

- l. Describe how the heart's pacemaking control, rate, and rhythm are determined.
- m. Explain the physiological basis of conduction delay in the AV node.
- n. Define the functional properties of cardiac muscle.
- o. Define the events comprising electrical potential.
- p. List the most important ions involved in myocardial action potential and their primary function in this process.
- q. Describe the events involved in the steps from excitation to contraction of cardiac muscle fibers.
- r. Describe the clinical significance of Starling's law.
- s. Identify the structures of the autonomic nervous system (ANS).
- t. Identify the effect of the ANS on heart rate, rhythm, and contractility.
- u. Give examples of positive and negative inotropism, chronotropism, and dromotropism.
- v. Discuss the pathophysiology of cardiac disease and injury

- w. Describe the details of inspection, auscultation, and palpation specific to the cardiovascular system.
- x. Define pulse deficit, pulsus paradoxus, and pulsus alternans.
- y. Identify the normal characteristics of the point of maximal impulse (PMI).
- z. Differentiate between the heart sounds.
- aa. Relate heart sounds to hemodynamic events in the cardiac cycle.
- bb. Describe the differences between normal and abnormal heart sounds.
- cc. Describe the components of the focused history as they relate to the patient with cardiovascular compromise.
- dd. Explain the purpose of ECG monitoring.
- ee. Describe how ECG wave forms are produced.
- ff. Compare the electrophysiological and hemodynamic events occurring throughout the entire cardiac cycle with the various ECG wave forms, segments, and intervals.
- gg. Identify how heart rates, durations, and amplitudes may be determined from ECG recordings.
- hh. Relate the cardiac surfaces or areas represented by the ECG leads.
- ii. Given an ECG, identify the arrhythmia.
- jj. Identify the limitations to the ECG.
- kk. Differentiate among the primary mechanisms responsible for producing cardiac arrhythmias.
- ll. Describe a systematic approach to the analysis and interpretation of cardiac arrhythmias.
- mm. Describe the arrhythmias originating in the sinus node, AV junction, atria, and ventricles.
- nn. Describe the arrhythmias originating or sustained in the AV junction.
- oo. Describe the abnormalities originating within the bundle branch system.
- pp. Describe the process of differentiating wide QRS complex tachycardias.
- qq. Recognize the pitfalls in the differentiation of wide QRS complex tachycardias.
- rr. Describe the conditions of pulseless electrical activity.
- ss. Describe the phenomena of reentry, aberration, and accessory pathways.
- tt. Identify the ECG changes characteristically produced by electrolyte imbalances,

and specify the clinical implications.

uu. Identify patient situations where ECG rhythm analysis is indicated.

vv. Recognize the changes on the ECG that may reflect evidence of myocardial ischemia and injury.

ww. Recognize the limitations of the ECG in reflecting evidence of myocardial ischemia and injury.

xx. Compare abnormal ECG findings with clinical interpretation.

yy. Identify the major therapeutic objectives in the treatment of the patient with any arrhythmia.

zz. Identify the major mechanical, pharmacological, and electrical therapeutic interventions.

aaa. Based on field impressions, identify the need for rapid intervention for the patient in cardiovascular compromise.

bbb. Describe the incidence, morbidity, and mortality associated with myocardial conduction defects.

ccc. Describe the epidemiology, morbidity and mortality, and pathophysiology of angina pectoris.

ddd. Describe the assessment parameters to be evaluated in a patient with angina pectoris.

eee. Identify what is meant by the OPQRST of chest pain assessment.

fff. List other clinical conditions that may mimic signs and symptoms of coronary artery disease and angina pectoris.

ggg. Identify the ECG findings in patients with angina pectoris.

hhh. Identify the paramedic responsibilities associated with management of the patient with angina pectoris.

iii. Based on the pathophysiology and clinical evaluation of the patient with chest pain, list the anticipated clinical problems according to their life-threatening potential.

jjj. Describe the epidemiology, morbidity, and mortality of myocardial infarction.

kkk. List the mechanisms by which an MI may be produced by traumatic and nontraumatic events.

lll. Identify the primary hemodynamic changes produced in myocardial infarction.

mmm. Describe the assessment parameters to be evaluated in a patient with a suspected myocardial infarction.

nnn. Identify the anticipated clinical presentation of a patient with a suspected acute myocardial infarction.

ooo. Differentiate the characteristics of the pain/discomfort occurring in angina pectoris and acute myocardial infarction.

ppp. Identify the ECG changes characteristically seen during evolution of an acute myocardial infarction.

qqq. Identify the most common complications of an acute myocardial infarction.

rrr. Define the term "cardiac arrest."

sss. Identify the characteristics of patient population at risk for developing cardiac arrest from cardiac causes.

ttt. Identify noncardiac causes of cardiac arrest.

uuu. Describe the arrhythmias seen in cardiac arrest.

- vvv. Identify the critical actions necessary in caring for the patient with cardiac arrest.
- www. Explain how to confirm asystole using the 3-lead ECG.
- xxx. Define the terms defibrillation and synchronized cardioversion.
- yyy. Specify the methods of supporting the patient with a suspected ineffective implanted defibrillation device.
- zzz. Describe the most commonly used pharmacological agents in the managements of cardiac arrest in terms of therapeutic effects.
- aaaa. Identify resuscitation.
- bbbb. Identify circumstances and situations where resuscitation efforts would not be initiated.
- cccc. Identify the inclusion and exclusion criteria for termination of resuscitation efforts.
- dddd. Identify communication and documentation protocols with medical direction and law enforcement used for termination of resuscitation efforts.
- eeee. Based on the pathophysiology and clinical evaluation of the patient with chest pain, characterize the clinical problems according to their life-threatening potential.
- ffff. Apply knowledge of the epidemiology of cardiovascular disease to develop
- gggg. Integrate pathophysiological principles into the assessment of a patient with cardiovascular disease.
- hhhh. Apply knowledge of the epidemiology of cardiovascular disease to develop prevention strategies.
- iiii. Integrate pathophysiological principles into the assessment of a patient with cardiovascular disease.
- jjjj. Synthesize patient history, assessment findings, and ECG analysis to form a field impression for the patient with cardiovascular disease.
- kkkk. Based on the pathophysiology and clinical evaluation of the patient with chest pain, list the clinical problems according to their life-threatening potential.
- llll. Integrate pathophysiological principles to the assessment of a patient with chest pain.
- mmmm. Synthesize patient history, assessment findings, and ECG analysis to form a field impression for the patient with angina pectoris.
- nnnn. Formulate a treatment plan based on the field impression for the patient with chest pain.
- oooo. Integrate pathophysiological principles to the assessment of a patient with a suspected myocardial infarction.
- pppp. Synthesize patient history, assessment findings, and ECG analysis to form a field impression for the patient with a suspected myocardial infarction.
- qqqq. Formulate a treatment plan based on the field impression for the suspected myocardial infarction patient.
- rrrr. Integrate the pathophysiological principles to the assessment of the patient with cardiac arrest.
- ssss. Synthesize assessment findings to formulate a rapid intervention for a patient in cardiac arrest.
- tttt. Synthesize assessment findings to formulate the termination of resuscitative efforts for a patient in cardiac arrest.
- uuuu. Integrate pathophysiological principles to the assessment and field management of

a patient with chest pain.

vvvv. Demonstrate the sense of urgency for initial assessment and intervention in the patient with cardiac compromise.

www. Discuss patient situations where ECG rhythm analysis is indicated.

xxxx. Based on the pathophysiology and clinical evaluation of the patient with acute myocardial infarction, list the clinical problems according to their life-threatening potential.

yyyy. Discuss the measures that may be taken to prevent or minimize complications in the patient with a suspected myocardial infarction.

zzzz. Demonstrate the urgency in rapid determination of and rapid intervention of patients in cardiac arrest.

aaaa. Discuss the possibility of termination of resuscitative efforts in the out-of-hospital setting.

2. Demonstrate the pathophysiology principles and assessment findings to formulate a field impression and implement the treatment plan for the patient with cardiovascular disease.

(EMS2, EMS3, EMS4, EMS5, EMS7, EMS8, EMS9, EMS10, EMS11)

a. Demonstrate how to set and adjust the ECG monitor settings to varying patient situations.

b. Demonstrate a working knowledge of various ECG lead systems.

c. Demonstrate how to record an ECG.

d. Demonstrate satisfactory performance of psychomotor skills of basic and advanced life support techniques according to the current American Heart Association Standards and Guidelines, including the following:

(1) Cardiopulmonary resuscitation

(2) Defibrillation

e. Complete a communication patch with medical direction and law enforcement used for termination of resuscitation efforts.

f. Demonstrate how to evaluate major peripheral arterial pulses.

3. Explain pathophysiological principles and assessment findings to formulate a field impression and implement the treatment plan for the patient with chronic cardiovascular disease. (EMS2, EMS3, EMS4, EMS5, EMS7, EMS8, EMS9, EMS10, EMS11)

a. Identify the clinical indications for transcutaneous and permanent artificial cardiac pacing.

b. Describe the components and the functions of a transcutaneous pacing system.

c. Explain what each setting and indicator on a transcutaneous pacing system represents and how the settings may be adjusted.

d. Describe the techniques of applying a transcutaneous pacing system.

e. Describe the characteristics of an implanted pacemaking system.

f. Describe artifacts that may cause confusion when evaluating the ECG of a patient with a pacemaker.

g. List the possible complications of pacing.

h. List the causes and implications of pacemaker failure.

i. Identify additional hazards that interfere with artificial pacemaker function.

j. Recognize the complications of artificial pacemakers as evidenced on ECG.

k. List the characteristics of a patient eligible for thrombolytic therapy.

l. Describe the “window of opportunity” as it pertains to reperfusion of a myocardial

injury or infarction.

m. Based on the pathophysiology and clinical evaluation of the patient with a suspected acute myocardial infarction, list the anticipated clinical problems according to their life-threatening potential.

n. Specify the measures that may be taken to prevent or minimize complications in the patient suspected of myocardial infarction.

o. Describe the most commonly used cardiac drugs in terms of therapeutic effect and dosages, routes of administration, side effects, and toxic effects.

p. Describe the epidemiology, morbidity, and mortality of heart failure.

q. Define the principal causes and terminology associated with heart failure.

r. Identify the factors that may precipitate or aggravate heart failure.

s. Describe the physiological effects of heart failure.

t. Define the term "acute pulmonary edema," and describe its relationship to left ventricular failure.

u. Define preload, afterload, and left ventricular end-diastolic pressure, and relate each to the pathophysiology of heart failure.

v. Differentiate between early and late signs and symptoms of left ventricular failure and those of right ventricular failure.

w. Explain the clinical significance of paroxysmal nocturnal dyspnea.

x. Explain the clinical significance of edema of the extremities and sacrum.

y. List the interventions prescribed for the patient in acute congestive heart failure.

z. Describe the most commonly used pharmacological agents in the management of congestive heart failure in terms of therapeutic effect, dosages, routes of administration, side effects, and toxic effects.

aa. Define the term "cardiac tamponade."

bb. List the mechanisms by which cardiac tamponade may be produced by traumatic and nontraumatic events.

cc. Identify the limiting factor of pericardial anatomy that determines intrapericardiac pressure.

dd. Identify the clinical criteria specific to cardiac tamponade.

ee. Describe how to determine if pulsus paradoxus, pulsus alternans, or electrical alternans is present.

ff. Identify the paramedic responsibilities associated with management of a patient with cardiac tamponade.

gg. Describe the incidence, morbidity, and mortality of hypertensive emergencies.

hh. Define the term "hypertensive emergency."

ii. Identify the characteristics of the patient population at risk for developing a hypertensive emergency.

jj. Explain the essential pathophysiological defect of hypertension in terms of Starling's law of the heart.

kk. Identify the progressive vascular changes associated with sustained hypertension.

ll. Describe the clinical features of the patient in a hypertensive emergency.

mm. Rank the clinical problems of patients in hypertensive emergencies according to their sense of urgency.

- nn. From the priority of clinical problems identified, state the management responsibilities for the patient with a hypertensive emergency.
- oo. Identify the drugs of choice for hypertensive emergencies, rationale for use, clinical precautions, and disadvantages of selected antihypertensive agents.
- pp. Correlate abnormal findings with clinical interpretation of the patient with a hypertensive emergency.
- qq. Define the term “cardiogenic shock.”
- rr. Describe the major systemic effects of reduced tissue perfusion caused by cardiogenic shock.
- ss. Explain the primary mechanisms by which the heart may compensate for a diminished cardiac output, and describe their efficiency in cardiogenic shock.
- tt. Differentiate progressive stages of cardiogenic shock.
- uu. Identify the clinical criteria for cardiogenic shock.
- vv. Describe the characteristics of patients most likely to develop cardiogenic shock.
- ww. Describe the most commonly used pharmacological agents in the management of cardiogenic shock in terms of therapeutic effects, dosages, routes of administration, side effects, and toxic effects.
- xx. Correlate abnormal findings with clinical assessment of the patient in cardiogenic

shock.

- yy. Identify the paramedic responsibilities associated with management of a patient in cardiogenic shock.
- zz. Describe the incidence, morbidity, and mortality of vascular disorders.
- aaa. Describe the pathophysiology of vascular disorders.
- bbb. List the traumatic and nontraumatic causes of vascular disorders.
- ccc. Define the terms “aneurysm,” “claudication,” and “phlebitis.”
- ddd. Identify the peripheral arteries most commonly affected by occlusive disease.
- eee. Identify the major factors involved in the pathophysiology of aortic aneurysm.
- fff. Recognize the usual order of signs and symptoms that develop following peripheral artery occlusion.
- ggg. Identify the clinical significance of claudication and presence of arterial bruits in a patient with peripheral vascular disorders.
- hhh. Describe the clinical significance of unequal arterial blood pressure readings in the arms.
- iii. Recognize the signs and symptoms of dissecting thoracic or abdominal aneurysm.
- jjj. Describe the significant elements of the patient history in a patient with vascular disease.
- kkk. Identify the hemodynamic effects of vascular disorders.
- lll. Identify the complications of vascular disorders.
- mmm. Identify the paramedic’s responsibilities associated with management of patients with vascular disorders.
- nnn. Formulate a treatment plan based on the field impression for the patient with vascular disorders.
- ooo. Differentiate among signs and symptoms of cardiac tamponade, hypertensive emergencies, cardiogenic shock, and cardiac arrest.

- ppp. Integrate pathophysiological principles to the assessment of a patient in need of a pacemaker.
- qqq. Synthesize patient history, assessment findings, and ECG analysis to form a field impression for the patient in need of a pacemaker.
- rrr. Formulate a treatment plan based on field impression for the patient in need of a pacemaker.
- sss. Integrate pathophysiological principles to the assessment of the patient with heart failure.
- ttt. Synthesize assessment findings and patient history information to form a field impression of the patient with heart failure.
- uuu. Formulate a treatment plan based on the field impression for the heart failure patient.
- vvv. Integrate pathophysiological principles to the assessment of a patient with cardiac tamponade.
- www. Synthesize assessment findings and patient history information to form a field impression of the patient with cardiac tamponade.
- xxx. Formulate a treatment plan based on the field impression for the patient with cardiac tamponade.
- yyy. Integrate pathophysiological principles to the assessment of the patient with a hypertensive emergency.
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- zzz. Synthesize assessment findings and patient history information to form a field impression of the patient with a hypertensive emergency.
- aaaa. Formulate a treatment plan based on the field impression for the patient with a hypertensive emergency.
- bbbb. Integrate pathophysiological principles to the assessment of the patient with cardiogenic shock.
- cccc. Synthesize assessment findings and patient history information to form a field impression of the patient with cardiogenic shock.
- dddd. Formulate a treatment plan based on the field impression for the patient with cardiogenic shock.
- eeee. Integrate pathophysiological principles to the assessment of a patient with vascular disorders.
- ffff. Synthesize assessment findings and patient history to form a field impression for the patient with vascular disorders.
- gggg. Recognize the sense of urgency necessary to protect the window of opportunity for reperfusion in the patient with suspected myocardial infarction.
- hhhh. Recognize the application of transcutaneous pacing system.
- iiii. Recognize the urgency in identifying pacemaker malfunction.
- jjjj. Discuss the urgency based on the severity of the patient's clinical problems in a hypertensive emergency.
- kkkk. From the priority of clinical problems identified, state the management responsibilities for the patient with a hypertensive emergency.
- llll. Based on the pathophysiology and clinical evaluation of the patient with vascular disorders, characterize the clinical problems according to their life-threatening

potential.

mmmm. Recognize the sense of urgency in identifying peripheral vascular occlusion.

nnnn. Recognize the sense of urgency in recognizing signs of aortic aneurysm.

oooo. Describe infectious diseases of the heart, to include endocarditis and pericarditis.

4. Demonstrate pathophysiological principles and assessment findings to formulate a field impression and implement the treatments plan for the patient with chronic cardiovascular disease. (EMS2, EMS3, EMS4, EMS5, EMS7, EMS8, EMS9, EMS10, EMS11)

a. Apply a transcutaneous pacing system.

b. Given the model of a patient with signs and symptoms of heart failure, position the patient to afford comfort and relief.

c. Demonstrate how to determine if pulsus paradoxus, pulsus alternans, or electrical alternans is present.

d. Demonstrate satisfactory performance of psychomotor skills of basic and advanced life support techniques according to the current American Heart Association Standards and Guidelines, including the following:

(1) Cardiopulmonary resuscitation

(2) Defibrillation

(3) Synchronized cardioversion

(4) Transcutaneous pacing

(5) Mechanical CPR devices

(6) External carotid massage

5. Demonstrate correct application and interpretation of 12-lead ECGs. (EMS2, EMS3, EMS4, EMS10)

a. Perform a 12-lead ECG.

b. Identify the 12-lead ECG changes characteristically seen during an acute myocardial infarction including anterior MI, septal MI, lateral MI, inferior MI, posterior MI, right ventricular infarction, STEMI, and any combination of the MIs together.

c. Identify the 12-lead ECG changes caused by an old myocardial infarction.

d. Identify the 12-lead ECG changes seen with bundle branch blocks.

e. Identify the 12-lead ECG changes seen with fascicular blocks.

f. Identify the 12-lead ECG changes seen with atrial enlargement.

g. Identify the 12-lead ECG changes seen with ventricular enlargement.

h. Identify the 12-lead ECG changes commonly seen with electrolyte abnormalities.

i. Identify the 12-lead ECG changes commonly seen with drug effects.

j. Identify the electrical axis seen on 12-lead ECGs.

k. Identify the 12-lead ECG effects commonly seen with hypothermia.

l. Identify the 12-lead ECG effects seen with WPW pattern and syndrome.

m. Identify the 12-lead ECG effects seen with LGL syndrome.

n. Identify a prolonged QT interval on a 12-lead ECG.

o. Identify an Osborn wave on a 12-lead ECG.

p. Discuss causes and treatments of ECG abnormalities.

Attendance: per Health Science and CCC school policy.

Absence from Class for School Sanctioned Activities

The nature of the educational programs at Coahoma Community College is such that it is necessary for every student to attend class regularly. Instructors will keep accurate class attendance records, and those records will become part of the student's official record. Regular class attendance and punctuality are expected. All arrangements for completing missed work are to be made with the instructor. It is the student's responsibility to initiate these arrangements. *Excessive absences may result in loss of credit for the course concerned as well as loss of grant refunds and/or financial aid eligibility.* For more information, see the Attendance Policy section in the College Catalog.

Make-up Policy:

The student will be allowed one (1) make-up exam for any major exam missed in a given semester. No additional make-up exam shall be given beyond this.

Academic Dishonesty:

Cheating and plagiarism (the representation of someone else's work as your own, usually by directly copying or paraphrasing without a reference to the original source) will not be tolerated. The penalty will be receiving a (0) for that assignment, without any possibility of make-up work or alternative assignments. Additionally, according to the Student Handbook, *such acts will be considered a severe infraction and carry a possible sanction of suspension in semester (s) length or expulsion.* For a more in-depth explanation of academic dishonesty, see the Student Handbook.

Electronic Devices in Class

The use of cellular phones, pagers, CD players, radios, and similar devices is prohibited in the classroom and laboratory facilities.

Non-Discrimination/Disability Policy:

Notice of Non-discrimination. Coahoma Community College does not discriminate on the basis of race, color, national origin, sex, disability, or age in its programs and activities. The following person has been designated to handle inquiries regarding the non-discrimination policies: Michael Houston; Coordinator for Section 504/ADA, Title IX; Vivian M. Presley Administration Bldg, 3240 Friars Point Road; Clarksdale, MS 38614; Telephone # (662) 621-4853; Email: mhouston@coahomacc.edu

Accommodations for Students with Disabilities.

Disability Support Services Coordinator has established open hours when students, staff and faculty may drop in without an appointment. Appointments can be made by call (662) 621-4853 or by email to mhouston@coahomacc.edu

Michael Houston

Disability Support Services Coordinator
Vivian M. Presley Administration Building
(662) 621-4853
mhouston@coahomacc.edu

Instructional Techniques:

Instructors may use many different methods of instruction, to include power-point, video presentations, hands-on participation in the skills lab and any other training aid the instructor feels would benefit the student, given the material being presented at that time, provided there is no unnecessary exposure of the student to risk.

Method(s) of Evaluation:

Didactic and psychomotor examinations at regular intervals throughout each semester. Such evaluations will be a direct measurement of the students' level of retention of the material. *(Method(s) of evaluation must measure the student learning outcomes listed above.)*

Grade Scale:

Coahoma Community College changed from the 3.0 system to the 4.0 system effective, September, 1974. College students' academic progress is evaluated according to the following grading system.

Grading Scale for Paramedic		
Grade	Scale	Quality Points
A – Excellent	95-100	4.0
B – Good	87-94	3.0
C – Average	80-86	2.0
D – Poor	70-79	1.0
F - Failure	69 or below	0.0
I – Incomplete		0.0
W – Withdrawal		0.0
Z – Unassigned Grade		0.0

Failure to attain a course grade of “C” or 80% will prevent the student from progressing to the next scheduled semester in the Paramedic Program. 80% will be considered the “cut score” for all major assignments.

To be in good academic standing, students are required to maintain a cumulative 2.0 average on the 4.0 system. Each grade reported as having been earned by the student at the end of a semester or summer term will be included in computing the cumulative grade point average. The student should observe that the grade “F” carries zero quality points and will be included in the computation. For more information on the Coahoma Community College Grade Scale, students should see the College Catalog.

COURSE OUTLINE
EMS 1825
Cardiology
January, 2016

CH. 2	Heart Anatomy and Physiology	
	Cardiology, ECG Monitoring, 12 lead Monitoring	
	Multiple opportunities for testing throughout Ch. 2	
	(At least two (2) exams with daily quizzes)	
	MID TERM EXAM	3/7/2017
	* You will integrate the cognitive information learned into practical applications in lab to include use of high/low fidelity manikins. Additional opportunities to practice will occur in clinical and field exercises*	
	NOTE: Many if not all patient assessment scenarios will include the use of the <i>cardiac monitor</i>. It is your responsibility to be familiar with the equipment, just as you would on your job as a paramedic.	

This outline is intended as a guideline for the course. The institution and the instructor reserve the right to make modifications in content, schedule, and requirements as necessary to enhance each student's educational experience and student learning outcomes.