National Curriculum of Pakistan
2022-23

TECHNICAL EDUCATION

MEDICAL TECHNOLOGY

Cardiovascular Technology

Grades 11-12

NATIONAL CURRICULUM COUNCIL SECRETARIAT
MINISTRY OF FEDERAL EDUCATION AND
PROFESSIONAL TRAINING, ISLAMABAD
GOVERNMENT OF PAKISTAN

بسم الله الرحمن الرحيم

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It is with great pride that we, at the National Curriculum Council Secretariat, present the first core curriculum in Pakistan's 75-year history. Consistent with the right to education guaranteed by Article 25-A of our Constitution, the National Curriculum of Pakistan (2022-23) aspires to equip every child with the necessary tools required to thrive in and adapt to an ever-evolving globalized world.

The National Curriculum is in line with international benchmarks, yet sensitive to the economic, religious, and social needs of young scholars across Pakistan. As such, the National Curriculum aims to shift classroom instruction from rote learning to concept-based learning.

Concept-based learning permeates all aspects of the National Curriculum, aligning textbooks, teaching, classroom practice, and assessments to ensure compliance with contemplated student learning outcomes. Drawing on a rich tapestry of critical thinking exercises, students will acquire the confidence to embark on a journey of lifelong learning. They will further be able to acknowledge their weaknesses and develop an eagerness to build upon their strengths.

The National Curriculum was developed through a nationwide consultative process involving a wide range of stakeholders, including curriculum experts from the public, private, and non-governmental sectors. Representatives from provincial education departments, textbook boards, assessment departments, teacher training departments, *deeni madaris*, public and private publishers, private schools, and private school associations all contributed their expertise to ensure that the National Curriculum could meet the needs of all Pakistani students.

The experiences and collective wisdom of these diverse stakeholders enrich the National Curriculum, fostering the core, nation-building values of inclusion, harmony, and peace, making the National Curriculum truly representative of our nation's educational aspirations and diversity.

I take this opportunity to thank all stakeholders, including students, teachers, and parents who contributed to developing the National Curriculum of Pakistan (2022-23)

Dr. Mariam Chughtai
Director
National Curriculum Council Secretariat
Ministry of Federal Education and Professional Training

Medical Technology

Cardiovascular Techniques

Grades 11-12

Progression Grid

Domain A: **Anatomy of Heart and Blood Vessels:**

Standard: Apply scientific knowledge and skills to conduct Cardiovascular technology in healthcare and relevant settings.

Grade 11	**Grade 12**
Benchmark I: Explore anatomy of heart and blood vessels. Interpret heart rate, blood pressure, and cardiac output.	
Student Learning Outcomes	
Students should be able to [SLO:CT-11-A-01]: Correlate anatomy with physiology. Identify the major anatomical function of the heart, including the chambers (atria and ventricles), valves (tricuspid, bicuspid/mitral, aortic, and pulmonary), and major blood vessels (aorta, vena cava, pulmonary arteries, and pulmonary veins).	

[SLO:CT-11-A-02]: Interpret heart rate, blood pressure, and cardiac output. [SLO:CT-11-A-03]: Describe phases of the cardiac cycle, including systole and diastole. [SLO:CT-11-A-04]: Explain the role of the sinoatrial (SA) node, atrioventricular (AV) node, and the bundle of His in cardiac conduction.	

Domain B: **Cardiac Cycle**

Standard: Apply the scientific knowledge and skills to conduct Cardiovascular technology in healthcare and relevant settings.

Grade 11	**Grade 12**
Benchmark I: ● Describe different phases of the cardiac cycle. ● Identify the basic phases of the cardiac cycle, including systole and diastole. ● Identify the cardiac cycle in its connection to the larger circulatory system, transporting oxygen and nutrients to the body's cells.	
Student Learning Outcomes	

Students should be able to: [SLO:CT-11-B-01]: Observe and identify the different phases of the cardiac cycle. [SLO:CT-11-B-02]: Develop the ability to explain the cardiac cycle using age-appropriate language and terms. [SLO:CT-11-B-03]: Identify the basic phases of the cardiac cycle, including systole and diastole. [SLO:CT-11-B-04]: Identify the cardiac cycle in its connection to the larger circulatory system, transporting oxygen and nutrients to the body's cells.	

Domain C: **Physiology of the Heart**

Standard: Apply the scientific knowledge and skills to conduct cardiovascular technology in healthcare and relevant settings.

Grade 11	Grade 12
Benchmark I: • Explore interlinkages anatomy with physiology. • Identify the major anatomical function of the heart, including the chambers. • Interpret heart rate, blood pressure, and cardiac output.	
Student Learning Outcomes	
Students should be able to [SLO:CT-11-C-01]: Correlate anatomy with physiology. Identify the major anatomical function of the heart, including the chambers (atria and ventricles), valves (tricuspid, bicuspid/mitral, aortic, and pulmonary), and major blood vessels (aorta, vena cava, pulmonary arteries, and pulmonary veins). [SLO:CT-11-C-02]: Interpret heart rate, blood pressure, and cardiac output. [SLO:CT-11-C-03]: Describe the phases of the cardiac cycle, including systole and diastole.	

[SLO:CT-11-C-04]: Explain the role of the sinoatrial (SA) node, atrioventricular (AV) node, and the bundle of His in cardiac conduction.	

Domain D: **Conducting System**

Standard: Apply the scientific knowledge and skills to conduct cardiovascular technology in healthcare and relevant settings.

Grade 11	**Grade 12**
Benchmark I: Demonstrate the concept of automaticity in the cardiac conduction system and understand why the heart can generate electrical impulses spontaneously. define conductivity in the context of the heart and explain how the cardiac tissue transmits electrical impulses from one part of the heart to another.	

Student Learning Outcomes	
Students should be able to: [SLO:CT-11-D-01]: Explain the concept of automaticity in the cardiac conduction system and understand why the heart can generate electrical impulses spontaneously. [SLO:CT-11-D-02]: Define conductivity in the context of the heart and explain how the cardiac tissue transmits electrical impulses from one part of the heart to another. [SLO:CT-11-D-03]: Identify the S.A. node as the natural pacemaker of the heart, understand its location in the right atrium, and explain its role in initiating electrical impulses. [SLO:CT-11-D-04]: Explain the significance of the Bundle of His and its branches in conducting electrical impulses from the A.V. node to the ventricles, ensuring coordinated contractions.	

Domain E: ECG

Standard: Apply the scientific knowledge and skills to conduct cardiovascular technology in healthcare and relevant settings.

Grade 11	Grade 12
Benchmark I: Demonstrate the basic components of an ECG waveform. Identify a normal ECG waveform.Demonstrate the ability to calculate heart rate using ECG data.	
Student Learning Outcomes	

Students should be able to [SLO:CT-11-E-01]: Identify the basic components of an ECG waveform. [SLO:CT-11-E-02]: Demonstrate the proper usage and handling of an ECG machine. [SLO:CT-11-E-03]: Differentiate between standard limb leads and precordial leads. [SLO:CT-11-E-04]: Explain the significance of lead placement in capturing specific aspects of the heart's electrical activity. [SLO:CT-11-E-05]: Demonstrate correct electrode placement on the limbs and chest. [SLO:CT-11-E-06]: Identify a normal ECG waveform. [SLO:CT-11-E-07]:	

Understand the significance of a baseline in interpreting ECG readings. [SLO:CT-11-E-08]: Demonstrate the ability to calculate heart rate using ECG data.	

Domain F: **Ischemic Heart Disease (IHD):**

Standard: Apply the scientific knowledge and skills to conduct cardiovascular technology in healthcare and relevant settings.

Grade 11	**Grade 12**
Benchmark I: Demonstrate skills related to ischemic heart disease, identify its causes. interpret the symptoms of angina and recognize its significance and analyze risk factors associated with IHD.	
Student Learning Outcomes	

	Students should be able to [SLO:CT-12-F-01]: Define ischemic heart disease and identify its causes. [SLO:CT-12-F-02]: Explain the role of coronary arteries in supplying blood to the heart. [SLO:CT-12-F-03]: Interpret the symptoms of angina and recognize its significance. [SLO:CT-12-F-04]: Analyze risk factors associated with IHD. [SLO:CT-12-F-05]: List preventive measures for IHD.

Domain G: **Angina & its Types:**

Standard: Apply the scientific knowledge and skills to conduct Cardiovascular technology in healthcare and relevant settings.

Grade 11	Grade 12
Benchmark I: Demonstrate skills related to stable angina and unstable angina.,identify common triggers and symptoms of angina and ana;yze lifestyle factors that contribute to angina.	
Student Learning Outcomes	
	Students should be able to: [SLO:CT-12-G-01]: Identify the Differences between stable angina and unstable angina. Identify common triggers and symptoms of angina. [SLO:CT-12-G-02]: Demonstrate an understanding of the difference between stable and unstable angina. [SLO:CT-12-G-03]: Analyze lifestyle factors that contribute to angina. [SLO:CT-12-G-04]: Explain the importance of prompt medical attention for angina.

Domain H: **Myocardial Infarction (MI):**

Standard: Apply the scientific knowledge and skills to conduct Cardiovascular technology in healthcare and relevant settings.

Grade 11	**Grade 12**
Benchmark I: Demonstrate skills related to myocardial infarction, identify its causes and analyze lifestyle factors that differentiate between angina and myocardial infarction.	
Student Learning Outcomes	
	Students should be able to [SLO:CT-12-H-01]: Define myocardial infarction and its causes. [SLO:CT-12-H-02]: Differentiate between angina and myocardial infarction. [SLO:CT-12-H-03]: Identify emergency responses for someone experiencing an MI. [SLO:CT-12-H-04]:

	Understand the concept of the "golden hour" in MI treatment. [SLO:CT-12-H-05]: Recognize the symptoms of a heart attack.

Domain I: Hypertension (HTN):

Standard: Apply the scientific knowledge and skills to conduct Cardiovascular technology in healthcare and relevant settings.

Grade 11	**Grade 12**
Benchmark I: Demonstrate skills related to hypertension, identify its risk factors and interpret blood pressure readings. Explore the role of medications in hypertension treatment.	
Student Learning Outcomes	
	Students should be able to [SLO:CT-12-I-01]: Define hypertension and its risk factors. [SLO:CT-12-I-02]: Explain the consequences of untreated hypertension. [SLO:CT-12-I-03]:

	Measure and interpret blood pressure readings. [SLO:CT-12-I-04]: Identify lifestyle changes to manage and prevent hypertension. [SLO:CT-12-I-05]: Explore the role of medications in hypertension treatment.

Domain J: Congestive Cardiac Failure (CCF):

Standard : Acquire skills to learn and apply the scientific knowledge and skills to conduct Cardiovascular technology in healthcare and relevant settings.

Grade 11	**Grade 12**
Benchmark I: Demonstrate skills related to congestive cardiac failure, identify its causes and recognize symptoms of CCF. . .	
Student Learning Outcomes	
—----------	Students should be able to [SLO:CT-12-J-01]: Define congestive cardiac failure and its causes.

	[SLO:CT-12-J-02]: Recognize symptoms of CCF. [SLO:CT-12-J-03]: Explain the impact of CCF on heart function. [SLO:CT-12-J-04]: Identify treatment options for congestive heart failure. [SLO:CT-12-J-05]: Explore lifestyle modifications for individuals with CCF.

Domain K: Cardiogenic Shock:

Standard: Acquire skills to learn and apply the scientific knowledge and skills to conduct Cardiovascular technology in healthcare and relevant settings.

Grade 11	**Grade 12**
Benchmark I: Demonstrate skills related to congestive cardiac failure, identify its causes and recognize symptoms of CCF.	
Student Learning Outcomes	
—----------	Students should be able to [SLO:CT-12-K-01]: Define cardiogenic shock and its causes.

	[SLO:CT-12-K-02]: Recognize signs and symptoms of cardiogenic shock. [SLO:CT-12-K-03]: Identify emergency measures for managing cardiogenic shock. [SLO:CT-12-K-04]: Explain the role of medical interventions in cardiogenic shock treatment. [SLO:CT-12-K-05]: Explore the importance of rapid response in cardiogenic shock cases.

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