

# DMS-1381: CARDIAC DIAGNOSTIC PROCEDURES

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## Cuyahoga Community College

**Viewing: DMS-1381 : Cardiac Diagnostic Procedures**

**Board of Trustees:**

January 2023

**Academic Term:**

Fall 2023

**Subject Code**

DMS - Diagnostic Medical Sonography

**Course Number:**

1381

**Title:**

Cardiac Diagnostic Procedures

**Catalog Description:**

Theory and laboratory practice of entry-level cardiovascular procedures of electrocardiography (ECG). Interpretation practice of 12-lead ECG tracings, fundamentals of Holter monitoring, and pacemakers. Emphasis on technical accuracy in operational, problem solving and quality control skills.

**Credit Hour(s):**

3

**Lecture Hour(s):**

2.5

**Lab Hour(s):**

1.5

## Requisites

**Prerequisite and Corequisite**

BIO 2341 Anatomy and Physiology II or concurrent enrollment.

## Outcomes

**Course Outcome(s):**

Perform an electrocardiogram according to protocol including explanation of procedure to patient.

**Objective(s):**

- a. Describe the necessary equipment needed and reasons for performing an electrocardiogram.
- b. Explain in a professional manner, the procedure and patient's role.
- c. Select the proper equipment necessary to perform an electrocardiogram and demonstrate the ability to correctly operate and maintain cardiovascular testing equipment.
- d. Identify and correct basic technical, mechanical and electrical malfunction of testing equipment.
- e. Create accurate patient and test record information.

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**Course Outcome(s):**

Analyze and interpret various electrocardiograms.

**Objective(s):**

- a. Describe basic arrhythmias and dysrhythmias found on electrocardiograms as well as indications for cardioversion and defibrillation.
- b. Recognize abnormal artifact from a cardiac rhythm.
- c. Consider pharmacological alterations in cardiac electrical function caused by cardiac drugs.

- d. Describe the chemical and mechanical functions necessary to produce an action potential.
  - e. Relate the electrical pathway throughout the heart's anatomy to normal electrocardiography components.
  - f. List and identify the components of an electrocardiogram.
  - g. Accurately determine heart rhythm from an electrocardiogram.
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**Methods of Evaluation:**

- a. Observation
  - i. Student performing an electrocardiogram
  - ii. Student interpreting EKG strips
- b. Written examination
- c. Practical examination
- d. Homework assignments

**Course Content Outline:**

- a. Concepts
  - i. Basic cardiac anatomy and physiology
  - ii. Action potential and pathway
  - iii. Indications
  - iv. Equipment
  - v. EKG components
  - vi. Normal and abnormal rhythms
  - vii. Policies and procedures
  - viii. Exam protocols
  - ix. Quality
  - x. Professionalism
  - xi. Terminology
- b. Skills
  - i. Providing instructions to patient in professional manner
  - ii. Correctly performing an electrocardiogram
  - iii. Identifying and interpreting EKG findings
  - iv. Correlating exam findings
  - v. Recording patient and test information
- c. Issues
  - i. Knowledge retention
  - ii. Standards of practice
  - iii. Scope of practice
  - iv. Diversity
  - v. Standard precautions and safety
  - vi. Quality
  - vii. Technical and mechanical difficulties
  - viii. Equipment malfunctions
- d. Basic anatomy and physiology of the heart
  - i. Cardiac muscle layers
  - ii. Chambers
  - iii. Great vessels
  - iv. Valves and apparatus
  - v. Coronary anatomy
  - vi. Cardiac cycle
- e. Terminology and basic concepts
  - i. Characteristics of heart muscle
  - ii. Electrolyte balance
  - iii. Resting membrane potential
  - iv. Action current
    - v. Depolarization and repolarization
  - vi. Rate of conduction through cardiac muscle

- vii. Mechanical events
- viii. Cardiac cells
- ix. Conduction system pathway
- f. Relationship to monitoring using PQRSTU complexes
  - i. P waves
  - ii. PR interval
  - iii. PR segment
  - iv. QRS complex
  - v. ST segment
  - vi. T waves
  - vii. QT interval
  - viii. U waves
- g. Cardiovascular testing
  - i. Types
  - ii. Indications
- h. Testing Equipment
  - i. Basic maintenance
  - ii. Safety procedures
- i. Basic electrocardiographic machine operation
  - i. Limb leads placement
  - ii. Chest leads placement
  - iii. Patient instructions
  - iv. Use of controls
- j. Basic electrocardiographic tracings interpretation
  - i. Rate
  - ii. Rhythm
  - iii. Presence or absence of P, Q, R, S, and T waves
  - iv. Normal limits of P-R intervals, QRS, Q-T intervals and S-T segments
  - v. Presence or absence of arrhythmias
- k. Arrhythmias
  - i. Atrial
  - ii. Junctional
  - iii. Ventricles
  - iv. Heart blocks
  - v. Indications for cardioversion and defibrillation
- l. 12-Lead EKG interpretation
  - i. Acute coronary syndrome
  - ii. Intraventricular Conduction Delays
  - iii. Chamber enlargement
  - iv. Electrolyte complications
- m. Pharmacological effects on the cardiovascular system
  - i. Antiarrhythmic agents
  - ii. Beta blockers
  - iii. Vasodilators
  - iv. Vasopressors
- n. Ambulatory EKG
  - i. Types
  - ii. History
  - iii. Indications
- o. Pacemakers
  - i. Types
  - ii. Pacing chambers and modes
  - iii. Pacemaker malfunctions
  - iv. Analyzing pacemaker function on EKG

## Resources

Barbara J. Aehlert. *ECGs Made Easy*. 6th ed. St Louis: Elsevier, 2018.

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Atwood, Sandra, Cheryl Stanton, and Jenny Storey Davenport. *Introduction to Basic Cardiac Dysrhythmias*. 5th ed. Burlington: Jones & Bartlett Learning, 2018.

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Ellis, Karen. *EKG Plain and Simple*. 4th . New York: Pearson, 2016.

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Shade, Bruce. *Interpreting ECGs A Practical Approach*. 3rd . New York: McGraw-Hill, 2018.

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Dubins, Dale. *Rapid Interpretation of EKG's*. 5th ed. Tampa: Cover Publishing, 2000.

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Walraven, Gail. *Basic Arrhythmias*. 8th ed. Boston: Pearson Education, 2016.

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Woods, S., Ehrat, K. . *The Art of EKG Interpretation: A Self-Instructional Text*. 8th ed. Dubuque: Kendall Hunt, 2015.

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