# HSCI 0030 - FUNCTIONAL ANATOMY AND PATHOPHYSIOLOGY FOR EMS PROFESSIONALS

## Catalog Description

Prerequisite: Completion of HSCI 2 with grade of "C" or better, or current state certification as an Emergency Medical Technician
Hours: 54 lecture
Description: Designed for students pursuing careers in Emergency Medical Services (EMS) and advanced levels of prehospital care. Provides overview of functional anatomy, symptomology and pathophysiology of disease, medical emergencies, and effects of traumatic injuries. EMS management and review of field treatment protocols enhance ability to treat and stabilize emergency medical situations in the field. (CSU)

## Course Student Learning Outcomes

- CSLO #1: Compare and contrast pathophysiology and etiology of diseases with related symptomology.
- CSLO #2: Explain the different functions of human systems.
- CSLO #3: Describe the effects of diseases and/or injury of human systems.
- CSLO #4: Explain the symptomology associated with diseases and injury of the human systems.
- CSLO #5: Identify the different field treatment protocols for associated diseases and injury of human systems.

## Effective Term

Fall 2023

## Course Type

Credit - Degree-applicable

## Contact Hours

54

## Outside of Class Hours

108

## Total Student Learning Hours

162

## Course Objectives

1. Define the basic terminology used in the study of human diseases.
2. Define the pathophysiology and etiology of diseases.
3. Name the organelle contained within the typical animal cell.
4. Describe the basic structure, components and function of an organelle.
5. Identify terminology related to the mechanisms of human disease.
6. Describe the process of cell/tissue injury, adaptation, and death.
7. Identify the progression of cancer development.
8. Describe the symptomology of different cancers.
9. Describe the basic defense mechanisms in the body.
10. Identify the process of tissue repair and healing.
11. Identify complications of wound healing.
12. Describe the physiological maintenance of body fluid and acid base balance.
13. Describe the symptomology of altered body fluid and acid base balance.
14. Identify common interventions for fluid and acid base imbalances.
15. Define the term shock.
16. Identify four classifications of shock and how the cardiovascular system is affected.
17. Describe the symptomology of shock and important assessment findings.
18. Discuss the basic anatomy and physiology of the respiratory system.
19. Define the terms common to respiratory system disorders.
20. Identify the common disorders of the respiratory system.
21. Identify the symptomology associated with respiratory disorders.
22. Describe the common diagnostics test used to determine respiratory disorders.
23. Describe the typical treatment protocols for common respiratory disorders.
24. Discuss the basic anatomy and physiology of the cardiovascular system.
25. Identify common disorders of the cardiovascular system.
26. Identify the symptomology common to cardiovascular system disorders.
27. Describe typical treatment protocols for common cardiovascular disorders.
28. Discuss basic anatomy and physiology of the nervous system.
29. Identify the symptomology of common nervous system disorders.
30. Describe typical treatment protocols for common nervous system disorders.
31. Discuss the anatomy and physiology of the musculoskeletal system.
32. Define common terminology of the musculoskeletal system and disorders.
33. Identify common disorders and trauma of the musculoskeletal system.
34. Identify the symptomology of the musculoskeletal disorders and trauma.
35. Discuss the basic anatomy and physiology of the endocrine system.
36. Discuss the symptomology of endocrine system disorders.
37. Describe the typical treatment protocols for common endocrine disorders.
38. Discuss the anatomy and physiology of the immune and lymphatic system.
39. Identify sign and symptoms of immune and lymphatic system disorders.
40. Describe typical treatment protocols for immune system lymphatic disorders.
41. Discuss the basic anatomy and physiology of the digestive system.
42. Identify the signs and symptoms common to digestive system disorders.
43. Discuss the treatment protocols for common digestive system disorders.
44. Describe the effects of aging upon the digestive system and related disorders.
45. Describe the basic anatomy and physiology of the renal and urologic system.
46. Identify the symptomology associated with renal and urologic disorders.
47. Discuss management and treatment protocols of renal and urologic disorders.

48. Describe effects of aging and disorders of the renal and urologic system.
49. Describe four routes of entry for toxins into the system.
50. Describe the four steps in the management of toxicological emergencies.
51. Describe the pathology, signs, and management of five different toxidromes.
52. Describe pathology, signs and treatment protocols of substance abuse.
53. Describe pathology, signs and treatment protocols of chemical poisoning.
54. Describe pathology, signs and management of stings, bites, and injections.
55. Describe the basic anatomy and physiology of the hematologic system.
56. Describe the common signs and symptoms of hematologic disorders.
57. Discuss the basic anatomy and physiology of the integumentary system.
58. Discuss common disorders of the integumentary system.
59. Identify the symptomology associated with integumentary system disorders.
60. Discuss basic anatomy and physiology of the eyes and ears.
61. Describe the typical trauma injuries to the eye and the injury pathologies.
62. Describe the physiology of the thermoregulatory mechanism.
63. Define the signs, symptoms, and pathophysiology of heat related conditions.
64. Define the signs, symptoms, and pathophysiology of cold related conditions.
65. Define the signs and pathophysiology for drowning and diving accidents.
66. Describe the normal physiological changes that occur at high altitudes.
67. Define signs, symptoms, and pathophysiology of high altitude conditions.
68. Describe the signs and symptoms associated with mental health disorders.
69. Describe the management and treatment protocols for mental health disorders.
70. Discuss the basic anatomy and physiology of the reproductive systems.
71. Identify the signs and symptoms of reproductive system disorders.
72. Identify treatment protocols and management of reproductive system disorders.
73. Describe the physiological changes that occur throughout the pregnancy.
74. Describe the pathophysiology of complications and disorders during pregnancy.
75. Describe the common complications and treatment protocols during delivery.
76. Describe the pathology and management of postpartum complications.
77. Describe the complications and symptomology of trauma during pregnancy.
78. Identify common signs and symptoms associated with pediatric diseases.
79. Discuss the pathology of pediatric diseases and disorders common to children.
80. Discuss the management and treatment protocols of pediatric emergencies.

# General Education Information

- Approved College Associate Degree GE Applicability
- CSU GE Applicability (Recommended-requires CSU approval)
- Cal-GETC Applicability (Recommended - Requires External Approval)
- IGETC Applicability (Recommended-requires CSU/UC approval)

# Articulation Information

- CSU Transferable

# Methods of Evaluation

- Essay Examinations
  - Example: In an essay, students will describe primary signs and symptoms of hemodynamic instability associated with an intertrochanteric fracture of the proximal femur.
- Objective Examinations
  - Example: Students will take a multiple-choice examination on EKG rhythms. Standard Grading. Example Question: Which of the following rhythms would be corrected with 6-12mg of adenosine? A. Complete 3rd degree heart block, B. Supra-ventricular Tachycardia, C. Sinus Bradycardia with junctional escape beats, D. Sinus rhythm with premature ventricular contractions.

# Repeatable

No

# Methods of Instruction

- Lecture/Discussion
- Distance Learning

Lecture:

1. The instructor will explain the pathophysiology of shock and demonstrate the concept mapping and symptomology of altered body fluids and acid base balance. Student will explain the symptomology and assessment findings of inadequate perfusion, and identify the different classifications of distributed and obstructive shock.
2. The instructor will divide students into groups to utilize a cardiac monitor with lead II and twelve lead capabilities, and equipped with cardiac rhythm simulator. Students will be asked to identify and differentiate the different rhythms, and identify the electrophysiology of each rhythm and the associated cardiac pathology.

Distance Learning

1. Online lecture on the progression of cancer development, followed by students writing a report on the progression of cancer and posting for comments. Use of the discussion board tp facilitate critical thinking and group discussion. Students will be required to respond to a minimum of 2 others students initial responses which will allow for interaction between students and the instructor.

# Typical Out of Class Assignments

## Reading Assignments

1. Read the chapter on cellular and tissue injury and review the case study with extremity entrapment. Answer the questions from the case study exercise and provide a summary of the expected signs and symptoms based on the patients injury pathology. 2. Read the assigned

chapter on the circulatory system and cardiac physiology to prepare for class discussion on EKG interpretation and arrhythmia recognition.

## Writing, Problem Solving or Performance

1. Working in assigned groups, identify the patient symptomology and provide the concept mapping associated with acute respiratory distress disorders. 2. Working with an assigned partner, students will identify the symptomology of musculoskeletal disorders, and demonstrate a common diagnostic test for field assessment of traumatic musculoskeletal injuries.

## Other (Term projects, research papers, portfolios, etc.)

## Required Materials

- Anatomy and Physiology for the Prehospital Care Provider
  - Author: Kirsten M. Elling, Bob Elling
  - Publisher: Jones and Bartlett
  - Publication Date: 2015
  - Text Edition: 2nd
  - Classic Textbook?:
  - OER Link:
  - OER:
- Pathophysiology for Paramedic and EMTs
  - Author: Kirsten M. Elling, Bob Elling
  - Publisher: Jones and Bartlett
  - Publication Date: 2008
  - Text Edition: 1st
  - Classic Textbook?:
  - OER Link:
  - OER:
- Emergency Care and Transportation of the Sick and Injured
  - Author: American Academy of Orthopedic Surgeons
  - Publisher: Jones and Bartlett
  - Publication Date: 2016
  - Text Edition: 11th
  - Classic Textbook?:
  - OER Link:
  - OER:

## Other materials and-or supplies required of students that contribute to the cost of the course.