COURSE OUTLINE

Title: Basic EKG Interpretation I

Course Number: NUR-217

Credits: 1

Date: Winter, 2014

Institution: CLACKAMAS COMMUNITY COLLEGE

Outline Developed by: Carol Thorn

Type of Program: Professional-Technical

Course Description:

This course presents the student with an introductory overview related to the anatomy and physiology of the heart. It also explores normal electrical conduction as well as common variations as evidenced by changes in the waveform on the cardiac monitoring device. The course will also focus on the student’s ability to perform cardiac monitoring via 3, 5 and 12 lead monitoring devices.

Student Learning Outcomes:

Upon the successful completion of this course, the student should be able to:
1. define unique characteristics of cardiac system related to anatomy and physiology of the heart,
2. demonstrate understanding of normal electrophysiology of the cardiac system,
3. recognize normal waveforms in the electrical conduction of the cardiac system,
4. identify common variations in the electrical conduction of the cardiac system,
5. distinguish deadly heart rhythms in the electrical conduction of the cardiac system,
6. demonstrate understanding and differences of 3, 5 and 12 lead cardiac monitoring devices;
7. demonstrate understanding of role and responsibilities of person obtaining & or monitoring EKG,
8. perform a 12 lead EKG.

Length of Course: 11 lecture hours

Grading Method: Letter Grade Only

Prerequisites: None

Co-requisites: None

Recommended: None

Major Topic Outline:

1. Basic Anatomy and Physiology of the Heart
2. Electrical Conduction System of the Heart
3. Basic waveform analysis
4. Components of obtaining an accurate EKG reading
5. Role and responsibilities of person obtaining &/or monitoring EKG
COURSE SYLLABUS

Title:  Basic EKG Interpretation I
Course Number:  NUR 217

Credits:  1
Date:  Spring 2014

Institution:  CLACKAMAS COMMUNITY COLLEGE

Outline Developed by:  Carol Thorn

Type of Program:  Professional-Technical

Course Description:

This course presents the student with an introductory overview related to the anatomy and physiology of the heart. It also explores normal electrical conduction as well as common variations as evidenced by changes in the waveform on the cardiac monitoring device. The course will also focus on the student’s ability to perform cardiac monitoring via 3, 5 and 12 lead monitoring devices.

Student Learning Outcomes:

Upon the successful completion of this course, the student should be able to:
• Define unique characteristics of cardiac system related to anatomy and physiology of the heart
• Demonstrate understanding of normal electrophysiology of the cardiac system
• Recognize normal waveforms in the electrical conduction of the cardiac system
• Identify common variations in the electrical conduction of the cardiac system
• Distinguish deadly heart rhythms in the electrical conduction of the cardiac system
• Demonstrate understanding and differences of 3, 5 and12 lead cardiac monitoring devices
• Demonstrate understanding of role and responsibilities of person obtaining & or monitoring EKG
• Perform a 12 lead EKG

Length of Course:  11 lecture hours
Mondays 1:30 – 3:50 pm

Grading Method:  Letter Grade or P/NP; Allow repeat

Prerequisites:  None
Co-requisites:  None
Recommended:  None

Major Topic Outline:

- Basic Anatomy and Physiology of the Heart
- Electrical Conduction System of the Heart
- Basic waveform analysis
- Components of obtaining an accurate EKG reading
Role and responsibilities of person obtaining &/or monitoring EKG

Method of Evaluation:

- Worksheets 10%
- Quizzes 30%
- Final 60%

Total 100%

Grading Scale:

- A 92-100%
- B 84-91%
- C 75-83%
- D 66-75%
- F Below 66-1%

If you do not achieve an average of 75% or higher, you will not pass Nursing 217. You will not be able to progress to NUR 218.

Required Texts:

No required text for this course. Readings and handouts will be provided via Evolve and in class.

Methods of Instruction:

This course is taught in a lecture/discussion/interactive manner.

Theory Outline:

March 31st:
The focus of today’s class will be:

- An overview of the course
- Roles and responsibilities of person obtaining an EKG
- Roles and responsibilities of person monitoring an EKG
- Basic Anatomy and Physiology of the Heart
- Electrical Conduction System of the Heart
- Components of the EKG
  - 3 lead, 5 lead and 12 lead EKG
- Proper EKG lead placement
- Practice performing an EKG

April 7th:
The focus of today’s class will be:

- EKG Interpretation
  - Identification of waveforms on rhythm strip
  - Measurement of waveforms on rhythm strip
  - Determining heart rate from rhythm strips
- Recognition of sinus rhythms
- Causes and treatment modalities of abnormal sinus rhythms

April 14th:
The focus of today’s class will be:
- EKG Interpretation
  - Atrial rhythms
  - Causes and treatment modalities of abnormal atrial rhythms

**April 21st:**
The focus of today’s class will be:
- EKG Interpretation
  - Ventricular rhythms
  - Causes and treatment modalities of abnormal ventricular rhythms
  - Junctional rhythms
  - Causes and treatment modalities of abnormal junctional rhythms

**April 28th:**
The focus of today’s class will be:
- Final Exam
  - Performing an EKG
  - Written exam
**NUR-217 Lesson Plan:**

**March 31st:**
The focus of today’s class will be:
- An overview of the course
- Roles and responsibilities of person obtaining an EKG
- Roles and responsibilities of person monitoring an EKG
- Basic Anatomy and Physiology of the Heart
- Electrical Conduction System of the Heart
- Components of the EKG
  - 3 lead, 5 lead and 12 lead EKG
- Proper EKG lead placement
- Practice performing an EKG

**April 7th:**
The focus of today’s class will be:
- EKG Interpretation
  - Identification of waveforms on rhythm strip
  - Measurement of waveforms on rhythm strip
  - Determining heart rate from rhythm strips
- Recognition of sinus rhythms
- Causes and treatment modalities of abnormal sinus rhythms

**April 14th:**
The focus of today’s class will be:
- EKG Interpretation
  - Atrial rhythms
- Causes and treatment modalities of abnormal atrial rhythms

**April 21st:**
The focus of today’s class will be:
- EKG Interpretation
  - Ventricular rhythms
- Causes and treatment modalities of abnormal ventricular rhythms
  - Junctional rhythms
- Causes and treatment modalities of abnormal junctional rhythms

**April 28th:**
The focus of today’s class will be:
- Final Exam
  - Performing an EKG
  - Written exam
ECG Rhythm Identification Practice

For each of the ECG practice rhythms:
1. Identify the P, Q, R, S, T (and U waves if any are seen).
2. Calculate the measurement and rates asked for in each strip.

Figure 3-18

1. Identify the P, Q, R, S, T, U waves.
2. Look to the left of the QRS, and identify each P wave.
   Is the P wave (+) or (-) ________?

3. QRS (ventricular) rate/rhythm __________.
4. P (atrial) rate/rhythm __________.
5. PR interval __________.

Figure 3-19

1. Identify the P, Q, R, S, T, U waves.
2. Look to the left of the QRS, and identify each P wave.
   Is the P wave (+) or (-) ________?

3. QRS (ventricular) rate/rhythm __________.
4. P (atrial) rate/rhythm __________.
5. PR interval __________.
1. Identify the P, Q, R, S, T, U waves.
2. Look to the left of the QRS, and identify each P wave.
   Is the P wave (+) or (-) ________?

3. QRS (ventricular) rate/rhythm ________.
4. P (atrial) rate/rhythm ________.
5. PR interval ________.

---

1. Identify the P, Q, R, S, T, U waves.
2. Look to the left of the QRS, and identify each P wave.
   Is the P wave (+) or (-) ________?
1. Identify the P, Q, R, S, T, U waves.
2. Look to the left of the QRS, and identify each P wave.
   Is the P wave (+) or (-) ?

3. QRS (ventricular) rate/rhythm ____________.
4. P (atrial) rate/rhythm ____________.
5. PR interval ____________.

---

1. Identify the P, Q, R, S, T, U waves.
2. Look to the left of the QRS, and identify each P wave.
   Is the P wave (+) or (-) ?

3. QRS (ventricular) rate/rhythm ____________.
4. P (atrial) rate/rhythm ____________.
5. PR interval ____________.
Figure 3-24

1. Identify the P, Q, R, S, T, U waves.
2. Look to the left of the QRS, and identify each P wave.
   Is the P wave (+) or (-) ________?
3. QRS (ventricular) rate/rhythm __________
4. P (atrial) rate/rhythm __________
5. PR interval __________

Figure 3-25

1. Identify the P, Q, R, S, T, U waves.
2. Look to the left of the QRS, and identify each P wave.
   Is the P wave (+) or (-) ________?
3. QRS (ventricular) rate/rhythm __________
4. P (atrial) rate/rhythm __________
5. PR interval __________

References


Sinus Rhythms

10–22
Regularity: __________ Heart rate: __________ PR interval: __________
P-waves: __________ QRS complex: __________
Interpretation: __________

10–23
Regularity: __________ Heart rate: __________ PR interval: __________
P-waves: __________ QRS complex: __________
Interpretation: __________

10–24
Regularity: __________ Heart rate: __________ PR interval: __________
P-waves: __________ QRS complex: __________
Interpretation: __________
Sinus Rhythms

10-19
Regularity: Heart rate: PR interval:
P-waves: QRS complex:
Interpretation:

10-20
Regularity: Heart rate: PR interval:
P-waves: QRS complex:
Interpretation:

10-21
Regularity: Heart rate: PR interval:
P-waves: QRS complex:
Interpretation:
RHYTHM STRIP INTERPRETATION

Identify which of the following rhythms represent:

Sinus tachycardia ______
Atrial fibrillation ______
Sinus rhythm w/ PVC’s ______
Normal sinus rhythm ______
Ventricular tachycardia ______
Atrial flutter ______
Sinus bradycardia ______
Ventricular fibrillation ______

Copies of rhythms are placed on this form...
On the following diagram, identify the components of the electrical conduction of the cardiac system. Using a colored pen, trace the path of electrical conduction in the normal heart.
Identify the P, Q, R, S, T waveforms on the following EKG strips:

Accurately measure the HR, PR interval, QRS interval and the QT interval in the following rhythm strips.
Utilizing the following EKG strips:

- Determine the heart rate of the following rhythms utilizing all three techniques learned
- Analyze the strips to determine if the heart rate is within normal limits, bradycardic, tachycardic.
- Distinguish whether the heart rate is potentially life threatening and needing immediate attention. Provide rationale for your answer

Rhythm strips are attached to this page
Evaluate the following EKG strips and interpret the findings related to waveform/rhythms represented.

Rhythm strips are attached to this page
Complete the following crossword puzzle:
This will be re-done to represent questions related to NUR 217 content

ACROSS
1. A rhythm with a saw tooth base line is atrial ____________.

3. If there is ST elevation in leads II, III, and AVF the patient is having ischemic changes in the ____________ portion of the heart.

4. Second degree heart block Mobitz I is also called ________________.

5. If a person is having ischemic changes identified on an EKG, you should look for _______________ changes in opposing leads.

6. When the atria and ventricles are both contracting but independently of each other, it is known as ____________ degree heart block.

8. When the atria contract early, it may be a conducted or blocked ________.

9. If an irregular heart rhythm suddenly starts and stops, it is called ________________.

11. A _______________ PVC signifies that it is generated from one irritable spot in the ventricle.

12. _______________ is a common trigger for atrial arrhythmias.

13. Leads V 5 and 6 look at the ________________ section of the heart.

14. The P wave signifies contraction of the ____________.

DOWN
2. A spiral looking V-tach is significant for ________________.

7. If a person has a narrow (QRS) complex tachycardia, you know that it originates ________________.
10. If a patient is having increased ventricular ectopy (arrhythmias), you should check this electrolyte.
On the chest diagrams below, identify where the appropriate leads should be placed to accurately capture the electrical conduction of the cardiac system.
20 Multiple Choice Questions regarding rhythms and performing an EKG.
Title: Basic EKG Interpretation II

Course Number: NUR 218

Credits: 1

Date: Winter, 2014

Institution: CLACKAMAS COMMUNITY COLLEGE

Outline Developed by: Carol Thorn

Type of Program: Professional-Technical

Course Description:

This course builds upon the knowledge gained in NUR 217. The course will focus on the student’s ability to understand and recognize variations in the electrical conduction of the heart as evidenced by changes on the 12 lead EKG. The course will encompass the recognition and treatment modalities of sinus, atrial, junctional and ventricular rhythms as well as heart block. Recognition and treatment of electrical conduction problems related to ischemia, injury and drug/electrolyte imbalances will also be discussed.

Student Learning Outcomes:

Upon the successful completion of this course, the student should be able to:

- Identify normal and abnormal electrical conduction waveforms of sinus rhythms
- Identify normal and abnormal electrical conduction waveforms of atrial rhythms
- Identify normal and abnormal electrical conduction waveforms of ventricular rhythms
- Identify normal and abnormal electrical conduction waveforms of junctional rhythms
- Identify electrical conduction waveforms in various types of heart block
- Describe the determining factors in the use of different types of pacemakers
- Demonstrate recognition of changes on 12-lead EKG due to ischemia, injury, metabolic disorders
- Demonstrate understanding of causes and treatment modalities for various electrical conduction abnormalities related to electrolyte imbalance
- Demonstrate understanding of causes and treatment modalities for various electrical conduction abnormalities related to tissue ischemia, injury or necrosis

Length of Course: 11 lecture hours

Grading Method: Letter Grade Only (willing to do this letter grade or P/NP if better for Allied Health programs); Allow repeat

Prerequisites: Basic EKG Interpretation I

Co-requisites: None

Recommended: None

Major Topic Outline:
 Components of the EKG
- EKG Interpretation
  - Sinus rhythms
  - Atrial rhythms
  - Ventricular Rhythms
  - Heart Block
    - Ischemia, Injury and Changes due to Metabolic Disturbances
- Causes and treatment modalities of abnormal heart rhythms
Title: Basic EKG Interpretation II
Course Number: NUR 218
Credits: 1
Date: Spring, 2014

Institution: CLACKAMAS COMMUNITY COLLEGE

Outline Developed by: Carol Thorn

Type of Program: Professional-Technical

Course Description:
This course builds upon the knowledge gained in NUR 217. The course will focus on the student’s ability to understand and recognize variations in the electrical conduction of the heart as evidenced by changes on the 12 lead EKG. The course will encompass the recognition and treatment modalities of sinus, atrial, junctional and ventricular rhythms as well as heart block. Recognition and treatment of electrical conduction problems related to ischemia, injury and drug/electrolyte imbalances will also be discussed.

Student Learning Outcomes:
Upon the successful completion of this course, the student should be able to:
• Identify normal and abnormal electrical conduction waveforms of sinus rhythms
• Identify normal and abnormal electrical conduction waveforms of atrial rhythms
• Identify normal and abnormal electrical conduction waveforms of ventricular rhythms
• Identify normal and abnormal electrical conduction waveforms of junctional rhythms
• Identify electrical conduction waveforms in various types of heart block
• Describe the determining factors in the use of different types of pacemakers
• Demonstrate recognition of changes on 12-lead EKG due to ischemia, injury, metabolic disorders
• Demonstrate understanding of causes and treatment modalities for various electrical conduction abnormalities related to electrolyte imbalance
• Demonstrate understanding of causes and treatment modalities for various electrical conduction abnormalities related to tissue ischemia, injury or necrosis

Length of Course: 22 Lecture/Lab hours
Lecture: Mondays 1:30 – 3:20 pm
Lab: Thursdays 0800-0950am

Grading Method: Letter Grade or P/NP; Allow repeat

Prerequisites: Basic EKG Interpretation I
Co-requisites: None
Recommended: None
Major Topic Outline:

- Components of the EKG
- EKG Interpretation
  - Sinus rhythms
  - Atrial rhythms
  - Ventricular Rhythms
  - Heart Block
  - Ischemia, Injury and Changes due to Metabolic Disturbances
- Causes and treatment modalities of abnormal heart rhythms

Method of Evaluation:

<table>
<thead>
<tr>
<th>Evaluation Type</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Worksheets</td>
<td>10%</td>
</tr>
<tr>
<td>Quizzes</td>
<td>30%</td>
</tr>
<tr>
<td>Final</td>
<td>60%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
</tr>
</tbody>
</table>

Completion of 25 EKG's during term P/NP

Grading Scale:

- A 92-100%
- B 84-91%
- C 75-83%
- D 66-75%
- F Below 6-61%

If you do not achieve an average of 75% or higher, you will not pass Nursing 218. You will not be able to take the ECG Technician exam provided through NCCT.

Required Texts:

No required text for this course. Readings and handouts will be provided via Evolve and in class.

Methods of Instruction:

This course is taught in a lecture/discussion/interactive manner.

Theory Outline:

May 5th:

The focus of today's class will be:

- An overview of the course
- Review of material provided in NUR 217 related to:
  - Sinus rhythm, sinus abnormalities and basic treatment modalities
  - Atrial rhythms and basic treatment modalities
  - Ventricular rhythm and basic treatment modalities

The focus of this week's lab will be:

- Review of performing an EKG
- Recognition of normal and abnormal waveforms when performing an EKG related to the following rhythms:
  - Sinus rhythms
May 12th:
The focus of today's class will be:
- EKG Interpretation
  - Heart Block
    - First degree
    - Second Degree Mobitz I
    - Second Degree Mobitz II
    - Third Degree
- Causes and treatment modalities of heart block
- Pacemakers
  - Types of pacemakers
    - Ventricular
    - Atrial
    - Atrial/Ventricular
  - Common problems with pacemakers
    - Failure to sense
    - Failure to capture

The focus of this week’s lab will be:
- Performing an EKG
- Recognition of normal and abnormal waveforms when performing an EKG related to the following rhythms:
  - First degree heart block
  - Second Degree Mobitz I
  - Second Degree Mobitz II
  - Third Degree
  - Paced rhythms

May 19th:
The focus of today's class will be:
- EKG Interpretation
  - Changes on the EKG due to:
    - Ischemia
    - Injury
    - Necrosis
    - Drug/electrolyte effects
      - Digoxin
      - Psychotropic medications
      - Potassium
      - Calcium

The focus of this week’s lab will be:
- Performing an EKG
- Recognition of normal and abnormal waveforms when performing an EKG related to the following rhythms:
  - EKG changes related to cardiac ischemia
• EKG changes related to cardiac injury
• EKG changes related to cardiac necrosis
• EKG changes related to drug/electrolyte effects
  o Digoxin
  o Psychotropic medications
  o Potassium
  o Calcium

**May 26th:**
The focus of today’s class will be:
  • Enjoying your Memorial Day Holiday 😊

The focus of this week’s lab will be:
  • Open lab time to practice performing an EKG and recognition of waveforms

**June 2nd:**
The focus of today’s class will be:
  • Review of course material in preparation of final exam

**June 9th:**
The focus of today’s class will be:
  • Final Exam
NUR-218 EKG II Lesson Plan:

May 5th:
The focus of today’s class will be:
- An overview of the course
- Review of material provided in NUR 217 related to:
  - Sinus rhythm, sinus abnormalities and basic treatment modalities
  - Atrial rhythms and basic treatment modalities
  - Ventricular rhythm and basic treatment modalities

The focus of this week’s lab will be:
- Review of performing an EKG
- Recognition of normal and abnormal waveforms when performing an EKG related to the following rhythms:
  - Sinus rhythms
  - Atrial rhythms
  - Ventricular rhythms

May 12th:
The focus of today’s class will be:
- EKG Interpretation
  - Heart Block
    - First degree
    - Second Degree Mobitz I
    - Second Degree Mobitz II
    - Third Degree
- Causes and treatment modalities of heart block
- Pacemakers
  - Types of pacemakers
    - Ventricular
    - Atrial
    - Atrial/Ventricular
  - Common problems with pacemakers
    - Failure to sense
    - Failure to capture

The focus of this week’s lab will be:
- Performing an EKG
- Recognition of normal and abnormal waveforms when performing an EKG related to the following rhythms:
  - First degree heart block
  - Second Degree Mobitz I
  - Second Degree Mobitz II
  - Third Degree
  - Paced rhythms
May 19th:
The focus of today’s class will be:
  - EKG Interpretation
    - Changes on the EKG due to:
      - Ischemia
      - Injury
      - Necrosis
      - Drug/electrolyte effects
        - Digoxin
        - Psychotropic medications
        - Potassium
        - Calcium

The focus of this week’s lab will be:
  - Performing an EKG
  - Recognition of normal and abnormal waveforms when performing an EKG related to the following rhythms:
    - EKG changes related to cardiac ischemia
    - EKG changes related to cardiac injury
    - EKG changes related to cardiac necrosis
    - EKG changes related to drug/electrolyte effects
      - Digoxin
      - Psychotropic medications
      - Potassium
      - Calcium

May 26th:
The focus of today’s class will be:
  - Enjoying your Memorial Day Holiday 😊

The focus of this week’s lab will be:
  - Open lab time to practice performing an EKG and recognition of waveforms

June 2nd:
The focus of today’s class will be:
  - Review of course material in preparation of final exam

June 9th:
The focus of today’s class will be:
  - Final Exam
PRACTICE SHEET FOR CHAPTER 7
Heart Blocks

7.1
Regularity: 
Rate: 
P Waves: 
PRI: 
QRS: 
Interp: 

7.2
Regularity: 
Rate: 
P Waves: 
PRI: 
QRS: 
Interp: 

168 CHAPTER 7 Heart Blocks
7.3

Regularity: 
Rate: 
P Waves: 
PRI: 
QRS: 
Interp: 

7.4

Regularity: 
Rate: 
P Waves: 
PRI: 
QRS: 
Interp: 

CHAPTER 7 Heart Blocks 169
7.9

Regularity: 
Rate: 
P Waves: 
PRI: 
QRS: 
Interp: 

7.10

Regularity: 
Rate: 
P Waves: 
PRI: 
QRS: 
Interp: 

CHAPTER 7 Heart Blocks
RHYTHM STRIP INTERPRETATION

Identify which of the following rhythms represent:

First degree heart block

Second degree heart block Mobitz I

Second degree heart block Mobitz II

Third degree heart block

Ventricular tachycardia

Atrial flutter

Ventricular paced rhythm

Atrio/ventricular sequentially paced rhythm

Copies of rhythms are placed on this form...
Evaluate the following EKG strips and interpret the findings related to waveform/rhythms represented.

Rhythm strips are attached to this page
Complete the following crossword puzzle:
This will be re-done to represent questions related to NUR 218 content

ACROSS
1. A rhythm with a saw tooth base line is atrial ____________.

3. If there is ST elevation in leads II, III, and AVF the patient is having ischemic changes in the ____________ portion of the heart.

4. Second degree heart block Mobitz I is also called ______________.

5. If a person is having ischemic changes identified on an EKG, you should look for _______________ changes in opposing leads.

6. When the atria and ventricles are both contracting but independently of each other, it is known as _____________ degree heart block.

8. When the atria contract early, it may be a conducted or blocked ________.

9. If an irregular heart rhythm suddenly starts and stops, it is called ________________.

11. A _________________ PVC signifies that it is generated from one irritable spot in the ventricle.

12. _________________ is a common trigger for atrial arrhythmias.

13. Leads V 5 and 6 look at the ________________ section of the heart.

14. The P wave signifies contraction of the ____________.

DOWN
2. A spiral looking V-tach is significant for ________________.

7. If a person has a narrow (QRS) complex tachycardia, you know that it originates ________________.

10. If a patient is having increased ventricular ectopy (arrhythmias), you should check this electrolyte.
Related to the following EKGs:

- Diagnose the rhythm
- Determine if this is a life threatening rhythm or not. What is the responsibility to the person obtaining &/or monitoring the EKG
- Identify potential underlying causes for the rhythm
- Determine appropriate treatment modalities for this rhythm

In relation to pacemakers, describe the difference between 'failure to sense' and 'failure to capture'.
30 Multiple Choice Questions regarding various rhythms, treatment modalities.