazard Spill kit	☐	☐	
• Chemical Spill kit	☐	☐	

Item	Achieved	Not Achieved	Preceptor Signature
• First Aid kit	☐	☐	
• Incident Report protocol	☐	☐	
PATIENT PREPARATION			
• Consent	☐	☐	
• Laboratory tests	☐	☐	
• Explanation of the procedure	☐	☐	
• Enter patient demographic details (and, ideally, details of body size) onto the machine.	☐	☐	
• Alens test for radial access	☐	☐	
• Patient exposure and wearing hospital gown	☐	☐	
• Scrubbing of the femoral and radial area and covering the patient with disposable sterile towels and sheets	☐	☐	
• Supine position	☐	☐	
• Attach ECG electrodes	☐	☐	
• Check the defibrillator	☐	☐	
• **Emergency Life Support**	☐	☐	
CARDIAC CATH LAB EQUIPMENT			
• Pressure transducer	☐	☐	
• Pressure zeroing and leveling	☐	☐	
• Movement of the C-Arm	☐	☐	
• Hand support during radial approach	☐	☐	
• Physiologic equipment - ECG/pressure recorder/analyzer (with or without computer interface) - Pressure transducers - Electrocardiography - Cardiac output thermodilution computer e. Blood gas and oxygen content and saturation analyzer	☐	☐	
• Angiographic equipment	☐	☐	
• Temporary pacemaker	☐	☐	

Item	Achieved	Not Achieved	Preceptor Signature
• IABP consoles	☐	☐	
• Emergency cart equipment	☐	☐	
HANDLING OF MATERIALS			
• handling of the tools - Puncture needles - Wires - Catheters - PCI tools	☐	☐	
• Flushing of the tools	☐	☐	
• Sterile preparations	☐	☐	
• Infection control	☐	☐	
BASIC CATH VIEWS			
• Right and left anterior oblique	☐	☐	
• Anteroposterior	☐	☐	
• Caudal and cranial angulation	☐	☐	
• Lateral	☐	☐	
ADDITIONAL VIEWS			
• Extreme lateral	☐	☐	
• Right lateral	☐	☐	
TECHNIQUES FOR EACH VIEW			
• Machine movement for each angiographic view e.g. (RAO 30 CAUDAL 30)	☐	☐	
ASSESSMENT OF CORONARY LESIONS			
• Angiographically	☐	☐	
• Physiologically (FFR)	☐	☐	
• Intravascular imaging (IVUS, OCT)	☐	☐	
• **Assessment of LV function**	☐	☐	
• **Assessment of wall movement**	☐	☐	
• **Assessment of mitral regurgitation**	☐	☐	
• **Aortography**	☐	☐	

Item	Achieved	Not Achieved	Preceptor Signature
POST-PROCEDURE CARE			
• Access site management (manual/mechanical access site compression)	☐	☐	
ELECTROPHYSIOLOGY			
• Identify the indications of electrophysiologic study	☐	☐	
• Placement of recording catheters in standard locations in the heart	☐	☐	
• Describe the equipment, personnel, preparation, and technique	☐	☐	
PATIENT PREPARATION FOR EPS STUDY			
• patient must be fasting for at least six hours before the procedure • Antiarrhythmic therapy must be withheld • Intravenous access should be secured before the arrival in the Electrophysiology laboratory • Fluids should be administered during the procedure to avoid Dehydration	☐	☐	
TECHNIQUE			
• Assessment of both the morphology and the timing of EGMs at baseline and after programmed electrical stimulation • The recording speed commonly used in EPS	☐	☐	
UNDERSTANDING AND OF THE FOLLOWING TERMS			
• Cycle Length (CL)	☐	☐	
• Programmed Stimulation	☐	☐	
• Incremental pacing (or burst pacing)	☐	☐	
• Extra stimulus pacing	☐	☐	
• Coupling Interval	☐	☐	
• Effective Refractory Period (ERP)	☐	☐	
MEASURING INTERVALS			
• PA Interval • AH Interval • H Time • HV Interval	☐	☐	

COMMENTS:

This table is to be filled by students:

Student Name _____ Sign. _____ Date _____

Adult Cath II Rotation EVALUATION	Always (5)	Usually (4)	Sometimes (3)	Seldom (2)	Never (1)
▪ Did you clearly understand what was expected of you?					
COMMENTS:					
▪ Was supervision available to you in case you needed help in the middle of a procedure?					
COMMENTS:					
▪ Was the Cath lab preceptor responsive to your questions?					
COMMENTS:					
▪ Did you have enough opportunity to demonstrate your knowledge and skill?					
COMMENTS:					
▪ Were the expectations appropriate for your level of training?					
COMMENTS:					
▪ Was the communication with your supervisor sufficient to meet your needs?					

COMMENTS:

Cardiac Technology Department

Internship Pediatric Cardiac Catheterization Competencies

Student Name		ID#		Training Institute Name		Preceptor Name		Sign.	

Item	Achieved	Not Achieved	Preceptor Signature
GENERAL GUIDELINES, POLICIES AND PROCEDURES			
• Hospital Chart, Mission, Vision & Values	☐	☐	
• Review and adhere to policies and procedures	☐	☐	
• Work attendance ethics	☐	☐	
• Reprint labels	☐	☐	
CATH LAB SAFTY			
• Read and understand Laboratory Safety Policies and Procedures	☐	☐	
• Read, use and locate Safety Data Sheet (SDS)	☐	☐	
• Safety handling of the tools - Puncture needles - Wires - Catheters	☐	☐	
• Safe handling of the imaging machine	☐	☐	
• Personal Protective Equipment (PPE) • Radiation safety - Lead equipment (lead apron and thyroid collar) • Geiger counter (personal radiation detector)	☐	☐	
• Emergency Codes	☐	☐	
LOCATE AND USE			
• Fire Extinguisher	☐	☐	
• Eye Wash	☐	☐	
• Safety Shower	☐	☐	
• Biohazard Spill kit	☐	☐	
• Chemical Spill kit	☐	☐	

Item	Achieved	Not Achieved	Preceptor Signature
• First Aid kit	☐	☐	
• Incident Report protocol	☐	☐	
PATIENT PREPARATION			
• Consent	☐	☐	
• Laboratory tests	☐	☐	
• Explanation of the procedure	☐	☐	
• Enter patient demographic details (and, ideally, details of body size) onto the machine.	☐	☐	
• Alens test for radial access	☐	☐	
• Patient exposure and wearing hospital gown	☐	☐	
• Scrubbing of the femoral and radial area and covering the patient with disposable sterile towels and sheets	☐	☐	
• Supine position	☐	☐	
• Attach ECG electrodes	☐	☐	
• Check the defibrillator	☐	☐	
• **Emergency Life Support**	☐	☐	
CARDIAC CATH LAB EQUIPMENT			
• Pressure transducer	☐	☐	
• Pressure zeroing and leveling	☐	☐	
• Movement of the C-Arm	☐	☐	
• Hand support during radial approach	☐	☐	
• Physiologic equipment - ECG/pressure recorder/analyzer (with or without computer interface) - Pressure transducers - Electrocardiography - Cardiac output thermodilution computer e. Blood gas and oxygen content and saturation analyzer	☐	☐	
• Angiographic equipment	☐	☐	
• Temporary pacemaker	☐	☐	

Item	Achieved	Not achieved	Preceptor Signature
• Intraaortic balloon pumps consoles	☐	☐	
• Emergency cart equipment	☐	☐	
HANDLING OF MATERIALS			
• Handling of the tools - Puncture needles - Wires - Catheters - PCI tools	☐	☐	
• Flushing of the tools	☐	☐	
• Sterile preparations	☐	☐	
• Infection control	☐	☐	
BASIC CATH VIEWS			
• Right and left anterior oblique	☐	☐	
• Anteroposterior	☐	☐	
• Caudal and cranial angulation	☐	☐	
• Lateral	☐	☐	
ADDITIONAL VIEWS			
• Extreme lateral	☐	☐	
• Right lateral	☐	☐	
TECHNIQUES FOR EACH VIEW			
• Machine movement for each angiographic view e.g. (RAO 30 CAUDAL 30)	☐	☐	
ASSESSMENT OF CORONARY LESIONS			
• Angiographically	☐	☐	
• Physiologically (FFR)	☐	☐	
• Intravascular imaging (IVUS, OCT)	☐	☐	
• **Assessment of LV function**	☐	☐	
• **Assessment of wall movement**	☐	☐	
• **Assessment of mitral regurgitation**	☐	☐	
• **Aortography**	☐	☐	

Item	Achieved	Not Achieved	Preceptor Signature
POST-PROCEDURE CARE			
• Access site management (manual/mechanical access site compression)	☐	☐	
PEDIATRIC CATH			
• Identify the indications of pediatric cath. study	☐	☐	
• Preoperative Clinical Assessment	☐	☐	
• Preoperative preparation	☐	☐	
• Premedication, sedation, and anesthesia	☐	☐	
• Post-operative care	☐	☐	
• Describe the equipment, personnel, preparation, and technique	☐	☐	
UNDERSTANDING AND APPLICATION OF THE FOLLOWING TERMS			
• Cardiac output/Index measurements	☐	☐	
• Shunts	☐	☐	
• Pressure measurements	☐	☐	
• Pressure gradient and valve area	☐	☐	
• Vascular resistance	☐	☐	
• ABG machine handling (blood gas testing)	☐	☐	
• **Reporting**	☐	☐	

COMMENTS:

This table is to be filled by students:

Student Name _____ Sign. _____ Date _____

Pediatric Cath Rotation EVALUATION	Always (5)	Usually (4)	Sometimes (3)	Seldom (2)	Never (1)
▪ Did you clearly understand what was expected of you?					
COMMENTS:					
▪ Was supervision available to you in case you needed help in the middle of a procedure?					
COMMENTS:					
▪ Was the Cath lab preceptor responsive to your questions?					
COMMENTS:					
▪ Did you have enough opportunity to demonstrate your knowledge and skill?					
COMMENTS:					
▪ Were the expectations appropriate for your level of training?					
COMMENTS:					
▪ Was the communication with your supervisor sufficient to meet your needs?					

COMMENTS:

Cardiac Technology Department

Internship Adult Echocardiography I Competencies

Student Name		ID#		Training institute		Preceptor Name		Sign.	

Item	Achieved	Not Achieved	Preceptor Signature
GENERAL GUIDLINES, POLICIES AND PROCEDURES			
• Hospital Chart, Mission, Vision & Values	☐	☐	
• Review and adhere to policies and procedures	☐	☐	
• Work attendance ethics	☐	☐	
• Reprint labels	☐	☐	
ECHOCARDIOGRAPHY LAB			
• Read and understand Laboratory Safety Policies and Procedures	☐	☐	
• Read, use and locate Safety Data Sheet (SDS)	☐	☐	
• Safe handling of the echo machines, equipment, and probe	☐	☐	
• Personal Protective Equipment (PPE)	☐	☐	
• Emergency Codes	☐	☐	
PATIENT PREPARATION			
• Explanation of the procedure	☐	☐	
• Patient exposure (expose area of interest till the waist)	☐	☐	
• Patient positioning in left lateral decubitus and their left hand up and behind the head in apical and parasternal views	☐	☐	
• Supine in subcostal and suprasternal views	☐	☐	
• Attach ECG electrodes	☐	☐	
• Enter patient demographic details	☐	☐	

Item	Achieved	Not Achieved	Preceptor Signature
PREPARING ECHOCARDIOGRAPHY MACHINE AND PROBE			
• Set up an ergonomic orientation of machine, patient, and operator. This will depend on your preferred operator position.	☐	☐	
• Check transthoracic image settings on machine, with harmonic imaging (if available) and your preferred image post-processing options selected. • Set overall gain, compress and transverse or lateral gain controls to standard positions	☐	☐	
• Make sure there is ECG tracing	☐	☐	
• Make sure image storage is possible	☐	☐	
• Take the appropriate transthoracic probe, apply gel to transducer and start imaging.	☐	☐	
PROBE HANDLING AND IMAGE QUALITY			
• The probe should be held in one hand and pressed firmly against the chest wall.	☐	☐	
• A layer of gel ensures good contact between probe and chest wall.	☐	☐	
The probe can be moved in multiple directions but the four key movements are: • Clockwise and anticlockwise rotation • Tilting anteriorly and posteriorly • Tilting to the left and to the right • Sliding across the chest	☐	☐	

Item	Achieved	Not Achieved	Preceptor Signature
2D IMAGE ACQUISITION			
Standard sequence of views: **Parasternal windows** • Parasternal long axis view • (Optional — parasternal right ventricle inflow) • (Optional — parasternal right ventricle outflow) • Parasternal short axis view (apex) • Parasternal short axis view (papillary level) • Parasternal short axis view (aortic level) • (Optional — right parasternal window). **Apical window** • Apical four chamber • Apical five chamber • Apical two chamber • Apical three chamber. **Subcostal window** • Subcostal long and short axis • Inferior vena cava	☐	☐	
ADITIONAL WINDOWS			
• Suprasternal window	☐	☐	
• Right parasternal window	☐	☐	
• Supraclavicular window	☐	☐	
TECHNIQUES FOR EACH VIEW			
• Color flow mapping	☐	☐	
• M-mode	☐	☐	

Item	Achieved	Not Achieved	Preceptor Signature
• CW Doppler	☐	☐	
• PW Doppler	☐	☐	
• Tissue Doppler imaging	☐	☐	
• Speckle tracking imaging	☐	☐	
• 3D imaging	☐	☐	
• Contrast imaging.	☐	☐	
ASSESSMENT OF LV SYSTOLIC FUNCTION			
• Linear (M-mode and 2D)	☐	☐	
• Volume (2D and 3D)	☐	☐	
• Modified Simpson method	☐	☐	
• Area length	☐	☐	
• LV Mass	☐	☐	
• TDI	☐	☐	
• MPI	☐	☐	
DIASTOLIC FUNCTION			
• Mitral inflow	☐	☐	
• TDI	☐	☐	
• PV flow	☐	☐	
• LA volume	☐	☐	
ASSESSMENT OF RV FUNCTION			
• RV internal dimension	☐	☐	
• TAPSI	☐	☐	
• FAC	☐	☐	
• TDI	☐	☐	
• 3D	☐	☐	

Item	Achieved	Not Achieved	Preceptor Signature
ASSESSMENT OF VALVULAR STRUCTURE AND FUNCTION			
• Velocity gradient	☐	☐	
• Color doppler	☐	☐	
• Planimetry	☐	☐	
ECHOCARDIOGRAPHY MACHINE AND PROBE CLEANING			
REPORTING	☐	☐	

COMMENTS:

This table is to be filled by students:

Student Name _____ Sign. _____ Date _____

Adult Echo I Rotation EVALUATION	Always (5)	Usually (4)	Sometimes (3)	Seldom (2)	Never (1)
▪ Did you clearly understand what was expected of you?					
COMMENTS:					
▪ Was supervision available to you in case you needed help in the middle of a procedure?					
COMMENTS:					
▪ Was the Cath lab preceptor responsive to your questions?					
COMMENTS:					
▪ Did you have enough opportunity to demonstrate your knowledge and skill?					
COMMENTS:					
▪ Were the expectations appropriate for your level of training?					
COMMENTS:					
▪ Was the communication with your supervisor sufficient to meet your needs?					

COMMENTS:

Cardiac Technology Department

Internship Adult Echocardiography II Competencies

Item	Achieved	Not Achieved	Preceptor Signature
GENERAL GUIDELINES, POLICIES AND PROCEDURES			
• Hospital chart, Mission, Vision & Values	☐	☐	
• Review and adhere to policies and procedures	☐	☐	
• Work attendance ethics	☐	☐	
• Reprint labels	☐	☐	
ECHOCARDIOGRAPHY LAB			
• Read and understand Laboratory Safety Policies and Procedures	☐	☐	
• Read, use and locate Safety Data Sheet (SDS)	☐	☐	
• Safe handling of the echo machines, equipment, and probe	☐	☐	
• Personal Protective Equipment (PPE)	☐	☐	
• Emergency Codes	☐	☐	
PATIENT PREPARATION			
• Consent in TEE	☐	☐	
• Explanation of the procedure	☐	☐	
• Patient exposure (expose area of interest till the waist)	☐	☐	
• Patient positioning in left lateral decubitus and their left hand up and behind the head in apical and parasternal views	☐	☐	
• Supine in subcostal and suprasternal views	☐	☐	
• In TEE, the patient lies in bed in left decubitus with a mouth guard is positioned between the jaws	☐	☐	
• Attach ECG electrodes	☐	☐	

• Enter patient demographic details	☐	☐	

Student Name		**ID#**		**Training institute**		**Preceptor Name**		**Sign.**	

Item	Achieved	Not achieved	Preceptor Signature
TECHNIQUES FOR EACH VIEW			
• Color flow mapping	☐	☐	
• M-mode	☐	☐	
• CW Doppler	☐	☐	
• PW Doppler	☐	☐	
• Tissue Doppler imaging	☐	☐	
• Speckle tracking imaging	☐	☐	
• 3D imaging	☐	☐	
• Contrast imaging.	☐	☐	
ASSESSMENT OF LV SYSTOLIC FUNCTION			
• Linear (M-mode and 2D)	☐	☐	
• Volume (2D and 3D)	☐	☐	
• Modified Simpson method	☐	☐	
• Area length	☐	☐	
• LV Mass	☐	☐	
• TDI	☐	☐	
• MPI	☐	☐	
DIASTOLIC FUNCTION			
• Mitral inflow	☐	☐	
• TDI	☐	☐	
• PV flow	☐	☐	
• LA volume	☐	☐	
ASSESSMENT OF RV FUNCTION			

• RV internal dimension	☐	☐	
• TAPSI	☐	☐	
• FAC	☐	☐	
• TDI	☐	☐	
• 3D	☐	☐	

Item	Achieved	Not achieved	Preceptor Signature
ASSESSMENT OF VALVULAR STRUCTURE AND FUNCTION			
• Velocity gradient	☐	☐	
• Color doppler	☐	☐	
• Planimetry	☐	☐	
SETTING UP THE ENVIROMENT FOR TEE STUDY			
• The student should talk to the patient and check identity and consent.	☐	☐	
• The student stands behind the patient or at the head of the bed to reassure the patient and support the head and mouth guard	☐	☐	
• During the procedure, the student should monitor hemodynamics and saturations and inform the operator if they change.	☐	☐	
• They monitor for secretions and give suction as required.	☐	☐	
• After the procedure they stay with the patient to ensure adequate recovery from sedation.	☐	☐	
PREPARING TEE: A 10 POINT PLAN			
• Put sheath on the probe.	☐	☐	
• Review referral form/notes for indication, contraindications.	☐	☐	
• Ask patient when last meal was (should be > 6 hours before), • previous problems with swallowing, known esophageal disease, allergies.	☐	☐	
• Insert patient name and hospital number on scanner and ask • patient to confirm.	☐	☐	
• Insert IV cannula	☐	☐	

• Attach probe to the scanner, test steering and whether probe is accepted by the scanner.	☐	☐	
• Start blood pressure monitoring and pulse oximetry, nasal specs for oxygen supply (2L/min).	☐	☐	
• Apply local anesthesia to patient's throat, then rotate patient into a left lateral decubitus position.	☐	☐	
• Put in mouth guard.	☐	☐	
• Give sedation.	☐	☐	

Item	Achieved	Not achieved	Preceptor Signature
PROBE MOVEMENT IN TEE			
• Withdrawal and advance • Rotation (or turning) • Sector angle • Angulation (or retro-/ante-flexion)	☐	☐	
TEE views			
• 4-chamber view. • 5-chamber view. • Short axis aortic view (± right ventricle inflow/outflow). • Long axis aortic view. • Interatrial septal view. • Left atrial appendage view. • then further views • Left pulmonary venous view. • Right pulmonary venous view. • Pulmonary artery view. • Trans-gastric views. • Descending aorta view. • Aortic arch view.	☐	☐	
DOBUTAMINE STRESS ECHOCARDIOGRAM (DES)			
Preparation for DES: • Consent • Check allergy to any medicines. • Fasting before the test. • Tobacco use and caffeinated beverages, such as coffee, tea, and soda, may be restricted several hours before testing. • Hold certain medicines before the test, such as beta-blockers. • IV canula for Dobutamine administration.	☐	☐	
STRESS ECHOCARDIOGRAPHY VIEWS			
The key 4 views are: • Apical 4-chamber • Apical 2-chamber • Parasternal short axis • Parasternal long axis (or apical long axis)	☐	☐	

Item	Achieved	Not achieved	Preceptor Signature
Machine settings: • select harmonic imaging and adjust focus zone. • Ideally, frame rate should be > 25 frames/s (if heart rate > 140 then frame rates > 30 frames/s may be better).	☐	☐	
TERMINATION CRITERIA			
Treadmill exercise echocardiography should be terminated at traditional endpoints: • Attainment of target heart rates. • Cardiovascular symptoms. • Significant ECG changes or arrhythmias.	☐	☐	
ECHOCARDIOGRAPHY MACHINE AND PROBE CLEANING			
REPORTING	☐	☐	

COMMENTS:

This table is to be filled by students:

Student Name _____ Sign. _____ Date _____

Adult Echo II Rotation EVALUATION	Always (5)	Usually (4)	Sometimes (3)	Seldom (2)	Never (1)
▪ Did you clearly understand what was expected of you?					
COMMENTS:					
▪ Was supervision available to you in case you needed help in the middle of a procedure?					
COMMENTS:					
▪ Was the Cath lab preceptor responsive to your questions?					
COMMENTS:					
▪ Did you have enough opportunity to demonstrate your knowledge and skill?					
COMMENTS:					
▪ Were the expectations appropriate for your level of training?					
COMMENTS:					
▪ Was the communication with your supervisor sufficient to meet your needs?					

COMMENTS:

Cardiac Technology Department

Internship Pediatric Echocardiography competencies

Student Name		ID#		Training institute		Preceptor Name		Sign.	

Item	Achieved	Not Achieved	Preceptor Signature
GENERAL GUIDLINES, POLICIES AND PROCEDURES			
• hospital chart, Mission, Vision & Values	☐	☐	
• Review and adhere to policies and procedures	☐	☐	
• Work attendance ethics	☐	☐	
• Reprint labels	☐	☐	
ECHOCARDIOGRAPHY LAB			
• Read and understand Laboratory Safety Policies and Procedures	☐	☐	
• Read, use and locate Safety Data Sheet (SDS)	☐	☐	
• Safe handling of the echo machines, equipment, and probe	☐	☐	
• Personal Protective Equipment (PPE)	☐	☐	
• Emergency Codes	☐	☐	
PATIENT PREPARATION			
• Consent by parents.	☐	☐	
• Sedation consent if needed.	☐	☐	
• Explanation of the procedure	☐	☐	
• Patient exposure (expose area of interest till the waist)	☐	☐	
• Patient positioning in left lateral decubitus and their left hand up and behind the head in apical and parasternal views	☐	☐	
• Supine in subcostal and suprasternal views	☐	☐	
• Attach ECG electrodes	☐	☐	
• Enter patient demographic details	☐	☐	

Item	Achieved	Not achieved	Preceptor Signature
PEDIATRIC ECHOCARDIOGRAPHY VIEWS AND ASSESSMENT			
• Abdominal transverse (Subcostal window with probe marker at ~3 o'clock) • Abdominal longitudinal (Subcostal window with the probe marker towards head ~12 o'clock) • Parasternal long axis including the inflow and outflow views • Parasternal short axis • Apical 2, 3, 4, 5 chamber views • Suprasternal view • Right parasternal long axis	☐	☐	
• Apply basic principles of transthoracic echocardiography assessment of ventricular function, valvular function, and presence of a pericardial effusion is usually possible in all patients	☐	☐	
• Sequential segmental analysis • Abdominal situs Solitus • Cardiac position • Apex orientation • Atrial anatomy and systemic venous connections • Atrioventricular connections • Morphology of Ventricles • Morphology of great arteries	☐	☐	
• Establish arrangement of atrial chambers (situs) • Determine ventricular morphology and arrangement: atrioventricular • (AV) connections • Determine morphology of great arteries • Ventriculoarterial (VA) connections • Assess for any associated intracardiac lesions	☐	☐	
TECHNIQUES FOR EACH VIEW			
• Color flow mapping	☐	☐	
• M-mode	☐	☐	
• CW Doppler	☐	☐	
• PW Doppler	☐	☐	
• Tissue Doppler imaging	☐	☐	
• Speckle tracking imaging	☐	☐	
• 3D imaging	☐	☐	
• Contrast imaging.	☐	☐	

Item	Achieved	Not achieved	Preceptor Signature
ASSESSMENT OF LV SYSTOLIC FUNCTION			
• Linear (M-mode and 2D)	☐	☐	
• Volume (2D and 3D)	☐	☐	
• Modified Simpson method	☐	☐	
• Area length	☐	☐	
• LV Mass	☐	☐	
• TDI	☐	☐	
• MPI	☐	☐	
DIASTOLIC FUNCTION			
• Mitral inflow	☐	☐	
• TDI	☐	☐	
• PV flow	☐	☐	
• LA volume	☐	☐	
ECHOCARDIOGRAPHY MACHINE AND PROBE CLEANING			
Preliminary Report	☐	☐	

COMMENTS:

This table is to be filled by students:

Student Name _____ Sign. _____ Date _____

Pediatric Echo Rotation EVALUATION	Always (5)	Usually (4)	Sometimes (3)	Seldom (2)	Never (1)
▪ Did you clearly understand what was expected of you?					
COMMENTS:					
▪ Was supervision available to you in case you needed help in the middle of a procedure?					
COMMENTS:					
▪ Was the echo lab preceptor responsive to your questions?					
COMMENTS:					
▪ Did you have enough opportunity to demonstrate your knowledge and skill?					
COMMENTS:					
▪ Were the expectations appropriate for your level of training?					
COMMENTS:					
▪ Was the communication sufficient to meet your needs?					
COMMENTS:					

APPENDIX 8

Contacts of Training Affairs at College of Applied Medical Sciences

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