EMS 414: 12-LEAD ECG INTERPRETATION III: ADVANCED TOPICS & CLINICAL APPLICATIONS

Foothill College Course Outline of Record

Heading	Value
Effective Term:	Winter 2026
Units:	0
Hours:	0.5 lecture per week (6 total per quarter)
Advisory:	EMT or higher level health care provider.
Degree & Credit Status:	Non-Degree-Applicable Non-Credit Course
Foothill GE:	Non-GE
Transferable:	None
Grade Type:	Non-Credit Course (Receives no Grade)
Repeatability:	Unlimited Repeatability

Student Learning Outcomes

- Differentiate and interpret advanced ECG presentationsÑincluding STEMI mimics, metabolic and toxicologic abnormalities, and pacemaker rhythmsÑusing 12-lead ECG criteria.
- Synthesize ECG findings with clinical case information to accurately assess complex cardiac emergencies and support real-time clinical decision-making.

Description

The third and final course in a three-course 12-lead electrocardiogram (ECG) interpretation series, this course covers topics essential for comprehensive ECG analysis in emergency and critical care settings. Students will refine their ability to differentiate STEMI mimics from true infarctions, analyze metabolic and toxicologic influences on ECG patterns, evaluate pacemaker rhythms, and integrate their knowledge through case-based learning. Successful completion of this course results in a certificate of completion, validating expertise in 12-lead ECG interpretation.

Course Objectives

The student will be able to:

1. Differentiate true STEMI from mimics using 12-lead ECG findings.
2. Interpret changes related to metabolic, toxicologic, and environmental emergencies.
3. Evaluate pacemaker function and identify pacing abnormalities on a 12-lead ECG.
4. Synthesize advanced ECG interpretation skills in case-based clinical scenarios.

Course Content

1. STEMI mimics
   a. Early repolarization vs. ischemia
   b. Pericarditis and ECG changes
   c. Left ventricular hypertrophy overlap
2. Metabolic, toxic, and environmental emergencies, and the 12-lead ECG
   a. Hyperkalemia, hypokalemia, and calcium shifts
   b. Digoxin toxicity and drug effects
   c. Hypothermia and Osborne waves
3. Paced rhythms
   a. Pacer spike appearance and common pacing modes
   b. ECG findings in failure to capture and failure to sense
   c. Clinical use of pacemakers and interpretation tips
4. Integrated clinical ECG case review
   a. Mixed-pathology ECG case reviews
   b. Integrating ECG with full clinical assessments
   c. Simulation-based interpretation practice

Lab Content

Not applicable.

Special Facilities and/or Equipment

1. Smart classroom with audio visual equipment.
2. Emergency medical equipment.

Method(s) of Evaluation

Methods of Evaluation may include but are not limited to the following:

Written tests
Case studies
Class participation

Method(s) of Instruction

Methods of Instruction may include but are not limited to the following:

Interactive lecture/presentations
In-class reading assignments, including but not limited to handout material relative to class lecture
In-class projects (e.g., scenarios for critical thinking)

Representative Text(s) and Other Materials

Garcia, Tomas. 12-Lead ECG: The Art of Interpretation, 2nd ed.. 2013.

Although this text is older than the suggested "5 years or newer" standard, it remains a seminal text in this area of study.

Handout materials and online resources (documents, presentation slides, web links, images, videos) will be provided by the instructor and/or presenter(s).

Types and/or Examples of Required Reading, Writing, and Outside of Class Assignments

1. Reading assignments from online sources, class handouts, and other various sources, ranging from 5-15 pages per week.
2. Written short answer essay questions and take home assignments.

Discipline(s)

Emergency Medical Technologies