



الهيئة السعودية للتخصصات الصحية
Saudi Commission for Health Specialties

Cardiac Care Nursing Diploma



سَبِّحْ لِلَّهِ حَمْدًا

PREFACE

- The primary goal of this document is to enrich the training experience of the postgraduate trainees by outlining the learning objectives to become independent and competent future practitioners.
- This curriculum may contain sections outlining some regulations of training; however, such regulations need to be sought from the “General Bylaws of Training in Postgraduate Programs” and “Executive Policies” published by the Saudi Commission for Health Specialties (SCFHS), which can be accessed online through the official SCFHS website. In case of discrepancies in regulation statements, the one stated in the most updated bylaws and executive policies will be the reference to apply.
- Because this curriculum is subject to periodic refinement, please refer to the electronic version posted online for the most updated edition at www.scfhs.org.sa

I. CONTRIBUTORS

This curriculum was prepared by the Specialty's Curriculum Development Committee:

- Dr. Ghadah M. Abdullah
- Mrs. Laila M. Hassan
- Mr. Saleh M. Mayyas
- Mrs. Afnan A. Alhayani

Reviewed and Approved by Specialty's Scientific (Council/Committee) Members:

- Dr. Ghadah M. Abdullah
- Mrs. Laila M. Hassan
- Mr. Saleh M. Mayyas
- Dr. Pradeep P. Nair
- Ms. Majd A. Taijani

Review and Approved by Head of the Curricula Review Committee:

- Ali Alyahya, MD, MME, FRCSC

Previous Versions' contributors (s).

- Ms. Bushra Alhunidi
- Mr. Hassan Osman
- Ms. Nawal Abualwafa



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Correspondence:

Saudi Commission for Health Specialties

P.O. Box: 94656

Postal Code: 11614

Contact Center: 920019393

E-mail: Curricula@scfhs.org.sa

Website: www.scfhs.org.sa

III. FOREWORD

The Cardiac Nursing Diploma Curriculum development team acknowledges the valuable contributions and feedback from the Cardiac Nursing Scientific Committee members in the development of this program. We extend special appreciation and gratitude to all the members who have been pivotal to the completion of this curriculum, especially the Curriculum Group, Curriculum Reviewers, and Scientific Council. Furthermore, we acknowledge that the New Zealand Cardiac Nursing (NZCN) Knowledge and Skills Framework is copyright. Many of the competencies in the descriptions were acquired from their own resources.



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IV. INTRODUCTION

1. Context of practice

Cardiovascular disease (CVD) remains the leading cause of death worldwide, accounting for approximately 18.6 million deaths in 2019 (WHO, 2021). Global deaths from CVD increased from 12,068,42 in 2009 to 18,562,510 in 2019 (Tsao et al., 2023). The American Heart Association's (AHA) statistical update on heart disease and stroke stated that heart disease remains the primary cause of death in the US, and coronary heart disease (CHD) accounts for approximately 13% of deaths, causing 365,744 deaths per year (Tsao, et al., 2023). In the UK, CHD causes more than 160,000 deaths each year or 460 deaths each day, that is, one death every three minutes (British Heart Foundation, 2023).

The WHO also declared that an estimated 17.9 million people died from CVDs in 2019, representing 32% of all global deaths, of which approximately 85% were due to heart attacks and strokes (WHO, 2021). Over three-quarters of CVD deaths occur in low-and-middle-income countries. The Prospective Urban Rural Epidemiology Study (PURE-Saudi), which was conducted between February 2012 and January 2015 among Saudi populations, revealed several unhealthy lifestyles and CVD risk factors (Alhabib et al., 2020). Overall, 69.4% had low physical activity; 49.6%, obesity; 34.4%, an unhealthy diet; 32.1%, dyslipidemia; 30.3%, hypertension; and 25.1%, diabetes. Additionally, 12.2% were current smokers, 15.4% self-reported feeling sad, 16.9% had a history of periods of stress, 6.8% had permanent stress, 1% had a history of stroke, 0.6% had heart failure, and 2.5% had coronary heart disease (CHD) (Alhabib et al., 2020).

Over the past 70 years, nurses have become integral members of the care teams for patients with CVD in various healthcare environments. Cardiac surgery began in 1944 as the first palliative procedure for “blue babies” (Cooley & Frazier, 2000). The first open-heart surgery was performed in 1955 to repair a congenital defect. In the 1950s, nurses helped develop specialized operating rooms for heart and lung surgery and cardiac catheterization laboratories (Cooley & Frazier, 2000).

Since 1961, the role of expert nurses in independently performing the resuscitation of arrested patients in Coronary Care Units has been identified and empowered (Morrow et al., 2012).

With the emergence of the science of cardiac nursing, expectations for care have increased among the public, patients, and healthcare professionals. Consequently, considering the challenges surrounding CVD care and management and the burden of keeping up with the healthcare needs of Saudi Arabia's young and growing population, such care is considered a priority. This challenge is exacerbated by limitations in healthcare resources and workforce shortages of physicians and nurses. This context provides numerous opportunities for cardiac nurses to contribute to the prevention and management of CVD.

The cardiac diploma has been created to facilitate the building of infrastructure in cardiac nursing to overcome the severe shortage of specialized nurses in Saudi Arabia and to support the implementation of Saudi Vision 2030. One of the Saudi Vision 2030 goals is to improve the quality and consistency of healthcare services and prepare staff who can provide safe, effective, patient-centered, timely, and equitable care, a goal that can be achieved through a cardiac diploma.

This diploma has also been created to enhance nurses' abilities to utilize evidence-based clinical judgments, promote the dissemination of research findings, and develop essential knowledge and skills. As an outcome of the program, nurses will be able to deliver the highest possible quality of nursing care to meet patients' needs in the cardiac field. This diploma will enable graduate-registered nurses to provide competently tailored care for patients with CVD in different cardiac settings.

2. Goals and responsibilities of curriculum implementation

Upon completion of Advanced Nursing Practice in Cardiac (Adult) Specialization, the trainee will be able to:

1. integrate knowledge of cardiac nursing and health sciences in the provision of care for patients with CVD;
2. demonstrate the ability to manage sudden or acute deterioration in patients with CVD;



3. assess common risk factors that may adversely affect the physical and psychosocial well-being of adult patients with CVD;
4. demonstrate interpersonal and psychomotor skills in implementing effective nursing care to patients with CVD;
5. utilize critical thinking skills to improve health outcomes of patients with CVD;
6. provide health education and counseling to patients with CVD;
7. apply infection control measures when caring for patients with CVD;
8. conduct a research project in the area of cardiac care nursing;
9. utilize an evidence-based approach in evaluating nursing practice within cardiac units;
10. apply the concept of quality improvement in evaluating nursing care;
11. manage ethical issues concerning the care of patients with CVD and their families in accordance with Saudi rules and regulations; and
12. perform self-directed professional development activities.

3. What is new in this edition?

This version has been updated and transformed into a competency-based curriculum that clearly represents the learning domains of knowledge, skills, and behavior. It employs Competency-based education (CBE) as an approach to “adult learning,” based on achieving predefined, fine-grained, and well-paced learning objectives driven by complex professional competencies.

The curriculum outlines the trainee’s responsibilities throughout the *training period and what should be achieved in each stage of training (Milestone)*. Also, it gave higher weight to the competency aspect of the training and provided clear objectives and expectations for each area of training rotation.

The following modifications were done to the previous version.

13. The **clinical hours** in the previous curriculum were changed to **clinical rotation** which was counted in days rather than hours.
14. The number of clinical hours increased in the new version and the theoretical hours were reduced.

15. The number of modules was reduced from 16 in the old curriculum to 11 in the new version by integrating similar and redundant content as follows:
- 3.1. Epidemiology module integrated with the Cardiovascular disease promotion, prevention, and rehabilitation module.
 - 3.2. Biostatistics Module integrated with the Introduction to nursing research and evidence-based practice.
 - 3.3. The Emotional and spiritual well-being module was integrated with Alterations in the cardiovascular system II module.
 - 3.4. The professional performance, Nursing informatics, and Evaluation of the quality-of-care modules were integrated into the Nursing leadership and Management modules.
16. The Advanced ECG module was reviewed and divided into **Basic ECG interpretation** in year one and **Advanced ECG interpretation** in year two, to ensure a fair and proper content distribution of the module hours throughout the training period. Such module divisions provide more time for trainees to develop advanced ECG interpretation competencies. The **Basic ECG interpretation** contents were part of the Cardiac Pathophysiology Module in the old curriculum and were not given the required weight and value as essential content for year one trainees.
17. The **Elective cardiovascular rotation module** was developed as a new version of the curriculum. The module is designed to provide the opportunity for trainees at the end of their second-year rotation to implement the cardiovascular knowledge and skills gained throughout the program into selected cardiovascular clinical areas of interest. Clinical practicum should be conducted within accredited cardiac centers in the KSA.
18. The curriculum and modules' **general and specific objectives** were reviewed and modified to meet the SMART objectives.
19. The **SMART objectives** of each module were **mapped to the competencies** to ensure that competency-based curriculum and training were achieved.
20. The curriculum references have been revised and updated. New references have been added, and a few references from the old curriculum have been removed.
21. **The following module names and contents were modified from the previous curriculum to reflect the scope of the modules as below:**



- 9.1. The name of the Foundational human anatomy and physiology of the cardiac system module in the old curriculum has been changed to **Foundational human anatomy and physiology of the cardiovascular system.**
 - 9.2. The name of the Cardiac nursing: assessment, planning, and managing care module in the old curriculum has been changed to **Cardiovascular nursing: assessment, planning, and managing care**
 - 9.3. The name of the Cardiac pharmacology module in the old curriculum has been changed to **Cardiovascular pharmacology.**
 - 9.4. The name of the Fundamentals of cardiac pathophysiology module in the old curriculum has been changed to **Alterations in the cardiovascular system I.**
 - 9.5. The name of the Health promotion, prevention, and rehabilitation module in the old curriculum has been changed to **Cardiovascular disease promotion, prevention, and rehabilitation.**
 - 9.6. The name of the Ethics in cardiac nursing practice module in the old curriculum has been changed to **Ethics in cardiovascular nursing practice.**
 - 9.7. The name of the Introduction to research and evidence-based practice module in the old curriculum has been changed to **Introduction to the nursing research and evidence-based practice.**
 - 9.8. The name of the Advanced cardiac care module in the old curriculum has been changed to **Alterations in the cardiovascular system II.**
22. The number of universal topics decreased from 27 to 17. Only relevant and important topics are included in the updated curriculum.
23. The applicants' English language levels were added to the program's entry requirements. It is preferred that the applicant submit one of the following:
- 11.1. (STEP: 64), valid for three years.
 - 11.2. (IELTS: 4) valid for 2 years.
 - 11.3. (TOFEL: IBT 48-PBT 458) valid for 2 years

V. ABBREVIATIONS

Abbreviation	Description
SCFHS	Saudi Commission For Health Specialties
D(1)	(First) Year Of
D(2)	(Second) Year Of
MINI-CEX	Mini-Clinical Experience Report
DOPS	Direct Observation Of Procedural Skills Report
CbD	Case-based Discussion
CBE	Competency-Based Education
TBL	Team-Based Learning
CPD	Continuous Professional Development
CD	Clinical Domains
ITER	In-Training Evaluation Report
SOE	Structural Oral Examination
OSCE	Objective Structured Clinical Examination
CCU	Coronary Care Unit.
ICU	Intensive Care Unit
ER	Emergency Room



Abbreviation	Description
OR	Operation Room
BLS	Basic life support
ACLS	Advance cardiac life support
ACS	Acute Coronary Syndrome
CAD	Coronary Artery Disease
CHD	Coronary Heart Disease
CVD	Cardiovascular Disease
CABG	Coronary Artery Bypass Graft
ECG	Electrocardiogram
LVAD	Left Ventricle Assist Device
ICD	Implantable Cardiac Defibrillator
CRTD	Cardiac Resynchronization Therapy- With A Pacemaker
CRTD	Cardiac Resynchronization Therapy- Defibrillator
PEG	Percutaneous Endoscopic Gastrostomy
TPN	Total Preantral Nutrition
CPAP	Continuous Positive Airway Pressure
BIPAP	Bilevel Positive Airway Pressure
NIMV	Noninvasive Motion Ventilator

VI. PROGRAM ENTRY REQUIREMENTS

1. Bachelor of Nursing (BSN) degree
2. Holding a valid Nursing License and classified Registered Nurse from SCFHS
3. At least one year of experience in cardiac or acute nursing care units before joining the program
4. A good English proficiency level—it is preferred that the applicant submit one of the following:
 - a. (STEP: 64) valid for three years;
 - b. (IELTS: 4) valid for 2 years; or
 - c. (TOFEL: IBT 48-PBT 458) valid for 2 years
5. Pass the admission's interview
6. Provide employer approval, for full-time training and enrollment in the training program
7. Be physically fit to practice

For more information about the registration and program acceptance, please visit the SCFHS website:

<https://www.scfhs.org.sa/MESPS/Pages/admissionregistration.aspx>



VII. LEARNING AND COMPETENCIES

1. Introduction to learning outcomes and competency based-education

Training should be guided by well-defined “*learning objectives*” that are driven by targeted “*learning outcomes*” of a particular program to serve specific specialty needs. Learning outcomes should reflect the professional “*competencies*” and tasks that are aimed to be “*entrusted*” and tasks that trainees aim to engage in upon graduation. This ensures that graduates meet the expected demands of the healthcare system and patient care in relation to their specialties. *Competency-based education* (CBE) is an approach of “*adult-learning*” that is based on achieving *pre-defined, fine-grained, and well-paced* learning objectives that are driven from complex professional competencies.

Professional competencies related to healthcare are usually complex and contain a mixture of multiple learning domains (knowledge, skills, and attitudes). CBE is expected to change traditional methods of postgraduate education. For instance, the time of training, though a precious resource, should not be considered a proxy for *competence* (e.g., time of rotation in certain hospital areas is not the primary marker of competence achievement). Furthermore, CBE emphasizes the critical role of informed judgment in learners’ competency progress, based on a staged and formative assessment driven by multiple workplace-based observations. Several CBE models have been developed for postgraduate healthcare education.

Several CBE models have been developed for postgraduate healthcare education including The New Zealand Cardiac Nursing (NZCN) Knowledge and Skills Framework. This framework was selected because it delineates key specialized clinical competencies and describes the core content curriculum that advanced practice nurses need to work within the context of specialized cardiac care nursing. This framework provides exceptional knowledge, skills, and attitudes for nurses caring for patients

with acute and chronic cardiac diseases. The following concepts enhance the implementation of CBE in the curriculum.

- **Competency:** Competency is a cognitive construct that assesses one's potential to perform efficiently in a given situation based on professional standards. Professional roles (e.g., medical experts, health advocates, communicators, leaders, scholars, collaborators, and professionals) are used to define competency roles to make them mendingable for learning and assessment.
- **Milestones:** Milestones are the stages of the developmental journey throughout the competency continuum. Throughout their learning journey from junior and senior levels, trainees will be assisted in transforming from novice/supervised to master/unsupervised practitioners. This should not undermine the role of supervisory/regulatory bodies towards malpractice of independent practitioners. Milestones are expected to enhance the learning process by pacing training/assessment to match the developmental level of the trainees (junior vs. senior).
- **Learning-domains:** Whenever possible, efforts should be directed to annotate learning outcomes with the corresponding domain (K=Knowledge, S=Skills, and A=Attitude). You may have more than one annotation for a given learning outcome.
- **Content-area categorization:** It is advisable to categorize learning outcomes into broad content areas related to the practice of the profession. Examples include diagnostic vs. therapeutic, simple vs. complex, and urgent vs. chronic.
- **Trainees** are expected to progress from a novice level to a master's level in a certain set of professional competencies.

The New Zealand Cardiac Nursing (NZCN) Knowledge and Skills Framework ([2018-CV-Nursing-Skills-and-Knowledge-Framework.pdf](#) (cardiacsociety.org.nz) by the cardiac clinical nurses who are affiliated to the Cardiac Society of Australia and New Zealand (CSANZ) was used as a competency framework in this curriculum.

2. Program Durations

- The Advanced Practice Nursing Program in Adult Cardiac Care is a two calendar year program.



- The program consists of 52 weeks per calendar year including a 5-weeks of leaves.
- A total of 48 hours of didactic and clinical sessions must be completed every week.
- Trainees may complete clinical rotations as an eight-hour shift per day, excluding a lunch break, or as a 12-hour shift, to complete a total of no more than 40 hours per week.
- The trainees are expected to complete certain numbers of night and weekend shifts
- The language of instruction for the program is English.

Leaves & vacations

- The trainee is entitled to annual leave for four weeks, in addition to one of the two Eid holidays, according to the training institution standards.
- Sick leave, maternity leave, and exceptional “emergency” leave for a period not exceeding 90 days shall be compensated for with an equivalent number of days before the trainee is awarded the Certificate of Training Completion.
- Leaves not utilized in due time within the year shall not be shifted to the following year.

Please Refer to the SCFHS policies for more specific details for all holidays

3. Program rotations

Table 1: Clinical Rotations for Cardiac Nursing Diploma Program:

The (NZCN) Knowledge and Skills Framework was used to review and develop cardiac diploma rotations. The framework delineates the key generic competencies applicable to all cardiac nurses working in advanced practice roles. These competencies include leadership, physiology and pathophysiology, assessment, diagnostics, and health education / cardiac rehabilitation /risk modification. Cardiac nurses perform these competencies in acute cardiac care and Chronic Heart Disease.

Table 1: Clinical Rotations for Cardiac Nursing Diploma Program

Training Year	Mandatory core rotations*		
	Rotation name	Duration by weeks	Setting ***
D1	<ul style="list-style-type: none"> General hospital and nursing orientation 	2 weeks	<ul style="list-style-type: none"> Nursing education Medical cardiology
	1. Foundational human anatomy and physiology of the cardiovascular system	6 Weeks	<ul style="list-style-type: none"> Medical cardiology Non-invasive cardiology
	2. Cardiovascular nursing: assessment, planning, and managing care	9 weeks	<ul style="list-style-type: none"> Medical cardiology Non-invasive cardiology Invasive cardiology
	3. Cardiovascular pharmacology	7 weeks	<ul style="list-style-type: none"> Medical cardiology ICUs
	4. Alterations in the cardiovascular system I	10 weeks	<ul style="list-style-type: none"> Medical cardiology Ambulatory cardiology
	5. Basic ECG interpretation	5 weeks	<ul style="list-style-type: none"> Medical cardiology ICUs
	6. Cardiovascular disease promotion, prevention, and rehabilitation	6 weeks	<ul style="list-style-type: none"> Cardiac outpatient clinics Patient and family education
	7. Ethics in cardiovascular nursing practice	2. Weeks	<ul style="list-style-type: none"> Medical cardiology ICUs
	Annual vacation (30 days)	4 weeks	
	<i>One of the two Eid holidays</i>	*1 week	
	TOTAL	52 weeks	
	D2	1. Introduction to the nursing research and evidence-based practice	8 weeks
2. Alterations in the cardiovascular system II		18 weeks	<ul style="list-style-type: none"> ICUs Invasive cardiology
3. Advanced ECG interpretation		12 weeks	<ul style="list-style-type: none"> ICUs Invasive cardiology



Training Year	Mandatory core rotations*		
	Rotation name	Duration by weeks	Setting ***
	4. Nursing leadership and management	4 weeks	<ul style="list-style-type: none"> • Medical cardiology • Non-invasive cardiology • Ambulatory cardiology • Invasive cardiology • ICUs
	5. Elective cardiovascular rotation	5 weeks	<ul style="list-style-type: none"> • Medical cardiology • Invasive cardiology • ICUs • Emergency Department
	Annual vacation (30 days)	4 weeks	
	<i>One of the two Eid holidays</i>	*1 week	
	TOTAL	52	

(***Mandatory core rotation**: Set of rotations that represent program core component and are mandatory to do.

****Elective rotation**: Set of rotations that are related to the specialty, as determined by the scientific council/committee, and the trainee is required to do some of them.)

(*** **Settings**: Medical cardiology (cardiac ward/CCU/Telemetry/Step down); Non-invasive cardiology (Day cardiac/ non-invasive cardiac procedures); Ambulatory cardiology (OPD-cardiology/patient and family education/HHC/ public health); Invasive cardiology (cath lab/cardiac OR); ICUs (MICU/SICU/CSICU). The names of the setting areas may vary according to the training center). * Subject to changes based on SCFHS rules.

4. Mapping of learning objectives and competency roles to program rotations

This section aims to match the competencies and objectives of each rotation to map the competencies, learning domains, and milestones. Trainees and trainers should collaborate to achieve these objectives during teaching and formative assessments. Their expectations evolved as the training level progressed (training stage and milestones).

Table 2 reflects the Junior-level Competency Matrix to map competencies, learning domains, and milestones, while **Table 3** reflects the Senior-level Competency Matrix to map competencies, learning domains, and milestones.

Five levels or degrees of competency were used to guide the training faculty in making decisions about the trainees' clinical progress throughout their training period (Table 4). These levels are also useful for evaluating the trainees' readiness to provide competent cardiac nursing care under a certain level of supervision until they become independent. The five levels were as follows (Tanner et al., 2020):

- Level 1 'trainee is able to observe.'
- Level 2 'trainee is able to perform the activity under direct supervision.'
- Level 3 'trainee can perform the activity under indirect supervision. The trainee must request help from a supervisor who is available immediately.'
- Level 4 'trainee is able to perform the activity under distant supervision. A supervisor was available over the phone.'
- Level 5 'trainee is able to supervise others in performing the activity.'



Table 2: Junior-level Competency-matrix: to map competencies, learning domains, and milestones

MODULE 1: FOUNDATIONAL HUMAN ANATOMY AND PHYSIOLOGY OF THE CARDIOVASCULAR SYSTEM

Module description:

This module is a six-week-long rotation that is designed to provide an overview of the structure and function of the heart, cardiac cycle, cardiac conduction pathway, and cardiac output, and their roles in the cardiac system.

MODULE 1: FOUNDATIONAL HUMAN ANATOMY AND PHYSIOLOGY OF THE CARDIOVASCULAR SYSTEM

Milestone	Mapping of objectives to competencies	Rotation settings	Teaching methods
1. Overview of anatomy and histology of the heart and its appendages	<p>A. Describe the outline and normal position of the heart, and its relationship with adjacent organs (K)</p> <p>B. List the layers of the heart, chambers and valves as well as their functions (K)</p> <p>C. Differentiate between arteries and veins through their structure and functions</p> <p>D. Explain the histology of cardiac cells (K)</p> <p>E. Describe microcirculation (K)</p> <p>F. Apply knowledge of anatomy and physiology to recognize the clinical manifestations of CVD (K, S, A)</p> <p>G. Demonstrate competency in physical examination of CV system (K, S, A)</p>	<ul style="list-style-type: none"> • Medical cardiology • Non-invasive cardiology 	<ul style="list-style-type: none"> • Interactive lectures • Discussion • Simulation • Demonstration • Return demonstration
2. Gain knowledge and skills about the conduction system of the heart and correlate it with the components of ECG waveforms	<p>A. Identify waves, segments and intervals of ECG (K, S)</p> <p>B. Explain the parts of a normal cardiac conduction system (K)</p> <p>C. Discuss the phases of cardiac action potential; reflect them on the ECG strip (K)</p>		
3. Gain knowledge and skills on the	<p>A. Discuss the intrinsic and extrinsic factors that affect cardiac function, including the role of electrolytes (K)</p>		



MODULE 1: FOUNDATIONAL HUMAN ANATOMY AND PHYSIOLOGY OF THE CARDIOVASCULAR SYSTEM

Milestone	Mapping of objectives to competencies	Rotation settings	Teaching methods
cardiac cycle and relate them to cardiac output, pulmonary and portal circulation	<ul style="list-style-type: none"> B. Explain the Frank-Starling mechanism (K) C. Describe the effect of the autonomic nervous system on the CV system (K) D. Identify the systolic and diastolic period; relate the heart sound with the events of cardiac cycle (K, S) E. Discuss the systemic, pulmonary, and portal circulations and their differences (K, S) F. Explain the determinants of cardiac output and their contribution to physiological changes during rest and exercise (K) 		
4. Gain knowledge and skills about the coronary circulation	<ul style="list-style-type: none"> A. Describe the origin of left and right coronary arteries and their course, branches, and distribution (K) B. Describe the venous drainage of the heart and cardiac veins (their names, location and drainage areas) (K) C. Describe the location and termination of the coronary sinus and its tributaries (K) D. Apply knowledge about coronary circulation to identify the location of myocardial ischemia/injury (K, S) 		
5. Develop knowledge and skills about the hemodynamics parameters	<ul style="list-style-type: none"> A. Explain the regulation of blood pressure and heartbeat (K, S) B. Discuss the factors that affect the hemodynamic parameters of the CV system 		

MODULE 1: FOUNDATIONAL HUMAN ANATOMY AND PHYSIOLOGY OF THE CARDIOVASCULAR SYSTEM

Module contents:

1. Anatomy and physiology of the heart

- Size and location of the heart
- Linings of the heart
- Wall of the heart
- Heart chambers and valves
- Skeleton of the heart
- Path of blood through the heart
- Heart sounds
- Cardiac conduction system
- Paths of circulation
- Pulmonary circuit
- Systemic circuit

2. Arterial system

- Principal branches of the aorta
- Arteries of shoulder & upper limbs
- Arteries of pelvis & lower limbs

3. Venous system

- Veins from the brain, head, and neck
- Veins of upper limbs and shoulders
- Veins of abdominal and thoracic walls
- Veins from the lower limbs and pelvis
- Portal circulation
- Histological structure of the heart and blood vessels

4. Conduction system of the heart

- Cardiac conduction system
- ECG waveforms, segments, and intervals
- Cardiac action potential

5. Cardiac cycle

- Path of blood through the heart
- Portal Circulation
- Systolic and diastolic period
- Heart sound with the events of the cardiac cycle
- The Frank-Starling mechanism
- Heart rate
- Stroke volume
- Cardiac output
- Preload
- Afterload

6. Coronary circulation

- Blood supply to the heart
- Venous drainage

7. Factors that affect the hemodynamic parameters of the CV system

- Systole, diastole, and the pulse pressure
- Mean arterial blood pressure, circulatory filling pressure, and central venous pressure
- Blood pressure measurement
- Nervous regulation of BP
- Role of baroreceptors and chemoreceptors



MODULE 2: CARDIOVASCULAR NURSING: ASSESSMENT, PLANNING, AND MANAGING CARE

Module description

This nine-week-long module was designed to equip trainees with advanced skills and knowledge about the variety of diagnostic tests used for cardiac disease. It also focuses on the role of nurses, including patient education, in caring for cardiac patients during these procedures.

MODULE 2: CARDIOVASCULAR NURSING: ASSESSMENT, PLANNING, AND MANAGING

Milestone	Mapping milestones with objectives	Rotation settings	Teaching methods
1. Demonstrate the ability to collect data in a systematic manner that accurately reflects the immediate condition or anticipated needs of the patient	<p>A. Develop knowledge about cardiac health assessment and collection of accurate data (K)</p> <p>B. Demonstrate skill in screening basic vital signs as part of cardiac assessment data collection (K, S, A)</p> <p>C. Assess and list the risk factors leading to CV diseases (K, S, A)</p>	<p>A. Medical cardiology</p> <p>B. Non-invasive cardiology</p> <p>C. Invasive cardiology</p>	<p>D. Demonstration</p> <p>E. Return demonstration</p> <p>F. Interactive lectures</p> <p>G. Discussion</p> <p>H. Simulation</p> <ul style="list-style-type: none"> •
2. Determine the nursing diagnosis or health-related complaint from assessment data	<p>A. Define nursing process and list their components (K)</p> <p>B. Apply the concept of nursing process as a scientific tool for planning nursing care (K, S, A)</p>		
3. Analyze the obtained patient data to plan care and attain defined outcomes for a range of cardiovascular disorders	<p>A. Demonstrate the ability to prepare the patient, environment and equipment required for a range of invasive and non-invasive cardiology-related diagnostic tests (K, S, A)</p> <p>B. Adhere to local policies and protocols regarding specific cardiac interventions & modalities (K, S, A)</p> <p>C. Maintain safety, privacy, dignity, confidentiality, and accurate documentation (K, S, A)</p>		



MODULE 2: CARDIOVASCULAR NURSING: ASSESSMENT, PLANNING, AND MANAGING (

Milestone	Mapping milestones with objectives	Rotation settings	Teaching methods
	D. Empathize and respect patients' socio-economic, ethical, cultural, and religious background (K, S, A)		

MODULE 2: CARDIOVASCULAR NURSING: ASSESSMENT, PLANNING, AND MANAGING CARE

Module contents:

1. Cardiac health assessment data

- Cardiac history
- Screening basic vital signs
- Screening for risk factors
- Nursing process

2. Diagnostic tests

- Non-invasive tests and procedures
- Invasive tests and procedures
- Cardiac-specific laboratory tests
- Electrocardiogram (ECG): 12 Lead ECG
- Holter monitor
- Electrophysiological studies (non-invasive & invasive)
- Loop memory monitor (implant or external)
- Post event monitor
- Signal averaged ECG & action potential ECG
- ECG exercise stress test
- Treadmill exercise test
- Bicycle exercise test
- Pharmacological stress test (dobutamine, dipyridamole, adenosine)
- Nuclear stress test (using exercise or chemical stress)

3. Echocardiogram (Echo)

- Transthoracic echo (TTE)
- Transesophageal echo (TEE)
- Doppler echo
- Stress echo (Pharmacological)

4. Chest X-Ray and other modalities

- Scan using X ray
- Cardiac computed tomography (CT)
- Cardiac computerized axial tomography (CAT)
- Multi detector scan or (MDCT)
- Scan using nuclear isotope & gamma camera
- Positron emission tomography (PET)
- Single photon emission computed tomography (SPECT)
- Radionuclide ventriculography or radionuclide angiography (MUGA Scan)
- Myocardial perfusion imaging (MPI) test
- Radionuclide stress test and nuclear stress test

5. Scan using magnetism

- Magnetic resonance imaging (MRI)

6. Cardiac catheterization(right/left)



MODULE 3: CARDIOVASCULAR PHARMACOLOGY

Module description

This module is a 7-week-long rotation designed to review and develop trainees' knowledge and skills in pharmacokinetics, pharmacodynamics, and safe medication administration related to medications used in cardiac patients.

MODULE 3: CARDIOVASCULAR PHARMACOLOGY

Milestones	Mapping milestones to objectives	Rotation settings	Teaching methodology
1. Develop comprehensive knowledge and skills of common drugs prescribed for cardiovascular patients	<p>A. Develop knowledge of drugs' mode of action and dosages for different classifications of cardiovascular, sedative, analgesic, and other relevant medications used in critical care (K)</p> <p>B. Identify common look-alike, sound-alike, and high-alert medications in cardiology (K)</p>	<ul style="list-style-type: none"> • Medical cardiology • ICUs • Invasive cardiology 	<ul style="list-style-type: none"> • Interactive lectures • Clinical teaching • Simulation • Case study • Morning report
2. Develop knowledge and skills in cardiovascular drugs calculation and administration	<p>A. Able to calculate medications accurately (K, S)</p> <p>B. Show ability in mixing medications appropriately based on the hospital pharmacy guideline (K, S)</p> <p>C. Administer medication safely while adhering to legal and ethical principles of medication administration for cardiac patients (K S,A)</p> <p>D. Able to make relevant recommendations to the treating medical team related to the medication management plan (K, S)</p>		



MODULE 3: CARDIOVASCULAR PHARMACOLOGY

Milestones	Mapping milestones to objectives	Rotation settings	Teaching methodology
	C. Demonstrate competency in conducting medication reconciliation for all cardiac patients (K, S, A)		
3. Communicate with the multidisciplinary team about medication management plan for patients with cardiovascular diseases	<ul style="list-style-type: none"> • Participate effectively in discussing the medication management plan of the patients during multidisciplinary patients' rounds (K, S, A) 		
4. Communicate with patients and family about medication management	<p>A. Use a respectful, clear, and concise approach to obtain information from cardiac patients and family about their drugs' dose, side effects, and interaction with other drugs (K, S, A)</p> <p>B. Use a respectful approach to teach cardiac patients and family about their medication plan (K, S, A)</p>		

MODULE 3: CARDIOVASCULAR PHARMACOLOGY

Milestones	Mapping milestones to objectives	Rotation settings	Teaching methodology
<p>5. Document all activities and incidents related to medication therapy in the patients' medical records</p>	<p>C. Develop a tailored nursing care plan for cardiac patients who are receiving different drugs (K, S, A)</p> <p>D. Demonstrate ability to create Occurrence Variance Reports (OVR) when medications errors occur (K, S, A)</p> <p>E. Record relevant information related to communication with patients and family about medication management in timely manner (K, S, A)</p>		



MODULE 3: CARDIOVASCULAR PHARMACOLOGY

Module contents:

1. Introduction to pharmacology:

- Pharmacodynamics: effects and mechanisms of drug action, drug-receptor interaction, dose-response relationships
- Pharmacokinetics
- A review of arithmetic
- Principles of medication administration
- 10 rights of drugs administration
- High alert medications
- Look alike sound alike medications
- Preparation and administration of medication via various routes
- Legal and ethical aspects of medication administration
- Principles of drug action
- Medication errors
- The nursing process and pharmacology

2. Agents used (for each agent, discuss as appropriate, mechanism of action, interaction, indications, contraindications, side effects, precautions, nursing management, implications, and education of patients and family):

- antihypertensives;
- diuretics;
- lipid lowering;
- anticoagulants;
- antiplatelet drugs, fibrinolytics, and blood components;
- anti-arrhythmic;
- thrombolytics;
- beta- and alpha-adrenergic receptor blockers;
- calcium channel blockers;
- inhibitors of the renin–angiotensin–aldosterone system;
- inotropic drugs;
- other anti-ischemic drugs;
- sinus node inhibitors;
- vasodilators;
- sedatives; and
- analgesic

MODULE 4: ALTERATIONS IN THE CARDIOVASCULAR SYSTEM I

Module description:

This module is a 10-week-long rotation that examines the pathophysiology, etiology, diagnosis, and complications of common cardiac conditions, as well as the medical and nursing management of these conditions. A review of BLS/ACLS is included. The principles of patient and family education, and guidelines for nursing documentation are also discussed in this module.



MODULE 4: ALTERATIONS IN THE CARDIOVASCULAR SYSTEM I

Milestones	Mapping milestones to objectives	Rotation settings	Teaching methodology
1. Critically analyze different cardiovascular illnesses	<p>A. Distinguish between different categories of cardiovascular diseases regarding the pathophysiology, diagnosis, and medical and nursing management (K)</p> <p>B. Predict the cardiovascular diagnosis for patients with different manifestations (K,S)</p> <p>C. Participate with the multidisciplinary team in planning and reviewing the medical management for patients with cardiovascular diseases (K, S, A)</p>	<ul style="list-style-type: none"> • Medical cardiology • Ambulatory cardiology 	<ul style="list-style-type: none"> • Online lectures and interactive tutorial • Group discussions • Clinical teaching • Problem-based learning • Clinical practice
2. Apply knowledge and skills in the assessment and management of patients with cardiovascular alterations	<p>A. Construct tailored nursing management plan for patients with different cardiovascular diseases (K, S, A)</p> <p>B. Discuss with the multidisciplinary team any variation from the international guidelines of cardiovascular disease management (K, S, A)</p> <p>C. Demonstrate ability in integrating the medication therapy knowledge into the management of patients with different types of cardiovascular disease (K, S, A)</p>		

MODULE 4: ALTERATIONS IN THE CARDIOVASCULAR SYSTEM I

Milestones	Mapping milestones to objectives	Rotation settings	Teaching methodology
	D. Apply evidence-based nursing practice guidelines related to cardiovascular alterations (K, S)		
3. Summarize activities related to patient's care	<ul style="list-style-type: none"> Document nursing care plan and activities related to patients care (K, S, A) 		
4. Provide education to patients with cardiovascular alterations and their families	<ul style="list-style-type: none"> Utilize effective communication skills to deliver concise information about patient's treatment plan, and discharge instructions (K, S, A) 		



MODULE 4: ALTERATIONS IN THE CARDIOVASCULAR SYSTEM I

Module contents

A. **Diseases to be covered** (for each disease, discuss pathophysiology, etiology, diagnosis (clinical presentation, investigations), medical management, nursing management, complications, special populations in cardiovascular illnesses (pregnant, athletics))

A. Atherosclerotic disease

- Coronary artery disease
- Peripheral arterial disease
- Aortic disease
- Carotid artery disease

B. Structural abnormalities

- Acquired valvar heart disease

C. Heart muscle disorders

- Infection and inflammatory heart disease:
- Heart failure
- Cardiomyopathy

D. Hypertensive emergencies

B. **Patient and family education**

C. **Nursing documentation**

MODULE 5: BASIC ECG INTERPRETATION

Module description:

This is a five-week-long module that provides the trainee with the opportunity to develop basic skills for ECG interpretation. The analysis included ECGs in acute coronary syndromes, differentiating the causes of ST changes, and different types of basic arrhythmias. At this level, trainees are expected to be certified by a BLS.



Module 5: BASIC ECG INTERPRETATION

Milestones	Mapping milestones to objectives	Rotation settings	Teaching methodology
1. Develop knowledge and skills on the basic principles of ECG	<p>A. Recognize or explain cardiac conduction system (K)</p> <p>B. Describe the electrocardiogram indications and components (K)</p> <p>C. Demonstrate ECG lead placement (K, S, A) Identify normal electrocardiographic waveforms, intervals, and ECG axis (K)</p> <p>D. Calculate the heart rate on the ECG strip (K,S)</p>	<ul style="list-style-type: none"> • Medical cardiology • ICUs 	<ul style="list-style-type: none"> • Group discussions • Clinical teaching • Clinical practice • Competency-based learning
2. Develop knowledge and skills in interpretation and management of basic ECG abnormalities	<p>A. Analyze the common ECG rhythms on ECG paper (K, S)</p> <p>B. Identify pharmacological and nonpharmacological therapies for ECG abnormalities (K)</p> <p>C. Illustrates the indications, therapeutic effects, and adverse effects of various treatment modalities (K)</p> <p>D. Manage the adverse effects of the pharmacological and non-pharmacological therapies (K, S, A)</p> <p>E. Apply safety precaution and measures while using the electrical management (K, S, A)</p>		

Module 5: BASIC ECG INTERPRETATION

Milestones	Mapping milestones to objectives	Rotation settings	Teaching methodology
	<p>F. Cautiously provide treatment/assistance while monitoring for adverse events (K, S, A)</p> <p>G. Identify the location of ischemia or infarction (K)</p> <p>H. Review BLS guidelines (K, S, A)</p>		



Module 5: BASIC ECG INTERPRETATION

Module contents

1. Principles of ECG

- A. Cardiac conduction system, action potential and its relation to ECG
- B. Definition and indication of ECG
- C. ECG leads and placement:
 - 3-electrode system
 - 5-electrode system
 - 12-electrode system
 - Right side electrode placement
 - Posterior lead placement
- D. ECG waveform and interval (normal and abnormal)
 - P wave
 - PR Interval
 - QRS Complex
 - ST segment
 - T wave
 - QT interval
- E. ECG paper measurement.
 - Electrocardiogram calibration and voltage calculation
- F. Rate calculation in regular and irregular rhythm
- G. Recognition of cardiac axis
 - Normal axis
 - Cardiac axis deviation
 - Right axis
 - Left axis
 - Extreme axis

2. ECG rhythm interpretation

- A. Steps to identifying a normal ECG
 - Rate
 - Rhythm
 - Waveform
 - Intervals

3. Review of BLS guidelines

4. Abnormal ECG rhythms

- A. Identification of abnormal ECG rhythms
 - I. Sinus arrhythmias:
 - Sinus bradycardia
 - Sinus tachycardia
 - II. Atrial arrhythmias:
 - Atrial fibrillation
 - Atrial flutter
 - Supraventricular tachycardia
 - III. Ventricular arrhythmias
 - PVCs
 - Ventricular tachycardia
 - Ventricular fibrillation
 - IV. AV BLOCK
 - First degrees
 - Second degree (Mobitz type 1 and Mobitz type 2)
 - Third degree (complete heart block)
 - V. Asystole
 - VI. Miscellaneous ECG abnormalities:
 - Electrolyte abnormalities in ECG: (hypokalaemia and hyperkalaemia, hypocalcemia and hypercalcemia, hypomagnesemia, and hypermagnesemia)
 - Pericarditis
- B. Management of abnormal ECG rhythm.

MODULE 6: CARDIOVASCULAR DISEASE PROMOTION, PREVENTION, AND REHABILITATION

Module description:

This six-week-long module focuses on cardiovascular risk assessment and interventions to support prevention, as well as instructions on how such health priorities may be implemented in practice.



MODULE 6: CARDIOVASCULAR DISEASE PROMOTION, PREVENTION, AND REHABILITATION

Milestones	Mapping milestones to objectives	Rotation settings	Teaching methodology
1. Develop knowledge of concepts related to health promotion and disease prevention	<p>A. Define specific terms related to health promotion and disease prevention (K)</p> <p>B. Identify health promotion strategies for behavior modification (K)</p> <p>C. Develop understating of the prevention strategies used to reduce CVD mortality and morbidity (K)</p>	<ul style="list-style-type: none"> • Cardiac outpatient clinic • Patient and family education • Cardiology ward 	<ul style="list-style-type: none"> • Classroom lecture • Group discussion
2. Recognize the Cardiac disease burden in Saudi Arabia & globally	<p>A. Describe the mechanisms of disease transmission dynamics in populations and the risk factors that determine their distribution (K)</p> <p>B. Calculate the measures of morbidity, mortality, incidence, and prevalence (K, S)</p>		
3. Develop knowledge and skills in identifying the Risk Factors of Coronary Heart Disease	<p>A. Identify evidence-based guidelines for risk factors prevention and management (K)</p> <p>B. Utilize effective interview skills to assess patient and family for CAD risk factors. (K, S, A)</p> <p>C. Identify the recommended lifestyle modifications for patients with diabetes, obesity,</p>		

MODULE 6: CARDIOVASCULAR DISEASE PROMOTION, PREVENTION, AND REHABILITATION

Milestones	Mapping milestones to objectives	Rotation settings	Teaching methodology
	hypertension, metabolic syndrome, smoking, dyslipidemia, and sleep apnea (K)		
4. Develop knowledge and skills in identifying and utilizing the most common health promotion and behavioral change models for individuals and populations.	<p>A. Apply the health promotion models to the targeted individuals and population (K, S, A)</p> <p>B. Demonstrate efficiency in teaching patients and families about CVD risk factors and behavioral change (K, S, A)</p>		



MODULE 6: CARDIOVASCULAR DISEASE PROMOTION, PREVENTION, AND REHABILITATION

Module contents

1. Concepts related to health

promotion and disease prevention

- A. Health promotion terminology
- B. Health promotion and disease prevention (level of prevention):
 - Primordial
 - Primary
 - Secondary
 - Tertiary
- C. Health prevention strategies to prevent mortality and morbidity.

2. CVD in Saudi Arabia

- A. Description of the cardiac disease burden in the Kingdom of Saudi Arabia and globally
- B. Definition of the epidemiology and disease morbidity, mortality, incidence, and prevalence
- C. Mechanisms and dynamics of disease transmission in populations, and the risk factors that determine their distribution.

3. Risk factors for CVD

- A. Risk factors for death locally and globally
 - Modifiable and nonmodifiable CAD risk factors
 - CVD risk factors tool (Framingham risk tool)
- B. Evidence-based risk factors prevention and management
 - Hypertension
 - Diabetes
 - Obesity
 - Metabolic syndrome
 - Smoking
 - Dyslipidaemia
 - Sleep apnea

4. Health promotion and behavioral change models

- A. Health belief theory
- B. Transtheoretical model of behavioral change (TTM)
- C. Health protection precede-proceed model
- D. Precaution adoption process model (PAPM)
- E. Cardiac rehabilitation program
- F. Patient and family advocacy and education

MODULE 7: ETHICS IN CARDIOVASCULAR NURSING PRACTICE

Module description:

This two-week-long module focuses on exploring the ethical and legal issues confronted by cardiovascular nurses in practice. The module also explains the usefulness of ethical reasoning in synthesizing standards of practice, ethical principles, and legal and regulatory requirements for the resolution of ethical dilemmas.



Module 7: ETHICS IN CARDIOVASCULAR NURSING PRACTICE

Milestones	Mapping milestones to objectives	Rotation settings	Teaching methodology
1. Apply nursing ethics and ethical theories for making sound decisions in workplace settings	<p>A. Describe the most common ethical principles applicable to nursing practice (K)</p> <p>B. Recognize the difference between moral and legal concepts (K)</p> <p>C. Demonstrate the ability to resolve any ethical dilemmas that arise using a decision-making process (K, S, A)</p> <p>D. Be an advocate for patients and families who are facing ethical dilemmas (K, A)</p> <p>E. Demonstrate skills in applying appropriate ethical and legal decisions in nursing practice and emergency situations (K, S, A)</p>	All cardiology settings	<ul style="list-style-type: none"> • Classroom lectures • Group discussions • Problem /case-based learning
2. Demonstrate skills in analyzing and utilizing common ethical principles in nursing practice	<p>A. Effectively apply the common ethical principles in any arising scenarios in the clinical areas (K, S, A)</p> <p>B. Recognize the differences among common ethical principles (K)</p>		
3. Demonstrate knowledge about the common nursing intentional and unintentional torts in clinical practice	<p>A. Analyze different clinical cases of intentional and unintentional torts (K, S, A)</p> <p>B. Apply the appropriate decision and management for any arising intentional and unintentional torts (K, S, A)</p>		

Module 7: ETHICS IN CARDIOVASCULAR NURSING PRACTICE

Milestones	Mapping milestones to objectives	Rotation settings	Teaching methodology
4. Develop knowledge about professional registration, classification, and privileging in nursing practice	<ul style="list-style-type: none">Demonstrate knowledge of the General Regulation of professional Classification, Registration, and privileging in Saudi Arabia (K)		



Module 7: ETHICS IN CARDIOVASCULAR NURSING PRACTICE

Module contents

1. Introduction to nursing ethics

- A. Definition of common ethical and legal terms: ethics, ethical dilemmas, bioethics, morals, and values
- B. Process of ethical decision-making for the common ethical dilemmas in nursing practice:
- DNR (Do Not Resuscitate)
 - Terminal illness and palliation /public health
 - Euthanasia
 - Autopsy examination, organ harvesting, and donation
 - Contagious disease control
 - Smoking and drug addiction control
 - Vaccination
- C. Patients and family advocacy.

2. Utilizing common ethical principles in nursing practice

- Paternalism
- Autonomy
- Beneficence
- Non-maleficence
- Fidelity
- Veracity
- Privacy
- Confidentiality
- Totality and integrity

3. Common nursing intentional and unintentional torts in clinical practice

A. Intentional torts:

- Assault
- Battery
- Fraud
- Defamation
- Libel
- Slander

B. Unintentional torts:

- Negligence and malpractice
- Staff shortage and staff floating
- Patients restraints
- Telephone order
- Incident reports/variance reports
- Controlled substances
- Informed consent
- Photographing patients

4. Staff privileges and credentialing

Table 3: Senior-Level Competency-Matrix: to Map Competency, Learning Domain, and Milestones

MODULE 1: INTRODUCTION TO NURSING RESEARCH

Module description:

This module is an 8-week-long rotation that was developed to provide trainees with a foundation for nursing research. The proposal, writing, reviewing, critiquing, and publication processes will be discussed.



Module 1: INTRODUCTION TO NURSING RESEARCH

Milestones	Mapping milestones to objectives	Rotation settings	Teaching methodology
1. Gain knowledge in Nursing Research and Evidence-Based Practice	<p>A. Develop knowledge in evidence-based practice (K)</p> <p>B. Understand research misconduct (K)</p> <p>C. Review and critique one research article (K, S, A)</p>	<ul style="list-style-type: none"> • Computer-based training • E-Library 	<ul style="list-style-type: none"> • Onsite/Online interactive lectures • Mentor-to-trainee discussion • Onsite search
2. Gain knowledge and skills in identifying quantitative and qualitative research studies	<ul style="list-style-type: none"> • Differentiate between quantitative and qualitative research related to research questions, sampling, data collection methods, research designs, and statistical analysis (K, S) 		
3. Develop knowledge and skills in writing a research proposal	<p>A. Develop skills in gathering and interpreting relevant data to make judgments to initiate the research proposal (K, S, A)</p> <p>B. Demonstrate ability in writing research proposals related to purpose, problem statement, research questions, hypotheses, literature review, sampling methods, and</p>		

Module 1: INTRODUCTION TO NURSING RESEARCH

Milestones	Mapping milestones to objectives	Rotation settings	Teaching methodology
	<p>citation methods (K, S, A)</p> <p>C. Review the proposal steps with the mentor (K, S, A)</p>		



Module 1: INTRODUCTION TO NURSING RESEARCH

Module contents

1. Basic research terminology
2. Historical trends and future directions in nursing research
3. Major characteristics of the positivist and constructivist paradigms
4. Key components of evidence-based practice
5. Research critique
6. Legal and ethical issues in research studies
7. Research plagiarism
8. Research purpose and objectives
9. Types, functions, and characteristics of research hypotheses
10. Research question and problem statement
11. Literature review
 - finding and reviewing research evidence in the literature
 - screening, abstracting, critiquing, and organizing research evidence

12. Research Design:

A. Quantitative research design

- Sampling and data collection in quantitative studies
- Measurement and data quality
- Statistical analysis
- Descriptive statistics
- Inferential statistics
- Applications of t-tests, analysis of variance, chi-squared tests, correlation coefficients, multiple regression, and analysis of covariance

B. Qualitative research designs, and approaches

- Sampling and data collection in qualitative studies
- Qualitative data analysis methods
- Content analysis
- Thematic analysis
- Narrative analysis
- Grounded theory analysis
- Discourse analysis
- Trustworthiness in qualitative research
- Statistical analysis of quantitative data
- Interpretation of the quantitative research

13. Theoretical and conceptual framework

14. Type of citation and referencing (APA, Harvard, and the Vancouver style)

Module 1: INTRODUCTION TO NURSING RESEARCH

Module contents

- Utilizing SPSS for research data analysis
- Key aspects for interpreting quantitative research results
- Approaches to an assessment of the credibility of quantitative results and undertaking such an assessment



MODULE 2: ALTERATIONS IN THE CARDIOVASCULAR SYSTEM II

Module description:

This module is an 18-week-long rotation focuses on further developing the specialty knowledge, skills, and professional behaviors required for advanced cardiac care nursing practice. It also provides specific knowledge to trainees regarding cardiovascular diseases that are commonly encountered in cardiac critical care units, providing detailed information about each disease, the physical and psychological status of patients, treatment modalities, monitoring systems, admission and discharge planning, and rehabilitation programs. The topic of "cardiac surgery" is covered in this module.

Module 2: ALTERATIONS IN THE CARDIOVASCULAR SYSTEM II

Milestones	Mapping milestones to objectives	Rotation settings	Teaching methodology
1. Develop knowledge and skills about principles of hemodynamic monitoring	<p>A. Recognize the principles of hemodynamic monitoring (K)</p> <p>B. Evaluate and manage patients with hemodynamic monitoring modalities (K, S, A)</p> <p>C. Demonstrate ability in troubleshooting in case of hemodynamic monitoring malfunctions (K, S)</p>	<ul style="list-style-type: none"> • ICUs • Invasive cardiology 	<ul style="list-style-type: none"> • Online lectures and interactive tutorial • Group discussions • Clinical teaching • Clinical practice • Competency-based learning • Logbooks
2. Manage patients with advanced cardiovascular diseases	<p>A. Predict the advanced cardiovascular diagnoses (K, S)</p> <p>B. Demonstrate ability in caring for patients with cardiovascular diseases (K, S, A)</p> <p>C. Work collaboratively with the multidisciplinary team to deliver quality care for patients with advanced cardiovascular diseases (K, S, A)</p> <p>D. Create a nursing care plan that addresses various needs for patients with different</p>		



Module 2: ALTERATIONS IN THE CARDIOVASCULAR SYSTEM II

Milestones	Mapping milestones to objectives	Rotation settings	Teaching methodology
	<p>cardiovascular diseases (K, S, A)</p> <p>E. Participate in teaching patients and families regarding cardiovascular diseases management (K, S, A)</p>		
3. Demonstrate competent practice in utilizing different procedures and modalities in cardiac patients	<p>A. Relate the use of different cardiac procedures and modalities to their clinical indication (K)</p> <p>B. Demonstrate ability in managing patients on different cardiac procedures and modalities (K, S, A)</p> <p>C. Participate in teaching patients and families regarding cardiovascular procedures and treatment modalities (K, S, A)</p>		
4. Expand knowledge and skills about cardiac surgery	<p>A. Review the principles, indications, and complications of cardiac surgery (K)</p> <p>B. Generate a pertinent nursing care plan to guide preoperative and postoperative patient needs (K, S, A)</p> <p>C. Practice evidence-based approach in the prevention of postoperative complications (K, S, A)</p>		

Module 2: ALTERATIONS IN THE CARDIOVASCULAR SYSTEM II

Milestones	Mapping milestones to objectives	Rotation settings	Teaching methodology
	<p>D. Participate in teaching patients and families regarding pre and post cardiac surgery (K, S, A)</p> <p>E. Provide psychosocial support for patients and family undergoing cardiac surgery (K, S, A)</p>		
5. Gain knowledge and skills in identifying and managing cardiac patients with a psychosocial and spiritual alteration	<p>A. Identify the psychosocial and spiritual response related to the cardiac diagnosis. (K, S, A)</p> <p>B. Manage patients with stress, anxiety, depression, hostility, anger, denial, and post-traumatic stress syndrome (K, S, A)</p> <p>C. Recognize the urgent need for nursing prevention and intervention of patients with suicidal ideation or attempts (K, S, A)</p> <p>D. Identify the available nursing self-care resources (K, S, A)</p>		
6. Manage patients with nutritional deficiencies	<ul style="list-style-type: none"> Safely administer feedings via different enteral routes (K, S, A). 		



Module 2: ALTERATIONS IN THE CARDIOVASCULAR SYSTEM II

Module contents

1. Hemodynamic monitoring

- A. Arterial pressure monitoring
- B. Central venous pressure monitoring
- C. Pulmonary artery pressure monitoring
- D. Cardiac output determination
- E. Evaluation of oxygen delivery and demand balance

2. Disease to be covered (for each disease, discuss pathophysiology, etiology, assessment and diagnosis, classification (if applied), medical management, nursing management, complications, patient and family education):

- A. Pulmonary hypertension
- B. Cardiac trauma
- C. Cardiac tumor
- D. Shock
 - Hypovolemic
 - Cardiogenic
 - Distributive
 - Obstructive
 - Multi-organ dysfunctions
- E. End-stage heart disease and donation after cardiac death
- F. Sudden cardiac death
- G. Congenital heart diseases
- H. Pregnancy and cardiovascular diseases

3. Cardiac Surgery

- A. For the listed types of cardiac surgery, the following will be covered:
 - Indications
 - Contraindications

4. Therapeutic Approaches and Mechanical circulatory assist devices

- Mechanical circulatory assist devices
 - A. Intra-aortic balloon pump
 - B. Left ventricular assisted device (LVAD)
 - C. Impella
 - D. Berlin heart
- Therapeutic approaches:
 - A. Pacemakers
 - B. Implantable defibrillators

5. Invasive mechanical ventilation

- Acid base imbalance and ABG interpretation
- Indications
- Modes of ventilation
- Non-invasive ventilation
- Nursing management

6. Emotional and spiritual patient needs

- Stress and psycho-neuro-immunology
- Post-traumatic stress reactions
- Anxiety
- Depression: patient health questioners - 9 PHQ-
- Hostility, anger, and denial
- Coping with stress and illness
- Alterations in self-concept
- Risk for compromised human dignity
- Spiritual challenges in critical care
- Holistic psychosocial-spiritual care
- Communicate with compassion and care
- Practice dignity-enhancing care
- Provide family-centered care

Module 2: ALTERATIONS IN THE CARDIOVASCULAR SYSTEM II

Module contents

- Preoperative assessment and preparation
 - Anesthesia management
 - Surgical techniques
 - Cardiopulmonary bypass
 - Graft material CABG
 - Postoperative care
 - Aquathermia and heating pads
 - Postoperative complication
 - Emergent sternotomy and internal defibrillation
- B. The following types of cardiac surgery to be discussed:
- Coronary artery bypass graft (CABG)
 - Valvular heart surgery
 - Cardiac transplantation
- C. Evidence-practice guideline for managing patient for cardiac surgery
- Engage spiritual resources
 - Patients with mental health and suicidal ideation
 - Nurse self-care
 - Pain and pain management
 - Grief support for patients and family
- 7. Nutrition alteration and management**
- Enteral feeding
 - Feeding tube: A. Small-bore insertion and care
B. Verification of placement
C. PEG, gastrostomy, and jejunostomy care
 - Central parenteral nutrition
 - TPN and fat emulsion administration



MODULE 3: ADVANCED ECG INTERPRETATION

Module description:

This module is a 12-week-long rotation that provides trainees with the opportunity to advance their ECG interpretation skills. At this level, trainees are expected to complete advanced cardiac life support (ACLS) certification.

Module 3: ADVANCED ECG INTERPRETATION

Milestones	Mapping milestones to objectives	Rotation settings	Teaching methodology
1. Expand knowledge about mechanisms of arrhythmias	<ul style="list-style-type: none"> Define concepts of re-entry, abnormal automaticity, triggered activity (K) 	<ul style="list-style-type: none"> ICUs Medical cardiology Invasive cardiology 	<ul style="list-style-type: none"> Lectures and interactive tutorial Group discussions Clinical teaching Clinical practice Competency-based learning
2. Demonstrate ability in interpreting ECG rhythms	<ul style="list-style-type: none"> Differentiate between various types of rhythm abnormalities (K, S) 		
3. Effectively manage patients with ECG abnormalities	<p>A. Demonstrate ability to use pharmacological and non-pharmacological therapies for each of the ECG abnormalities (K, S, A)</p> <p>B. Identify the indications, therapeutic effects, and adverse effects of various treatment modalities (K)</p> <p>C. Manage the adverse effects of the pharmacological and non-pharmacological therapies (K, S, A)</p> <p>D. Apply safety precaution and measures while using</p>		



Module 3: ADVANCED ECG INTERPRETATION

Milestones	Mapping milestones to objectives	Rotation settings	Teaching methodology
	<p>the electrical management (K, S, A)</p> <p>E. Cautiously provide the treatment while monitoring for adverse events (K, S, A)</p> <p>F. Review ACLS guidelines (K, S, A)</p>		
4. Manage patients with different types of pacemakers	<p>A. Recognize the normal functioning of the pacemaker (K, S)</p> <p>B. Identify abnormalities in the pacemaker function (K)</p> <p>C. Effectively manage patients with pacemaker abnormalities (K, S, A)</p>		

Module 3: ADVANCED ECG INTERPRETATION

Module contents

1) Mechanisms of arrhythmias

- Disorders of impulse generation
- Disorders of impulse conduction
- Re-entry
- Abnormal automaticity
- Triggered activity

2) Identification of arrhythmia

- For each type of arrhythmia, it is expected that the ECG characteristics, precipitating factors, and management are discussed

A. Conduction system disease

- Sinoatrial exit block and entrance block
- AV node idiosyncrasies
- The His bundle electrogram
- Evaluating “trifascicular” block

B. Atrial arrhythmias

- Distinguishing different types of atrial flutter
- Advanced concepts in atrial fibrillation
- Automatic versus reentry atrial tachycardia
- “Triggered” atrial arrhythmias

C. Wide QRS tachycardia

- Morphology of VT versus aberrant conduction
- Detecting AV dissociation
- Identifying “capture beats”
- Pre-excited tachycardia

D. Pre-excitation (Wolff-Parkinson-White syndrome)

G. Idiopathic ventricular arrhythmias

- “Idiopathic” ventricular arrhythmias
- VT arising from right ventricular outflow tract
- Arrhythmogenic right ventricular dysplasia/cardiomyopathy
- Idiopathic left ventricular (Belhassen’s) tachycardia

H. Long QT Syndrome

- Electrophysiological events of the cardiac cycle
- Genetic basis of repolarization
- Varieties of congenital long QT syndrome

I. ECG changes in miscellaneous conditions

- Electrolyte imbalance
- MI (reciprocal changes), angina
- Pericarditis
- Digoxin toxicity
- Chamber enlargement

3) Management of different ECG arrhythmia

- Pharmacological management for ECG arrhythmia
- Non-pharmacological management for ECG arrhythmia
- Safety precaution and measures, need to be discussed for the following treatment approaches, types, functions/indications,



Module 3: ADVANCED ECG INTERPRETATION

Module contents

- Physiological basis of pre-excitation
- Location of accessory pathways
- Relating 12-lead ECGs to pre-excitation
- Arrhythmias seen due to accessory pathways
- Other pre-excitation syndromes
- “Torsades de pointes”
- Drug-induced long QT syndrome

E. Paroxysmal SVT

- Common causes of PSVT
- Identifying electrophysiological causes of PSVT
- P-wave timing and PSVT mechanisms

F. Ventricular arrhythmias

- Distinguishing automatic versus reentry VT
- Identification of VT site of origin
- Brugada syndrome

troubleshooting of malfunctions, and complications:

- A. Parasympathetic maneuvers
- B. Pacemakers
- C. Automated External Defibrillator (AED)
- D. Transcutaneous cardiac pacing
- E. External defibrillation
- F. Cardioversion
- G. ICD
- H. CRT-P/CRT-D

4) Review of ACLS guidelines

Module 4: NURSING LEADERSHIP AND MANAGEMENT

Module description

This module was designed to examine the roles and functions of leaders and managers in cardiac care nursing, with an emphasis on leader traits, strategic and resource planning, change, and conflict management. The module was also designed to develop a foundation of knowledge and skills for trainees in QoC and nursing informatics. The module rotation length was four weeks.



Module 4: NURSING LEADERSHIP AND MANAGEMENT

Milestones	Mapping milestones to objectives	Rotation settings	Teaching methodology
1. Develop basic understanding of organizational structure and culture	<ul style="list-style-type: none"> Analyze the components of organizational structure and culture (K) 	<ul style="list-style-type: none"> Medical cardiology Non-invasive cardiology Ambulatory cardiology 	<ul style="list-style-type: none"> In class teaching Clinical teaching Role-play
2. Develop core understanding of leaders and managers roles and functions within clinical setting	<p>A. Explore the effective roles, responsibilities, and functions of leaders and managers in a cardiac care nursing (K)</p> <p>B. Assume (shadow) the roles of clinical nurse leaders and managers under supervision while utilizing the skills of decision-making, in managing different groups of patients across the wellness/illness continuum (K, S, A)</p> <p>C. Assist clinical nurse leaders and managers in carrying out different responsibilities and tasks (K, S, A)</p>	<ul style="list-style-type: none"> Invasive cardiology ICUs 	
3. Employee effective communication skills when dealing with different multi-disciplinary team members, and	<p>D. Demonstrate leadership and management of a care-giving team comprised of individuals with varied cultural backgrounds and varied levels of clinical knowledge and competencies (K, S, A)</p>		

Module 4: NURSING LEADERSHIP AND MANAGEMENT

Milestones	Mapping milestones to objectives	Rotation settings	Teaching methodology
patients and families in the clinical area			
4. Deliver effective patient quality of care	<ul style="list-style-type: none"> A. Apply the measurement of patients' safety principles in clinical practice (K, S) B. Identify the nursing sensitive indicators and unit indicators (K) C. Assess, prevent, and manage the occurrence of sentinel event and near miss (K, S, A) D. Apply the concept of risk assessment, prevention, and management in the clinical practice (K, S, A) E. Participate in nursing quality improvements projects and/ or tasks that promotes a culture of safety (K, S, A) 		
5. Understand the methods used to apply technology into nursing practice	<ul style="list-style-type: none"> F. Describe the foundation of nursing informatics as an emerging field in the nursing profession (K) G. Explain the implications of nursing informatics for clinical practice, administration, and education (K) H. Demonstrate skills in the acquisition and retrieval of nursing information using health information systems 		



Module 4: NURSING LEADERSHIP AND MANAGEMENT

Milestones	Mapping milestones to objectives	Rotation settings	Teaching methodology
	within the institution and through the worldwide web and varied electronic resources (K, S, A) I. Apply security regulations to maintain patients' and organizations' data and information integrity, security and confidentiality (K, S, A)		

Module 4: NURSING LEADERSHIP AND MANAGEMENT

Module contents

A. Organizational structure and culture

- Formal and informal organizational structure
- Organizational culture: mission, vision, goals, philosophy, values, expectations
- Relationships and chain of commands

B. Leaders and managers roles

1. Concepts of leadership and management
2. Traits of successful leadership and management: decision making, problem solving, and critical thinking
3. Theories of effective leadership and management within selected health care arenas
4. Role of leaders and managers in
 - 4.1 Organizing patients care
 - 4.2 Planning
 - strategic planning and management
 - Time management
 - Fiscal planning
 - Career planning and development in nursing
 - 4.3 Change and conflict management
 - 4.4 Staffing
 - Care delivery module
 - Performance appraisal
 - 4.5 Motivation and team building
 - 4.6 Team working
 - 4.7 Role transition and delegation

C. Effective communication skills

D. Effective patient quality of care

- Principles of patient safety
- Roles of evidence-based policies and guidelines in creating patient safety culture
- Indicators: nursing sensitive indicators and unit indicators
- Incident reporting of patient safety event and quality problems
- Sentinel event and near miss
- Risk assessment and management
- Use of clinical risk assessment tools in quality
- International Patient Safety Goals (IPSGs)
- Principles of improvement projects

E. Apply technology into nursing practice

- Introduction and overview of nursing informatics
- Nursing informatics competencies (i.e., computer literacy skills, informatics literacy skills, etc.)
- Purpose of integrating computers and information technology in nursing clinical practice, administration, nursing and patients' education, and research
- Internet search engines and electronic databases and resources
- Application of using electronic health record to document, store, retrieve, share, and analyze information about individual patient care
- Information security principles



Module 4: NURSING LEADERSHIP AND MANAGEMENT

Module contents

- Effective communication
 - Communication process
 - Chanel of communication
 - Communication methods and barriers
 - Role of leader or manager in supporting communication in the healthcare settings
 - Evaluation of effectiveness of communication between nursing staff, multi-disciplinary team, and patient and family in the clinical area
 - Identify the role of the nurse leader or manager in supporting effective communication
- The role of nurses in maintaining the privacy and security of personal health information

Module 5: Elective Cardiovascular Rotation

Module description:

The module is 5-weeks-long and is designed to provide an opportunity for trainees at the end of their second-year rotation to implement the cardiovascular knowledge and skills gained throughout the program into selected cardiovascular clinical areas of interest, which will prepare them to work as specialized staff nurses in any cardiovascular area. The following criteria should be met to enroll in this module:

1. The trainee should complete all mandatory cardiovascular rotations/modules before proceeding with the elective rotation.
2. The trainee must select an elective in only one of the cardiovascular settings, which is based on availability.
3. The elective can be completed within the same center or another SCFHS-accredited cardiac center.
4. If the trainee selects another center:
 - a. Trainee should comply with the new center's training admission policies.
 - b. The trainee will be responsible for all associated costs with the new allocation.



Module 5: Elective Cardiovascular Rotation

Milestones	Mapping milestones to objectives	Rotation settings	Teaching methodology
1. Demonstrate leadership skills in managing patients independently or under minimal/indirect supervision in clinical practice	<p>A. Perform and/or assist competently and safely the focused cardiovascular clinical competencies (K, S, A)</p> <p>B. Perform independently complete focused cardiovascular history and physical examination for patients with complex cardiovascular histories and multiple comorbid conditions (K, S, A)</p> <p>C. Make decision regarding cardiovascular patients' management based on the interpretation of the cardiovascular tests and procedures (K, S)</p> <p>D. Demonstrate ability in implementing independently nursing care plan for different cardiovascular diseases (K, S, A)</p> <p>E. Demonstrate adequate advanced cardiac life support skills during a code blue (K, S, A)</p> <p>F. Recognize the indications, contraindications, and appropriate timing for the following procedures: AICD and pacemaker placement, cardioversion, diagnostic cardiac</p>	<ul style="list-style-type: none"> • Medical cardiology • Invasive cardiology • ICUs • Emergency Department 	<ul style="list-style-type: none"> • Clinical rotation/teaching • Guided reflection • Coaching

Module 5: Elective Cardiovascular Rotation

Milestones	Mapping milestones to objectives	Rotation settings	Teaching methodology
	<p>catheterization and angioplasty/stent placement, coronary artery bypass grafting, electrophysiology testing, pericardiocentesis, and Thrombolytics (K)</p> <p>G. Handle patients in in-patient settings while performing all related tasks within an appropriate timeframe</p> <ul style="list-style-type: none"> • handle independently a minimum of four patients per rotation with a cardioversion, diagnostic cardiac catheterization and angioplasty/stent placement, electrophysiology testing (K, S, A); • handle independently a minimum of three patients per rotation for Thrombolytic Therapy (K, S, A); • handle under indirect supervision a minimum of one patient per rotation who is post coronary artery bypass grafting (K, S, A); • handle under indirect supervision a minimum of one patient per rotation with AICD and pacemaker 		



Module 5: Elective Cardiovascular Rotation

Milestones	Mapping milestones to objectives	Rotation settings	Teaching methodology
	<p>placement or pericardiocentesis (K, S, A);</p> <ul style="list-style-type: none"> • Assist the scrub or circulatory nurse in cath lab and/or operating room for at least of ten patients with different cardiac procedures (K, S, A); and • Identify the needed resources to provide patients 'care (K, S, A) 		
<p>2. Provide compassionate, culturally-sensitive, and tailored education for the cardiovascular patient and their family</p>	<p>A. Counsel patients and family independently about their ongoing care plan and discharge planning (K, S, A)</p> <p>B. Teach patients and family independently about the indications and contraindications for cardiovascular procedures and diseases (K, S, A)</p>		

Table 4: Level of Independence for Competencies that should be completed within D1 and D2

No.	D 1 Core Competencies	Level of Independence
1.	Assessment: cardiac	L5
2.	Assessment: focused	L5
3.	Assessment: intake and output	L5
4.	Assessment: nutrition screening	L5
5.	Assessment: orthostatic vital signs	L5
6.	Assessment: respiration	L5
7.	Assessment: wounds	L5
8.	Blood products administration: red blood cells and whole blood	L5
9.	Blood product administration: platelets, fresh frozen plasma, albumin, plasma protein fraction, and cryoprecipitate	L5
10.	Streptokinase for acute myocardial infarction	L3
11.	Suctioning: endotracheal and tracheostomy tube	L5
12.	Pain assessment and reassessment	L5
13.	Wound dressing	L5
14.	Cardiac monitor setup and lead placement	L5



No.	D 1 Core Competencies	Level of Independence
15.	Perform 12 lead ECG	L5
16.	Electrocardiogram: right precordial and left posterior leads	L5
17.	Automated external defibrillator (AED)	L5
18.	Transcutaneous cardiac pacing	L3
19.	External defibrillation	L3
20.	Cardioversion	L2
21.	Alteplase for acute myocardial infarction	L2
22.	Tenecteplase for acute myocardial infarction	L2
23.	Alteplase for pulmonary embolism	L2
24.	Resuscitation bag: manual self-inflating in mechanically ventilated patients	L5
25.	Blood and fluid pressure infusers	L3
D2 Core Competencies		
26.	Arterial catheter insertion (assisting), care, and removal	L4
27.	Arterial catheter: blood sampling	L5
28.	Arterial pressure-based cardiac output monitoring	L5

No.	D 1 Core Competencies	Level of Independence
29.	Cardiac output measurement	L5
30.	Central venous catheter insertion	L4
31.	Central venous catheter: blood sampling	L5
32.	Central venous catheter: removal	L4
33.	Continuous ST-segment monitoring	L5
34.	Central venous catheter: site care	L5
35.	Chest tube insertion	L4
36.	Chest tube removal	L4
37.	Closed drainage systems	L5
38.	Endotracheal and tracheostomy tube cuff care	L5
39.	Endotracheal tube and tracheostomy tube: oxygen administration	L5
40.	Endotracheal tube extubation and tracheostomy tube decannulation	L3
41.	Endotracheal tube intubation	L4
42.	Endotracheal tube: skin and oral care	L5
43.	Mechanical ventilation: volume and pressure modes	L5



No.	D 1 Core Competencies	Level of Independence
44.	Mechanical ventilation: weaning	L4
45.	Nasopharyngeal airway insertion	L4
46.	Tracheostomy tube: care and suctioning	L4
47.	Pulsus paradoxus assessment troubleshooting	L4
48.	Implantable cardioverter-defibrillator: deactivation and reactivation	L4
49.	Implantable cardioverter-defibrillator: Emergency management	L4
50.	Pacemaker insertion temporary transvenous: advanced practice	L4
51.	Preoperative care	L4
52.	Postoperative care: immediate recovery period	L4
53.	Pacemaker: assessment of function	L4
54.	Pacing: epicardial wire removal	L3
55.	Pacing: temporary transvenous and epicardial	L4
56.	Pericardial catheter management	L3
57.	Pericardiocentesis	L3
58.	Pulmonary artery catheter insertion (assisting) and monitoring	L4

No.	D 1 Core Competencies	Level of Independence
59.	Pulmonary artery catheter: mixed venous oxygen saturation sample	L5
60.	Pulmonary artery catheter: removal	L5
61.	Pulmonary artery catheter	L5
62.	External jugular venous access	L3
63.	Thoracentesis	L3
64.	Intra-aortic balloon pump management	L4
65.	Ventricular assist devices	L4
66.	Transesophageal echocardiography	L4
67.	Right atrial and central venous pressure monitoring	L5
68.	Ventilation: noninvasive CPAP, BiPAP, and NIMV	L5
69.	Arterial and venous sheath removal	L4
70.	Code management	L4



VIII. CONTINUUM OF LEARNING

This includes learning that should occur at each key stage of progression within the specialty. Trainees are reminded of **Continuous Professional Development (CPD)**. Trainees should keep in mind the necessity of CPD for every healthcare provider in order to meet the demands of their vital professions. Table (5) states how the role is progressively expected to develop throughout the junior, senior, and consultant levels of practice.

Table 5: The Progress of Trainees' Level from Junior, to Senior and Consultant

Undergraduate	D1 (Junior Level)	D2 (Senior Level)	Expert Level
Non-practicing	Dependent/supervised practice	Minimum supervision and guidance, attaining competence in related knowledge /skills	Independent practice/provide supervision
Obtain basic health science and foundational level to core discipline knowledge	Obtain fundamental knowledge related to core clinical problems of the specialty	Demonstrate skilled performance in the activity with enhanced theoretical knowledge and understanding, and give a rationale for the practice Demonstrate and apply the knowledge and understanding in relation to relevant policies, procedures, and guidelines	Demonstrate competent performance in all the activities specified without direct supervision based on independently problem-solving complex situations and offering solutions through critical analysis and evaluation

Undergraduate	D1 (Junior Level)	D2 (Senior Level)	Expert Level
		Participate in problem-solving through critical analysis and evaluation of more complex situations.	
Internship to the practice of discipline	Apply clinical skills such as physical examination and practical procedures related to the core presenting problems and procedures of the specialty	Analyze and interpret the findings from clinical skills to develop appropriate differential diagnoses and management plan for the patient	Supervise and instruct others in a range of activities related to their role and responsibilities Apply knowledge, demonstrate, and research to relevant policies, procedures, and guidelines to critically analyze and improve practice



XI. TEACHING METHOD

The teaching process in postgraduate diploma training programs is primarily based on the principles of adult learning theory. The trainees are expected to be aware of the importance of learning and play active roles in the content and process of their own learning. The training programs implemented the adult learning concept in each feature of the activities, where the residents were responsible for their own learning requirements. Formal training time included the following three teaching activities:

1. Program specific learning activities
2. Universal topics
3. General learning opportunities
4. Simulation

1. PROGRAM-SPECIFIC LEARNING ACTIVITIES

Program-specific activities are educational activities specifically designed and intended for training. Trainees are required to attend these activities, and noncompliance can subject them to disciplinary actions. It is advisable to link attendance and participation in these activities with formative assessment tools (see the formative assessment section below). Program administrations should support these activities by providing protected time for trainees to attend and allowing them to participate in such activities.

4.1. Program academic half-day

The trainee must complete 40 hours of clinical practice each week. In addition, four hours of formal teaching time (commonly referred to as an academic half-day) should be reserved. Formal teaching time is planned in advance using the assigned tutor(s), timeslots, and venues. The academic half-day covers the core specialty topics that are determined and approved by the specialty's scientific council and which align with specialty-defined competencies and teaching methods. The trainee should be actively involved in the development and delivery of topics under faculty

supervision. This involvement might take the form of delivery, content development, research, etc. The trainee's supervisor ensures that the discussion on each topic is stratified into three categories of learning domains: knowledge, skill, and attitude, whenever applicable.

It is recommended that 40 half-day sessions be conducted each academic training year, and that time be reserved for other forms of training, such as journal clubs and clinical/practical teaching. The Program Training Committee (TPC), program directors, and trainee representatives, in coordination with academic and training affairs and regional supervisory committees, should work together to ensure the planning and implementation of academic activities, as indicated in the curriculum. This should be done efficiently by utilizing the available resources with an optimal exchange of expertise. (Appendix A: Examples of academic half-days)

1.2. Practice-based learning:

Training exposure during bedside, lab, O.R., and other work-related activities, including courses and workshops (e.g., simulations, standardized patients, and bedside teaching), represent excellent opportunities for learning. Trainees are expected to build their capacity through self-directed learning.

On the other hand, practice-based learning allows educators to supervise trainees to become competent in the required practical skills that ensure fulfilling the knowledge, psychomotor, and/or attitude learning domains. Each trainee was required to maintain a logbook documenting the procedures observed, performed under supervision, and performed independently. It would be prudent to determine the minimum number of procedures to be performed before training completion and the minimum number required to maintain competency after certification.

1.3. Morning report and afternoon handover:

Morning and afternoon nursing handover reports are case-based teaching sessions that are common to many trainees with varying purposes and focuses. The goals of morning and afternoon nursing handover reports are to teach efficient handover strategies and case presentation skills, allow discussions on the management of interesting cases, and enhance problem-solving and multidisciplinary team skills.



2. UNIVERSAL TOPICS

Universal topics are educational activities developed by the SCFHS and intended for all specialties. Priority is given to topics related to the following qualities:

1. High value
2. Interdisciplinary and integrated
3. Expertise that might be beyond the availability of the local clinical training sites

Universal topics have been developed by the SCFHS and are available through e-learning via personalized access for each trainee (to access online modules). Each universal topic has a self-assessment at the end of the module. As indicated in the “executive policies of formative assessment and annual promotion,” universal topics are a mandatory component of the criteria for the annual promotion of trainees from their current level of training to the subsequent level. Universal topics were distributed throughout the training period.

Supervisors and trainees were required to refer to the Saudi Commission for Health Specialties Online Universal Topics (<https://www.scfhs.org.sa/MESPS/PME/Pages/UniversalTopics.aspx> (17 topics must be completed according to the SCFHS standards). Further details are presented in Table (6).

Table 6: Universal Topics

Training Year Level	Modules	Universal Topics
D1	Module 1: introduction “medical fundamentals”	Blood transfusion Healthcare-associated infections (HAI) Antibiotic stewardship Sepsis, SIRS, DIVC Safe drug prescription
	Module 3: diabetes and metabolic disorders	Recognition and management of diabetic emergencies Management of diabetic complications
	Module 4: medical and	Management of acute chest pain Management of acute breathlessness

	surgical emergencies	Management of hypotension and hypertension
D2	Module 5: acute care	Pre-operative assessment Post-operative care Acute pain management Chronic pain management Fluid management in the hospitalized patient Management of acid-base electrolyte imbalances

(See Appendix B: Universal topics modules)

3. GENERAL LEARNING OPPORTUNITIES:

Formal training time should be supplemented by other **practice-based learning** (PBL) such as

- Journal club, twice per academic year
- Involvement in one quality improvement committee and attending associated meetings
- Continuous professional development (CPD) activities relevant to the specialty (conferences and workshops), once per academic year
- Basic Cardiovascular Life Support Course (BCLS) in the first year
- Advanced Cardiovascular Life Support Course (ACLS) in the second year, which is a mandatory requirement for second-year exams and graduation from the program

4. SIMULATION

As a national supervising body, the SCFHS initiated a move towards integrating simulations into residency training programs. Cardiac care simulations involve creating artificial clinical scenarios from which trainees can learn. This process has educational advantages, such as learning and practicing how to deal with rare and/or high-risk clinical scenarios and rare procedures, while practicing in a controlled standardized environment with immediate effective feedback that has a significant impact on knowledge, skills, and attitude.

The use of simulations in postgraduate training programs is currently necessary, especially in competency-based curricula. Current programs

aim to graduate skilled, competent, and independent cardiac nurses while maintaining a focus on quality and patient safety. There can be a high level of variability in using simulations to implement competency-based curricula, and the nature of the specialty is likely to play another role in increasing this variability. Establishing standardized needs assessment methods for simulation may pose a challenge to any national organizational body dealing with various ongoing postgraduate training programs.

X. ASSESSMENT AND EVALUATION

1. PURPOSE OF ASSESSMENT

Assessments play a vital role in the success of postgraduate training. Assessment guides trainees and trainers to achieve defined standards, learning outcomes, and competencies. Additionally, assessments provide feedback to learners and faculty regarding curriculum development and implementation, teaching methods, and the quality of the learning environment. A reliable and valid assessment is essential for evaluating curriculum alignment with respect to objectives, learning methods, and assessment tools. Finally, the assessment assures patients and the public that health professionals are safe and competent. This assessment serves the following purposes:

- a. **Assessment for learning** consists in the use of information from trainees' performances to inform their learning for improvement. This enables educators to use information about trainees' knowledge, understanding, and skills to provide feedback about learning and ways to improve.
- b. **Assessment as learning** involves trainees in the learning process while enabling them to monitor their own progress. Trainees use self-assessment and educator feedback to reflect on their progress. It develops and supports the trainees' metacognitive skills. Learning assessment is crucial for helping residents/fellows become lifelong learners.
- c. **Assessment of learning** is used to demonstrate the achievement of trainees' learning. This is a graded assessment that usually counts towards the trainees' end-of-training degrees.
- d. **Feedback and evaluation** as assessment outcomes, represent quality metrics that can improve the learning experience.

Miller's Pyramid of Assessment provides a framework for assessing the trainees' clinical competencies which acts as a guide for the trainers



to select the assessment methods to target different clinical competencies including “knows,” “knows how,” “shows how,” and “does” (check the - checklist- Appendix C).

For the sake of organization, the assessment will be further classified into two main categories: formative and summative.

2. FORMATIVE ASSESSMENT

2.1 General principles

Trainees, as adult learners, should strive develop their performance based on feedback throughout their journey of competency from “novice” to “mastery” levels. Formative assessment is a is distributed throughout the academic year, aiming primarily to provide trainees with effective feedback.

2.2 Formative assessment tools

Every two weeks, trainees are assigned at least one hour to meet with their mentors to review their performance reports (e.g., ITER). Input from the overall formative assessment tools is utilized at the end of the year to determine whether individual trainees will be promoted from the current to the subsequent training level. Formative assessment is defined based on scientific (council/committee) recommendations, usually updated and announced for each individual program at the start of the academic year.

According to the executive policy (available online: www.scfhs.org), formative assessment has the following features, based on Miller’s pyramid (see Appendix C):

- a. Multisource: minimum four tools
- b. Comprehensive: covering all learning domains (knowledge, skills, and attitude)
- c. Relevant: focusing on workplace-based observations
- d. Milestone-oriented competency: this reflects the trainee’s expected competencies that match the trainee’s developmental level

Trainees should actively seek feedback during training, and trainers should provide timely and formative assessments. The SCFHS provides

an e-portfolio system to enhance the communication and analysis of data from formative assessments.

Trainers and trainees are expected to follow the recommendations of the Scientific Council regarding updated forms, frequency, distribution, and deadlines related to the implementation of the evaluation forms (See Table 7).

2.3 Promotion exam

It is a written exam that determines whether the trainee should be promoted from “junior” to “senior” level of training. For further details on the promotional examination, please refer to the General Bylaws and Executive Policy of Assessment (available online at www.scfhs.org).
Blueprint outline: Please refer to the updated version of the SCFHS website.

(<https://www.scfhs.org.sa/examinations/TrainingExams/Pages/PostGradPB.aspx>).

Blueprint outline: Please refer to the updated version published on the SCFHS website. The blueprint for the promotion exam is presented in Table 8.

Table 7. Formative Assessment Tools

Learning Domain: Knowledge		
Formative assessment tool	D1 (Year 1)	D2 (Year 2)
Structured Oral Exam (SOE)	Not applicable	<p>SOE: This will be done once per academic year with the OSCE stations.</p> <p>SOE will include a minimum of two stations (and each station has three items for a total of six items). Trainees must pass a minimum of four items (borderline pass) irrespective of the mark on each item or station.</p>

Learning Domain: Knowledge

Formative assessment tool	D1 (Year 1)	D2 (Year 2)
Academic activities	<p>Quizzes: Trainees are required to pass the quizzes (oral or written) after each module according to SCHFS criteria to be promoted or complete training.</p>	<p>Quizzes: Trainees are required to pass the quizzes (oral or written) after each module according to SCHFS criteria to be promoted or complete training.</p>
	<p>Academic day: Trainees are required to attend <u>AND</u> present at least two presentations per academic year.</p>	<p>Academic day: Trainees are required to attend <u>AND</u> present at least two presentations per academic year.</p>
	<p>Universal Topics: Trainees are required to take the topics according to the curriculum.</p> <p>Results on form will be used for formative feedback purposes only and not for pass-fail purposes to complete training.</p>	<p>Universal Topics: Trainees are required to take the topics according to the curriculum.</p> <p>Results on the form will be used for formative feedback purposes only and not pass- fail purposes to complete training.</p>
Case-Based Discussion (CBD)	<p>Trainees are required to do at <u>least six CBD</u> per academic year according to SCHFS criteria to be promoted or complete training.</p>	<p>Trainees are required to do at <u>least six CBD</u> per academic year according to SCHFS criteria to be promoted or complete training.</p>
End-of-year progress test	Promotion Exam	Not applicable

Learning Domain: Skills

Learning Domain: Knowledge

Formative assessment tool	D1 (Year 1)	D2 (Year 2)
OSCE: Objective structured clinical examination	Not applicable	<p>OSCE: This will be done once per academic year using SOE stations. OSCE will include a minimum of six stations. Trainees must pass a minimum of four stations (borderline pass) irrespective of the mark on each item or station</p>
Logbook	<ul style="list-style-type: none"> - Trainees are required to fulfil all logbook requirements according to training level, as per the curriculum, to be promoted or complete training. - Trainees must complete a minimum of 25 logs from the competency checklist. Out of these 25 logs, 6 nursing care plane (NCP) must be completed. - Logbook performance indicators: Weak: 1; Fair: 2; Good: 3; Very good: 4; Excellent: 5. 	<ul style="list-style-type: none"> - Trainees are required to fulfill all logbook requirements according to training level as per the curriculum to be promoted or complete training. - Trainees must complete a minimum of 45 logs from the competency checklist) Out of these 45 logs, 6 nursing care plane (NCP) must be completed.



Learning Domain: Knowledge

Formative assessment tool	D1 (Year 1)	D2 (Year 2)
DOPS: Direct Observation for Procedural Skills	<ul style="list-style-type: none"> - Trainees are required to do at <u>least six DOPS</u> per academic year for promotion or completion of training. - Results on form will be used for formative feedback purposes only. 	<ul style="list-style-type: none"> - Trainees are required to do at <u>least six DOPS</u> per academic year for promotion or completion of training. - Results on form will be used for formative feedback purposes only.
Mini-CEX: Mini-Clinical Evaluation Exercise	<ul style="list-style-type: none"> - Trainees are required to do at <u>least six Mini-CEX</u> per academic year for promotion or completion of training. - Results on form will be used for formative feedback purposes only. 	<ul style="list-style-type: none"> - Trainees are required to do at <u>least six Mini-CEX</u> per academic year for promotion or completion of training. - Results on form will be used for formative feedback purposes only.
Research Activities	<p>Trainees are required to take the SCFHS E-module (EBP) and give proof of completion or certificate for promotion before the end of the first training year <u>AND</u> to attend a conference OR workshop related to cardiac and provide certification to be promoted.</p>	<p>Trainees are required to take the SCFHS E-modules (Research module) and give proof of completion or certificate to complete training <u>AND</u> to complete at least one research proposal in the academic year and pass according to SCFHS criteria to complete training</p> <p><u>AND</u> to attend a conference OR workshop related to cardiac and provide certification to complete training</p> <p>(See appendix D: Nursing research project guidelines).</p>

Learning Domain: Knowledge

Formative assessment tool	D1 (Year 1)	D2 (Year 2)
Volunteering	Trainees are encouraged to participate in a campaign or patient awareness program related to cardiac (No pass/fail if this was not fulfilled).	Trainees are encouraged to participate in a campaign or patient awareness program related to cardiac (No pass/fail if this was not fulfilled).

Learning Domain: Attitude

ITER: In-Training Evaluation Report	All ITERS must be completed and pass with a minimum of 60% of passing grade for promotion, following SCFHS policies for ITERS.	All ITERS must be completed and pass with a minimum of 60% of passing grade for promotion, following SCFHS policies for ITERS.
Attendance	<ul style="list-style-type: none"> - Trainees are required to attend at least 80% of all academic activities all together. - Trainees who do not comply with this will be subjected to disciplinary action 	<ul style="list-style-type: none"> - Trainees are required to attend at least 80% of all academic activities all together. - Trainees who do not comply with this will be subjected to disciplinary action



Table 8: Promotion Exam Blueprint

No.	Sections	Percentage
1	Foundational Human Anatomy and Physiology of the Cardiovascular System	11%
2	Cardiovascular Nursing: Assessment, Planning, and Managing Care	18%
3	Cardiovascular Pharmacology	18%
4	Cardiovascular Disease Promotion, Prevention, and Rehabilitation	12%
5	Alterations in the Cardiovascular System I	25%
6	Basic ECG Interpretation	11%
7	Ethics in Cardiovascular Nursing Practice	5%
Total		100%

The evaluation of each component was based on the following parameters according to the executive policy on continuous assessment at (www.scfhs.org).

Score	Less than 50%	50% – 59.4%	60% - 69.4%	More than 70%
Description	Clear Fail	Borderline Fail	Borderline Pass	Clear Pass

To achieve unconditioned promotion, the candidate must score a minimum of “borderline pass” in all used formative assessment tools.

- The program director can still recommend the promotion of candidates if the above criteria are not met in certain situations.
- In case the candidate scored “borderline failure” in one or two components at maximum, these scores should not belong to the same area of assessment (for example: both borderline failures should not belong both to skills)
- The candidate must have passed all other components and scored a minimum clear pass in at least two components.

3. SUMMATIVE ASSESSMENT

3.1 General principles

Summative assessment is a component of an assessment that primarily aims to make informed decisions about trainees' competency. Unlike formative assessment, *summative assessment* does not aim to provide constructive feedback. For further details, please refer to the general bylaws of training in postgraduate programs and general assessment bylaws (available online: www.scfhs.org). To be eligible to sit for the final exams, trainees will be granted "Certification of Training Completion" upon successful completion of all training rotations.



Table 9: Summary of Summative Assessment Tools

Learning Domain	Summative Assessment Tools	Passing Score
Knowledge	Final written examination	<ul style="list-style-type: none"> At least a borderline pass in each tool in accordance with the standard method used by the executive administration of assessment
Skills	Objective Structured Clinical Examinations (OSCE)	<ul style="list-style-type: none"> At least borderline pass in each station in accordance with the standard setting method used by the executive administration of assessment
Attitude	FITER: In-Training Evaluation Report	<ul style="list-style-type: none"> Successfully pass FITER

3.2. Final In-training Evaluation Report (FITER)

In addition to the approval of the completion of clinical requirements (resident’s logbook) by the supervising committee, FITER is prepared by program directors for each resident at the end of their final year of training. This report will be the basis for obtaining a Certificate of Training Program Completion, as well as the qualification to sit for the final specialty examinations.

3.3 Certification of training completion

In order to be eligible to sit for final specialty examinations, each trainee is required to obtain “*Certification of training completion*”. Based on the General Bylaws of Training in Postgraduate Programs and executive policy (please refer to www.scfhs.org), trainees will be granted “Certification of training-completion” once the following criteria are fulfilled.

- a. Successful completion of all training rotations

- b. Completion of training requirements (e.g., logbook, research, and others), as outlined in FITER, approved by the scientific council/committee of specialties
- c. Clearance from SCFHS training affairs that ensures compliance with tuition payments and the completion of universal topics
- d. Passing the first part examination (whenever is applicable)

The “Certification of Training Completion” is issued and approved by the supervisory committee or its equivalent according to the SCFHS policies.

3.4 Final specialty examinations

The final specialty examination is a summative assessment component that grants trainee specialty certifications. It has two elements:

- a) **Final written exam**: in order to be eligible for this exam, trainees are required to have obtained “Certification of Training Completion.”
- b) **Final clinical/practical exam**: Trainees are required to pass the final written exam to be eligible for the final clinical/practical exam.

Blueprint Outlines: The content of the following table is for demonstration only (please refer to the most updated version published on the SCFHS website):

The blueprints for the final written and clinical/practical examinations are shown in Table 10 and Table 11:



Table 10: The Written Exam Blueprint

No.	Sections	Percentage
1	Cardiac nursing: assessment, planning, and managing care	6%
2	Cardiovascular pharmacology	6%
3	Cardiovascular disease promotion, prevention, and rehabilitation	6%
4	Alteration in the Cardiovascular System I	6%
5	Basic ECG interpretation	6%
6	Alteration in the Cardiovascular System II	36%
7	Advanced ECG interpretation	26%
8	Nursing leadership and management	8%
Total		100%

Table 11. The Final Clinical Exam Blueprint

Examination Content	
Sections	-The examination will cover 4 or more of the following sections:
	1. Cardiac nursing: assessment, planning, and managing care
	2. Cardiovascular pharmacology
	3. Cardiovascular disease promotion, prevention, and rehabilitation
	4. Alteration in the Cardiovascular System I
	5. Basic ECG interpretation
	6. Alteration in the Cardiovascular System II
	7. Advanced ECG interpretation

For further details on the final examinations, please refer to the general bylaws and executive policy of the assessment (available online at www.scfhs.org).



XI. PROGRAM AND COURSE EVALUATION

The SCFHS applies various measures to evaluate the implementation of this curriculum. The training outcomes of this program follow the quality assurance framework endorsed by the Central Training Committee of the SCFHS. Trainee assessment (both formative and summative) results are analyzed and mapped to the curriculum content. Other indicators that will be incorporated are as follows:

4. Report on the annual trainees' satisfaction survey
5. Reports from trainees' evaluation of faculty members
6. Reports from trainees' evaluation of rotations
7. Reports from the annual survey of program directors
8. Data available from program accreditations
9. Reports from direct field communications with trainees and trainers.

Goal-Based Evaluation: The achievement of intended milestones will be evaluated at the end of each stage to assess the progress of curriculum delivery. Any deficiencies will be addressed in the following phase by utilizing the time devoted to trainee-selected topics and professional sessions.

In addition to subject-matter opinions and best practices from benchmarked international programs, the SCFHS will apply a robust method to ensure that this curriculum will utilize all data available during its revision in the future.

XIII. POLICIES AND PROCEDURES

This curriculum represents the means and materials and outlines the learning objectives with which trainees and trainers will use to achieve the identified educational outcomes. The SCFHS has a full set of “General Bylaws of Training in Postgraduate Programs” and “Executive Policies” (published on the official SCFHS website) that regulate all training-related processes. The general bylaws of training, assessment, and accreditation as well as executive policies on admission, registration, formative assessment and promotion, examination, trainees’ representation and support, duty hours, and leaves are examples of regulations that need to be implemented. Under this curriculum, trainees, trainers, and supervisors must comply with the most updated bylaws and policies, which can be accessed online (via the official SCFHS website).



XIII. APPENDICES

List of appendices:

4. Appendix A: Examples of an academic-day table
5. Appendix B: Universal topics modules
6. Appendix C: Miller's Pyramid of Assessment
7. Appendix D: Nursing research project guidelines
8. Appendix E: References

Appendix A:

Example of an academic-day table

The following is a table with sample topics that illustrate the half-day activities as they span over the course of one year (or a cycle of teaching if more than one year is required to cover all topics).

Repeating sessions and topics in every training year was discouraged. Each half-day is dedicated to one theme.



Adult Cardiac Care Nursing Diploma Program Didactic Class - Session Plan
Module 2: Alteration in cardiovascular system II

Academic week	Sections	Date	Time	Sessions	Presenters
6	Introduction to the critical care environment roles and responsibilities	November 6, 2022	12:00 – 16:00	<ul style="list-style-type: none"> - Scope of practice - Professionalism - Accountability - Professional relationships - Legal responsibility - Advanced practice role - Credentials - Professional portfolios 	Mr. Hadi Alyami
7	Common problems in cardiac critical care	November 14, 2022	10:00 – 16:00	<ul style="list-style-type: none"> A. Pain assessment B. Anesthesia C. Sedation 	Mrs. Khadijah Alrasheed
8	Hemodynamic monitoring	November 21, 2022	11:00 – 16:00	<ul style="list-style-type: none"> A. Arterial pressure monitoring B. Central venous pressure monitoring C. Pulmonary artery pressure monitoring D. Cardiac output determination E. Evaluation of oxygen delivery and demand balance 	Mr. Saleh Mayyas

Adult Cardiac Care Nursing Diploma Program Didactic Class - Session Plan
Module 2: Alteration in cardiovascular system II

Academic week	Sections	Date	Time	Sessions	Presenters
9	Ethical dilemmas	November 27, 2022	12:00 – 16:00	<ul style="list-style-type: none"> - Ethical concepts - Ethical theories - Framework for decision making - Brain death - Bioethics - Euthanasia - Organ Donation - - Donation After Cardiac Death 	Ms.Omina Bashehab
10	ABG and mechanical ventilation	December 4, 2022	10:00 – 16:00	<ul style="list-style-type: none"> - ABG interpretation - Mechanical ventilation - MV modes, and nursing management 	Zainab Al-darweesh



Appendix B:

Universal topics modules

Training Year Level	Modules	Universal Topics
D1	Module 1: Introduction “medical fundamentals”	Blood transfusion Healthcare-associated infections (HAI) Antibiotic stewardship Sepsis, SIRS, DIVC Safe drug prescription
	Module 3: Diabetes and metabolic disorders	Recognition and management of diabetic emergencies Management of diabetic complications
	Module 4: Medical and surgical emergencies	Management of acute chest pain Management of acute breathlessness Management of hypotension and hypertension
D2	Module 5: Acute care	Pre-operative assessment Post-operative care Acute pain management Chronic pain management Fluid management in the hospitalized patient Management of acid-base electrolyte imbalances

Universal Topics: First Year

Module 1: Introduction “medical fundamentals”

Blood transfusion: At the end of the learning unit, you should be able to:

- 1) review the different components of blood products available for transfusion;
- 2) recognize the indications and contraindications of blood product transfusion;
- 3) discuss the benefits and risks of and the alternatives to transfusion;
- 4) undertake consent for specific blood product transfusion;
- 5) perform the steps necessary for safe transfusion;
- 6) develop an understanding of the special precautions and procedures necessary during massive transfusions; and
- 7) recognize transfusion associated reactions and provide immediate management.

Healthcare-associated infections (HAI): At the end of the learning unit, you should be able to

- 1) discuss the epidemiology of HAI with special reference to HAI in Saudi Arabia;
- 2) recognize HAI as one of the major emerging threats in healthcare;
- 3) identify the common sources and presentation of HAI;
- 4) describe the risk factors for common HAIs such as ventilator-associated pneumonia, methicillin-resistant *Staphylococcus aureus* (MRSA), central line-associated bloodstream infection (CLABSI), and vancomycin-resistant enterococcus (VRE);
- 5) identify the role of healthcare workers in the prevention of HAI;
- 6) determine appropriate pharmacological (e.g., selected antibiotic) and non-pharmacological (e.g., removal of indwelling catheter) measures for the treatment of HAI; and
- 7) propose a plan to prevent HAI in the workplace.



Antibiotic stewardship: At the end of the learning unit, you should be able to:

- 1) recognize antibiotic resistance as one of the most pressing public health threats globally;
- 2) describe the mechanism of antibiotic resistance;
- 3) determine the appropriate and inappropriate use of antibiotics;
- 4) develop a plan for safe and proper antibiotic usage, including correct indications, duration, types of antibiotic, and discontinuation; and
- 5) appraise local guidelines in the prevention of antibiotic resistance.

Sepsis, SIRS, DIVC: At the end of the learning unit, you should be able to

- 1) explain the pathogenesis of sepsis, SIRS, and DIVC;
- 2) identify patient-related and non-patient related predisposing factors of sepsis, SIRS, and DIVC;
- 3) recognize a patient at risk of developing sepsis, SIRS, and DIVC;
- 4) describe the complications of sepsis, SIRS, and DIVC;
- 5) apply the principles of management of patients with sepsis, SIRS, and DIVC; and
- 6) describe the prognosis of sepsis, SIRS, and DIVC.

Safe drug prescription: At the end of the learning unit, you should be able to:

- 1) recognize the importance of safe drug prescribing in healthcare;
- 2) describe the various adverse drug reactions with examples of commonly prescribed drugs that can cause such reactions;
- 3) apply the principles of drug-drug, drug-disease, and drug-food interactions to common situations;
- 4) apply principles of prescribing drugs in special situations, such as renal failure and liver failure;
- 5) apply principles of prescribing drugs in elderly and pediatric patients, and in pregnancy and lactation;
- 6) promote evidence-based cost effective prescribing; and
- 7) discuss the ethical and legal framework governing safe-drug prescribing in Saudi Arabia.



Module 3: Diabetes and metabolic disorders

Recognition and management of diabetic emergencies: At the end of the learning unit, you should be able to:

- 1) describe the pathogenesis of common diabetic emergencies, including their complications;
- 2) identify risk factors and groups of patients vulnerable to such emergencies;
- 3) recognize a patient presenting with a diabetic emergency;
- 4) institute immediate management;
- 5) refer the patient to appropriate next level of care; and
- 6) counsel patients and families to prevent such emergencies.

Management of diabetic complications: At the end of the Learning Unit, you should be able to:

- 1) describe the pathogenesis of important complications of Type 2 diabetes mellitus;
- 2) screen patients for such complications;
- 3) provide preventive measures for such complications;
- 4) treat such complications; and
- 5) counsel patients and families with special emphasis on prevention.

Module 4: Medical and surgical emergencies

Management of acute chest pain

Management of acute breathlessness

Management of hypotension and hypertension

For all the above, at the end of the Learning Unit, you should be able to

- 1) triage and categorize patients;
- 2) identify patients who need prompt medical and surgical attention;
- 3) generate preliminary diagnoses based on history and physical examination;
- 4) order and interpret urgent investigations;
- 5) provide appropriate immediate management to patients; and
- 6) refer patients to the next level of care, if needed.



Universal Topics: Second Year

Module 5: Acute care

Pre-operative assessment: At the end of the learning unit, you should be able to:

- 1) describe the basic principles of pre-operative assessment;
- 2) preoperative assessment in uncomplicated patients with special emphasis on
 - i. general health assessment,
 - ii. cardiorespiratory assessment,
 - iii. medication and medical advice assessment, (iv)
 - iv. drug allergy, and
 - v. pain relief needs
- 3) categorize patients according to risks.

Post-operative care: At the end of the learning unit, you should be able to:

- 1) devise a postoperative care plan, including monitoring of vitals, pain management, fluid management, medications, and laboratory investigations;
- 2) hand over a patient properly to the appropriate facilities;
- 3) describe the process of post-operative recovery in a patient;
- 4) identify common post-operative complications;
- 5) monitor patients for possible post-operative complications; and
- 6) institute immediate management for post-operative complications.

Acute pain management: You should be able to manage acute pain at the end of the learning unit, you should be able to:

- 1) review the physiological basis of pain perception;
- 2) proactively identify patients who might be in acute pain;
- 3) assess a patient with acute pain;
- 4) apply various pharmacological and non-pharmacological measures available for acute pain management;

- 5) provide adequate pain relief for uncomplicated patients with acute pain; and
- 6) identify and refer patients with acute pain who may benefit from specialized pain services.

Chronic pain management: At the end of the learning unit, you should be able to:

- 1) review bio-psychosocial and physiological bases of chronic pain perception;
- 2) discuss various pharmacological and non-pharmacological options available for chronic pain management;
- 3) provide adequate pain relief for uncomplicated patients with chronic pain; and
- 4) identify and refer patients with chronic pain who may benefit from specialized pain services.

Fluid management in the hospitalized patients: At the end of the learning unit, you should be able to

- 1) review the physiological basis of water balance in the body;
- 2) assess a patient for hydration status;
- 3) recognize a patient with over- or under-hydration;
- 4) order fluid therapy (oral as well as intravenous) for a hospitalized patient; and
- 5) monitor fluid status and response to therapy through history, physical examination, and selected laboratory investigations.

Management of acid-base electrolyte imbalances: At the end of the learning unit, you should be able to:

- 1) review the physiological basis of electrolyte and acid-base balance in the body;
- 2) identify diseases and conditions that are likely to cause or be associated with acid-base and electrolyte imbalances;
- 3) correct electrolyte and acid-base imbalances;
- 4) perform careful calculations, checks, and other safety measures while correcting acid-base and electrolyte imbalances; and



- 5) monitor response to therapy through history, physical examination, and selected laboratory investigations.



Appendix C:

Miller's Pyramid of Assessment



Appendix D:

Nursing research project guidelines

Under the guidance of an advisor, the trainees can work as individuals or groups. A clinical research project falls under the supervision of a faculty member and uses a scientific process to analyze clinical problems or issues related to advanced nursing practice. Emphasis is on a project that has tangible practical applications. The trainee must submit a written proposal/research report and complete the clinical research project. The maximum score was 100 (see the project assessment tool below). Each item was weighted in terms of its importance in fulfilling the project's purpose.

Research project assessment tool available as a pdf file on the One45 system

Trainee:	ID Number:				
Date:	Specialty Area for Research				
Program Director:	Mark Obtained:				
Percentage:					
SCIENTIFIC NURSING RESEARCH	0	1	2	N/A	REMARKS
The title page includes the following:					
Topic					
Candidate's name and surname					
Course name					
Timely submission					
/8					
The table of contents includes the following:					
Headings and sub-headings are included.					
Numbering for the headings and sub-headings are included.					
Headings' page numbers are included.					
Headings and sub-headings correspond with those in text.					
/8					
Abstract					
The abstract addresses the title, introduction, purpose, methodology, plan of work, and time schedule.					
The abstract contains keywords					



Trainee:	ID Number:				
Date:	Specialty Area for Research				
Program Director:	Mark Obtained:				
Percentage:					
SCIENTIFIC NURSING RESEARCH	0	1	2	N/A	REMARKS
/4					
Introduction:					
Background information to the clinical problem is provided.					
The importance of conducting the research is stated.					
/4					
Problem statement:					
The problem statement is clear.					
The problem statement includes the topic, target group, and setting.					
/4					
Purpose and objectives:					
The purpose of the intended research is stated.					
Measurable objectives to support the purpose are stated.					
/4					
Literature review:	0	1	2	N/A	REMARKS
The literature review is relevant to the research problem.					
Mainly primarily sources are reviewed.					

Trainee:	ID Number:				
Date:	Specialty Area for Research				
Program Director:	Mark Obtained:				
Percentage:					
SCIENTIFIC NURSING RESEARCH	0	1	2	N/A	REMARKS
The sources are up to the date (not older than five years, except classical sources).					
The best/most relevant evidence has been collected to support the data.					
The gap in the literature and the research contribution are clearly stated.					
/10					
Research design, population, sample and sampling:					
The selected research design is motivated.					
The research population is described.					
The research sample is described.					
The research sample size is described and calculated.					
The sampling methods is described.					
The research setting is described and stated.					
/12					
Ethical considerations:					
A letter requesting permission to conduct the research in the relevant setting is included (as an Appendix).					
Informed consent from the patient(s) is described.					



Trainee:	ID Number:				
Date:	Specialty Area for Research				
Program Director:	Mark Obtained:				
Percentage:					
SCIENTIFIC NURSING RESEARCH	0	1	2	N/A	REMARKS
The confidentiality of data is described.					
/6					
Data collection method and analysis:					
The data collection method is described.					
The data collection instrument is explained in detail.					
The reliability and validity of the data collection method and instrument are described.					
An appropriate data analysis method and statistical tests are selected and described.					
/8					
List of sources					
A detailed list of sources is included using Harvard style.					
The list of sources appears on a separate page.					
A variety of up to date sources are consulted.					
The sources correspond with the in – text citations.					
The sources are ordered alphabetically (according to author surname).					
The sources are <u>not</u> numbered.					

Trainee:	ID Number:				
Date:	Specialty Area for Research				
Program Director:	Mark Obtained:				
Percentage:					
SCIENTIFIC NURSING RESEARCH	0	1	2	N/A	REMARKS
The appendices appear after the list of sources.					
/14					
General:	0	1	2	N/A	REMARKS
The research report is neat.					
The research steps flow systematically.					
The research report is free of spelling errors.					
The grammar is correct.					
Effort has clearly been made.					
The research report is submitted on time.					
The plagiarism report is less than 15%.					
/14					
Appendix:					
The consent form and participant information sheet are included.					
The plagiarism report is included.					
/4					
TOTAL /100					



Trainee:	ID Number:				
Date:	Specialty Area for Research				
Program Director:	Mark Obtained:				
Percentage:					
SCIENTIFIC NURSING RESEARCH	0	1	2	N/A	REMARKS

Comments of program director:

Name of program director: _____

Signature: _____

Date: _____

Trainee Name: _____

Signature: _____

Date: _____

Appendix E:

References

General References

1. Bryson, W., McLachlan, A., Patrick, K., Chirnside, J., McGrinder, H., Downie, J., Kinloch, D., & Madenholt -Titley, S. (2018). The New Zealand Cardiac Nursing (NZCN) Knowledge and Skills Framework. <https://2018-CV-Skills-and-Knowledge-Framework-FINAL.pdf> (cardiacsociety.org.nz).
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6. Cooley, D. A., & Frazier O. H. (2000). The past 50 years of cardiovascular surgery. *Circulation*, 102, Iv-87–Iv-93. https://doi.org/10.1161/circ.102.suppl_4.IV-87
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care unit and the emerging need for new medical staffing and training models. A scientific statement from the American Heart Association. *Circulation*, 126, 1408–1428. <https://doi.org/10.1161/CIR.0b013e31826890b0>



D 1 Modules references:

Module I: Foundational human anatomy and physiology of the cardiovascular system:

Main Reference:

1. Urden, L. D., Stacy, K. M., & Lough, M. E. (2021). Critical Care Nursing: Diagnosis and Management. 9th edition. Elsevier

References for Extra Reading:

1. Perpetua E. (2021). Cardiac Nursing, the Red Reference Book for Cardiac Nurses (7th Edition). Wolter's Kluwer.



Module 2: Cardiovascular nursing: assessment, planning, and managing care

Main Reference:

1. Urden, L. D., Stacy, K. M., & Lough, M. E. (2021). Critical Care Nursing: Diagnosis and Management. 9th edition. Elsevier

References for Extra Reading:

1. Perpetua E. (2021). Cardiac Nursing, the Red Reference Book for Cardiac Nurses (7th Edition). Wolter's Kluwer.
2. Loscalzo J., (2015). Harrison's Cardiovascular Medicine (3RD Edition). McGraw Hill Education, Chennai

Module 3: Cardiovascular pharmacology

Main Reference:

1. Ford, S (2018). Roach'S Introductory Clinical Pharmacology (11th edition). Wolter's Kluwer.
2. Smith, B. (2018). Pharmacology for Nurses (2nd ed.). Jones and Bartlett Learning.

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1. Perpetua E. (2021). Cardiac Nursing, the Red Reference Book for Cardiac Nurses (7th Edition). Wolter's Kluwer.



Module 4: Alterations in the cardiovascular system I

Main Reference:

1. Urden, L. D., Stacy, K. M., & Lough, M. E. (2021). Critical Care Nursing: Diagnosis and Management (9th edition). Elsevier
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References for Extra Reading:

1. Jones, I. D., & Kucia, A. M. (Eds.). (2022). A Practical Guide for Nurses (2nd ed.). Wiley-Blackwell.
2. New Zealand. (2018). Cardiac Nursing Knowledge and Skills Framework.

Module 5: Basic ECG interpretation

Main Reference:

1. Halperin, M. (2018). The Only ECG Book You'll Ever Need. LWW
2. Coviello, J. S. (2020). ECG Interpretation Made Incredibly Easy (7th Edition). LWW

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