

UNIVERSITY OF MINNESOTA
School of Nursing
NURS 4705: Specialty Focused Practicum II
BASIC ELECTROPHYSIOLOGY AND SINUS RHYTHMS

The learning objectives for Week 1 focus on three broad content areas:

1. Explain the conduction system within the heart.
2. Identify the basic components of electrocardiogram (ECG) waveforms required to interpret rhythms.
3. Recognize and interpret sinus rhythms.
4. Describe the clinical significance of sinus rhythms in order to identify appropriate nursing interventions.

LEARNING OBJECTIVE 1: Explain the conduction system within the heart.

A student who has mastered this content area in preparation for class and Exam 1 will be able to:

- Define vocabulary terms describing the basic electrophysiology of the heart included in this week's KEYWORDS List
- Describe the normal sequence of electrical conduction through the heart (*see Fig. 2.10 on p. 36 and Fig. 3.1 on p. 77*)
- Describe the absolute and relative refractory period
- State the intrinsic rates of the SA node, AV junction, and Purkinje fibers

Readings: Aehlert (2018) *ECGs Made Easy*: **Chapter 2 pp. 28-38 and table 2.1 on p. 39.**

LEARNING OBJECTIVE 2: Identify the basic Electrocardiogram (ECG) waveforms used to interpret heart rhythms.

A student who has mastered this content area in preparation for class and Exam 1 will be able to:

- Identify the purposes for ECG monitoring
- State the duration (in time) that is represented by small and large boxes on ECG paper
- Identify ECG waveforms and understand the cardiac activity that each waveform represents: P wave, QRS complex, T wave
- Identify and measure ECG segments: PR interval, QRS segment, QT interval
- Describe a systematic method for interpreting a heart rhythm on an ECG strip
- Use the Six-Second Method and Large Box method to assess heart rate on ECG paper

Readings: Aehlert (2018) *ECGs Made Easy*:

- **Chapter 2 pp. 41-42 (read through "Leads")**
- **Chapter 2 pp. 47 (starting a Electrocardiography Paper) –p. 60**

LEARNING OBJECTIVE 3: Recognize and interpret sinus rhythms.

A student who has mastered this content area in preparation for class and Exam 1 will be able to:

- Recognize a normal sinus rhythm
- For sinus bradycardia, sinus tachycardia, sinus arrhythmia/dysrhythmia, SA block, and sinus arrest, describe the following:
 - ECG characteristics: *how do we know the rhythm is occurring?*
 - Possible causes: *what common causes of these rhythm abnormalities do we need to know?*
 - Signs and symptoms: *what symptoms might we expect a patient with this rhythm to have?*
 - Emergency management: *what are the nursing and interprofessional interventions for this rhythm?*

Readings: Aehlert (2018) *ECGs Made Easy*: **Chapter 3 pp. 76-84**

LEARNING OBJECTIVE 4: Describe the clinical significance of sinus rhythms in order to identify appropriate nursing interventions.

A student who has mastered this content area in preparation for class and Exam 1 will be able to:

- Identify signs and symptoms of hemodynamic compromise.
- Identify causes of sinus bradycardia (SB) and sinus tachycardia (ST).
- Describe the appropriate nursing care and treatment modalities for symptomatic SB or symptomatic ST:
 - adenosine
 - adrenergic drugs
 - cholinergic drugs
 - pacemakers
 - vagal maneuvers

Readings:

Aehlert (2018) *ECGs Made Easy*:

- **Chapter 3 pp. 79-81**
- **p. 112: read short section on "Vagal Maneuvers" only.**

Burchum, et al. (2016). *Lehne's Pharmacology for Nursing Care*:

- **p. 550: adenosine**
- **p. 108: tables 13-2 & 13-3 (Functions of Cholinergic & Adrenergic Receptor Subtypes)**
 - Also review as needed: Ch. 14, 17, and 18 (on cholinergic & adrenergic drugs)

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ATRIAL AND JUNCTIONAL RHYTHMS

The learning objectives for Week 2 focus on four broad content areas:

1. Describe the ECG characteristics and clinical significance of common atrial dysrhythmias.
2. Describe the ECG characteristics and clinical significance of junctional rhythms.
3. Identify the indications, contraindications, and major nursing administration considerations for common antidysrhythmic medications used to treat atrial dysrhythmias.
4. Describe nursing considerations for a patient undergoing synchronized cardioversion for an atrial dysrhythmia
5. Explain the appropriate nursing care of a patient with an atrial or junctional dysrhythmia.

LEARNING OBJECTIVE 1: Describe the ECG characteristics and clinical significance of atrial dysrhythmias.

A student who has mastered this content area in preparation for class and Exam 1 will be able to:

- Define vocabulary terms included in this week's KEYWORDS List
- Identify causes of triggered atrial activity (*see p. 103*)
- Identify the following atrial dysrhythmias on ECG:
 - Premature Atrial Complexes (PACs)
 - Atrial Flutter
 - Atrial fibrillation
- Explain the causative factors and collaborative care of the above atrial dysrhythmias
- Describe common interventions to restore normal rhythm when a patient exhibits atrial dysrhythmia including:
 - Vagal maneuvers
 - Synchronized cardioversion
 - Goals of medication management (*rate control and rhythm control*)

Readings: Aehlert (2018) *ECGs Made Easy*:

Chapter 4 pp. 103-105. Stop at "Noncompensatory versus compensatory pause"

Chapter 4 pp. 108-113. Stop at "Atrioventricular nodal reentrant tachycardia."

Chapter 4 pp. 117 "Atrial flutter" - 122

LEARNING OBJECTIVE 2: Describe the ECG characteristics and clinical significance of junctional rhythms

A student who has mastered this content area in preparation for class and Exam 1 will be able to:

- Identify the following junctional rhythms on ECG:
 - Premature Junctional Complexes (PJC's)
 - Junctional Escape Rhythm
 - Accelerated Junctional
 - Junctional Tachycardia
- Explain the causative factors and collaborative care of the 5 junctional rhythms

Readings: Aehlert (2018) *ECGs Made Easy*:

Chapter 5 pp. 141-148

LEARNING OBJECTIVE 3: Identify the indications, contraindications, and major nursing administration considerations for common antidysrhythmic medications used to treat atrial dysrhythmias

A student who has mastered this content area in preparation for class and Exam 1 will be able to:

- Explain the major nursing administration considerations (including indications and contraindications) for the following medications:
 - Propranolol
 - Amiodarone
 - Diltiazem
 - Digoxin
 - Adenosine
- Describe the mechanism of action for these 5 antidysrhythmic medications

Readings: Burchum, J. & Rosenthal, L. (2016) *Lehne's pharmacology for nursing care*. (9th ed.):
pp. 540-541 Overview of Common Dysrhythmias and Their Treatment
pp. 546-548 Read about Propranolol and Amiodarone
pp. 550-551 Read about Class IV Calcium Channel Blockers, Adenosine, and Digoxin

LEARNING OBJECTIVE 4: Describe nursing considerations for a patient undergoing synchronized cardioversion for an atrial dysrhythmia

A student who has mastered this content area in preparation for class and Exam 1 will be able to:

- Describe the indications for synchronized cardioversion
- Explain the procedure for the administration of synchronized cardioversion
- Describe appropriate post-procedural care for a patient following synchronized cardioversion

Readings: Aehlert (2018) *ECGs Made Easy* pp. 112-113

LEARNING OBJECTIVE 5: Explain the appropriate nursing care for a patient with an atrial or junctional dysrhythmia.

A student who has mastered this content area in preparation for class and Exam 1 will be able to:

- Identify common causes of PACs
- Describe the appropriate nursing care for a patient with symptomatic PACs
- Identify conditions associated with atrial flutter
- Identify conditions that predispose patients to atrial fibrillation
- Describe the appropriate nursing care for a patient with symptomatic atrial flutter or atrial fibrillation
- Identify common causes of junctional dysrhythmias
- Describe the appropriate nursing care for a patient with a symptomatic junctional dysrhythmia

Readings: Aehlert (2018) *ECGs Made Easy*: **Chapter 4 pp. 106-107**
Chapter 4 pp. 111
Chapter 4 pp. 121
Chapter 5 pp. 145-146

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HEART BLOCKS AND VENTRICULAR DYSRHYTHMIAS

The learning objectives for Week 3 focus on four broad content areas:

1. Describe the ECG characteristics, clinical significance, and collaborative management of ventricular dysrhythmias.
2. Describe the ECG characteristics and clinical significance of atrioventricular (AV) blocks.
3. Explain the terms *Pulseless Electrical Activity* and *Asystole*.
4. Describe the purpose and function of pacemaker systems.

LEARNING OBJECTIVE 1: Describe the ECG characteristics, clinical significance, and collaborative management of ventricular dysrhythmias.

A student who has mastered this content area in preparation for class and Exam 1 will be able to:

- Define vocabulary terms included in this week's KEYWORDS List
- Identify the following ventricular dysrhythmias on ECG:
 - Premature Ventricular Complexes (PVCs)
 - Ventricular Tachycardia (VT)
 - Idioventricular Escape Rhythm
 - Ventricular Fibrillation (VFib)
- Explain the causative factors and collaborative care of the above ventricular dysrhythmias
- Describe common interventions to restore normal rhythm when a patient exhibits ventricular dysrhythmia including:
 - Defibrillation
 - Synchronized cardioversion
 - Medication management

Readings: Aehlert (2018) *ECGs Made Easy*:

Chapter 6 pp. 165-168

Chapter 6 pp. 170-179 [skip "ACCELERATED IDIOVENTRICULAR RHYTHM"]

LEARNING OBJECTIVE 2: Describe the ECG characteristics and clinical significance of atrioventricular (AV) blocks.

A student who has mastered this content area in preparation for class and Exam 1 will be able to:

- Identify the following atrioventricular (AV) blocks on ECG:
 - First-degree AV block
 - Third-degree AV block
- Explain the causative factors and collaborative care of the above AV blocks.

Readings: Aehlert (2018) *ECGs Made Easy*:

Chapter 7 pp. 194-196

Chapter 7 pp. 202-203

LEARNING OBJECTIVE 3: Explain the term *Pulseless Electrical Activity* and *Asystole*.

A student who has mastered this content area in preparation for class and Exam 1 will be able to:

- Explain the term *Pulseless Electrical Activity*.
- Identify Aystole on ECG.

Readings:

Aehlert (2018) *ECGs Made Easy*: **Ch. 6 p. 177-178 “Asystole”**

Lewis, S., Dirksen, S., Heitkemper, M., & Bucher, L. (2017). *Medical-Surgical nursing: Assessment and management of clinical problems* (9th ed.). **Ch. 35 pp. 771 - Read “Pulseless Electrical Activity.”**

LEARNING OBJECTIVE 4: Describe the purpose and function of pacemaker systems.

A student who has mastered this content area in preparation for class and Exam 1 will be able to:

- Explain the clinical indications for a permanent pacemaker.
- Explain the clinical indications for an implanted cardiac defibrillator.
- Describe the clinical signs and symptoms of decreased cardiac output.

Readings: Aehlert (2018) *ECGs Made Easy* **Ch. 8 pp. 222-226**

Lewis, S., Dirksen, S., Heitkemper, M., & Bucher, L. (2017). *Medical-Surgical nursing: Assessment and management of clinical problems* (9th ed.).

Ch. 35 pp. 772-773 - Read “Implantable Cardioverter-Defibrillator”

Ch. 35 pp. 773-775 – Read “Pacemakers.” Stop at “Radiofrequency Catheter Ablation Therapy.”