



# Professional Enrichment Course

University of Pittsburgh School of Medicine  
Office of Medical Education

## EKG Interpretation: Beyond Recognition

<b>Enrollment Period:</b>	Spring 2024
<b>Course Dates:</b>	Feb 6, 20, 27, March 5 Tuesdays 4:30pm-6:30pm
<b>Student Max:</b>	15
<b>Class Year:</b>	MS2
<b>Course Director:</b>	Jason S. Chang, MD Assistant Professor of Emergency Medicine
<b>Course Administrator:</b>	
<b>Location:</b>	Scaife 3702
<b>Registration:</b>	Via Amp Up During Enrollment Period
<b>Course Description:</b>	Many medical students who look at an EKG today instinctively resort to pattern recognition when asked to identify an abnormal finding (e.g. "saw-tooth pattern" means atrial flutter; "rabbit ears" means a right bundle branch block). This is an ineffective means of EKG interpretation. Rote memorization of EKG patterns does little to promote an understanding of the basic pathophysiology behind arrhythmias and other abnormalities. The goal of this PEC is to present an interactive and in-depth examination of the electrical pathophysiology behind the patterns that are associated with common emergency arrhythmias and EKG abnormalities. Developing an understanding of these mechanisms will allow the student to interpret a variety of pathology simply by being able to explain the electrical activity and depolarization patterns within the myocardium.
<b>Objectives:</b>	<ol style="list-style-type: none"><li>1. Provide a review of the normal electrical depolarization patterns and the typical 12-lead EKG</li><li>2. Generate illustrative explanations of the electrical activity behind many individual EKG arrhythmias and abnormalities</li><li>3. Discuss several case presentations of emergency EKG abnormalities and management strategy based on a simple EKG</li><li>4. Predict and create EKG rhythms when presented with illustrative examples of abnormal electrical depolarization patterns</li></ol>
<b>Pre-Requisites:</b>	Completion of Cardiology Block

<b>Requirements:</b>	Attendance at all 4 sessions
<b>Texts:</b>	None

### **Week 1: Standard 12-Lead EKG interpretation and approach to understanding a normal EKG**

The first week of this course will review the standard EKG including reinforcement of the basic concepts behind the morphology behind a normal depolarization through the myocardium. This will include discussion of the anatomy of the heart, orientation of the electrical leads, pattern of depolarization from atrium to ventricle, and the anticipated normal EKG recordings. We will then introduce disturbances to the EKG rhythm when abnormal or ectopic depolarizations disrupt this regular sequence of events.

### **Week 2: Supraventricular Arrhythmias and Conduction Abnormalities**

After understanding a normal EKG, we will begin to discuss individual rhythm and conduction abnormalities originating from above the ventricle. The student will participate in illustrating the electrical mechanisms behind common atrial and AV nodal diseases while appreciating the central role the AV node plays in controlling and coordinating atrial to ventricular electrical communication, particularly when there is an abnormality within the AV nodal junction.

### **Week 3: Ventricular Arrhythmias and Conduction Abnormalities; ST segment changes**

The most deadly arrhythmias occur when they originate from within the ventricles. The student will be able to find parallels to atrial arrhythmias after discussing the mechanisms behind ventricular arrhythmias. This week will also explore some of the reasons behind basic ACLS guidelines and resuscitative measures for patients in cardiac arrest. Though not a primary objective of the course, ST segment changes will also be briefly discussed to introduce the concept of myocardial damage and its effect on the EKG.

### **Week 4: EKG Case Reviews and Illustrative Application of Knowledge**

Students will discuss several examples of EKG abnormalities framed by case presentations. We will reinforce the idea of interpreting an EKG without relying on pattern recognition and apply learning points presented in the previous weeks. Finally, the students will be challenged to create EKG rhythms based on pictorial illustrations of abnormal electrical activity. This will reverse the concept of EKG interpretation and instead force the trainee to understand how EKG patterns are created.