



EUROPEAN HEART RHYTHM ASSOCIATION
A Registered Branch of the ESC

*Core Syllabus Abbreviated version:
Invasive Cardiac Electrophysiology Exam*

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European Heart Rhythm Association Syllabus

Definitions

Heart Rhythm Specialist

The cardiologist with specific knowledge, training, skills, and attitudes for the study, management, research and teaching of heart rhythm disorders

Invasive Cardiac Electrophysiology

The field of Cardiology related to the study and management of heart rhythm physiology and disorders. It includes both invasive and non-invasive techniques.

Specific knowledge in invasive electrophysiology requires extensive knowledge in non-invasive electrophysiology, although the contrary is not necessarily required.

Knowledge about management of heart rhythm implantable devices, as one of the diverse diagnostic and therapeutical approaches for heart rhythm disorder management, is also required.

Heart Rhythm Implantable Devices: Cardiac Pacing, ICDs & other

Devices which are designed to be implanted in the human body for the study, diagnosis, prevention, or management of heart rhythm disorders. Proficiency in this discipline also requires a basic knowledge about invasive cardiac electrophysiology.

Summarized Syllabus for the Heart Rhythm Specialist

- Normal & abnormal anatomy of the heart and the conduction system
 - Normal & abnormal general physiology and heart electrophysiology, including ion channels, cellular electrophysiology, autonomous system influences, and basic mechanisms of rhythm disorders, syncope & sudden death.
 - Diagnostic procedures and techniques in Rhythmology & Clinical Electrophysiology (rationale, material & equipment, techniques & procedures, complications, result interpretation, indications & contra-indications, ESC Guidelines)
 - Clinical evaluation
 - ECG, Signal Average ECG, T-wave alternans, body-surface potential mapping, & other.
 - Holter ECG monitoring and other monitoring systems/devices, implantable or not.
 - Exercise tests
 - General knowledge in image techniques (fluoroscopy, echocardiography, MRI, CT)
 - Tilt test
 - Invasive electrophysiology studies
 - Pharmacologic tests
 - Other
 - Therapies in Rhythmology & Clinical Electrophysiology (rationale, material & equipment, techniques & procedures, side-effects & complications, results, indications & contraindications, ESC Guidelines)
 - Physical & autonomous system manoeuvres
 - Drugs with anti-arrhythmic effects
 - Drugs for associated rhythm problems (anticoagulants, vasodilators, other)
 - Invasive Electrophysiology guided therapies
 - Percutaneous catheter ablation
 - Surgery & revascularization techniques
 - Temporary and non-endocardial pacing
 - Cardioversion & defibrillation
 - Implantable devices (pacemakers, ICDs, CRTs, and other)
 - Other
 - Arrhythmic disorders (epidemiology, pathophysiology, clinical features & diagnosis, prognosis & risk evaluation, Treatment, ESC Guidelines)
- Sinus node & atrial impulse formation & conduction disorders
AV nodal & His-Purkinje conduction disorders
Atrial & thoracic vein ectopy & tachycardias
Atrial flutter
Atrial fibrillation

Junctional ectopy & tachycardias

Accessory pathway mediated tachycardias

Ventricular ectopy & tachycardias

Autonomic disorders (carotid sinus hypersensitivity, neurocardiogenic syncope, other)

- Arrhythmogenic diseases and syndromes (epidemiology, pathophysiology, clinical features & diagnosis, prognosis & risk evaluation, Treatment, ESC Guidelines)

Ischemic cardiomyopathy

Non-ischemic cardiomyopathies:

- Idiopathic dilated cardiomyopathies
- Hypertrophic cardiomyopathies
- Right ventricular arrhythmogenic cardiomyopathies
- Neuromuscular cardiomyopathies
- Valvular related cardiomyopathies
- Congenital diseases
- Other

Channelopathies & other Genetic syndromes

- Long & short QT syndromes
- Brugada syndromes
- Ryanodine syndromes
- Other

Other situations leading to rhythm disorders

- Professional, legal & socioeconomic aspects

Summarized Syllabus for the Invasive Cardiac Electrophysiology Exam

This syllabus includes comprehensive knowledge of what is detailed in the summarised syllabus for the heart rhythm specialist but with specific knowledge in invasive cardiac electrophysiology (EP), as follows:

- EP laboratory equipment (fluoroscopy, catheters, sheaths, EP signal recording systems, navigation systems, programmed electrical stimulation systems, other).
- Catheter placement techniques including cardiac access (transvenous, pericardial, other), guiding means (fluoroscopic and non-fluoroscopic), and other.
- ECG and EP Signals (bipolar/unipolar, filters, voltage/timing/morphology, other).
- Programmed electrical stimulation techniques (pulse width/amplitude, unipolar/bipolar, continuous/extrastimulus stimulation, atrial/ventricular/other location stimulation, pacing algorithms, other) and pharmacological tests and modulation.
- Basic EP principles (intervals, refractoriness, conduction velocity, block/gap, other).
- Basic arrhythmia mechanisms (macro-reentry, micro-reentry, automatism, triggered activity, reflection, and other).
- Impulse formation & conduction within the heart (sinus function, sinoatrial conduction, atrial conduction and refractoriness, AV nodal and His Purkinje physiology, ventricular conduction and refractoriness, other).
- ECG & Electrophysiology (cardiac activation, responses to electrical stimulation and to drug administration, EP diagnosis, other) of normal heart rhythm and electrical impulse conduction.
- ECG & Electrophysiology (induction, cardiac activation, responses to electrical stimulation and to drug administration, cardiac activation, EP diagnosis, other) of the different types and variants of sinus and AV node and His-Purkinje impulse formation and conduction effects including sick sinus syndrome, AV block, intraventricular conduction blocks, and autonomous system mediated disorders (carotid sinus hypersensitivity, neurocardiogenic, and other).
- ECG & Electrophysiology (induction, termination, cardiac activation, responses to electrical stimulation and to drug administration, EP diagnosis, other) of the different types and variants of sinus node and atrial arrhythmias, including atrial ectopy, atrial escape and accelerated rhythms, sinus node and atrial tachycardias, atrial flutters, and atrial fibrillation.
- ECG & Electrophysiology (induction, termination, cardiac activation, responses to electrical stimulation and to drug administration, EP diagnosis, other) of the different types and variants of junctional arrhythmias, including

junctional ectopy, junctional escape and accelerated rhythms, and junctional tachycardias.

- ECG & Electrophysiology (induction, termination, cardiac activation, responses to electrical stimulation and to drug administration, EP diagnosis, other) of the different types and variants of ventricular arrhythmias, including ventricular ectopy, ventricular escape and accelerated rhythms, ventricular tachycardias, ventricular flutter, and ventricular fibrillation.
- ECG & Electrophysiology (induction, termination, cardiac activation, responses to electrical stimulation and to drug administration, EP diagnosis, other) of the different types and variants of AV accessory pathways and AV accessory pathways mediated arrhythmias, including ectopy, escape and accelerated rhythms, and tachycardias.
- ECG & Electrophysiology (induction, termination, cardiac activation, responses to electrical stimulation and to drug administration, EP diagnosis, other) of the different types and variants of repolarization disorders (long & short QT syndromes, Brugada syndrome, Ryanodine defect disorders, other)
- Ablation techniques (catheters, energies, biophysics, mapping, anatomical substrates, success predictors, and other) of the different rhythm disorders previously stated.
- Complications and adverse effects of EP studies and ablation: pathophysiology, diagnosis, prevention, and management.
- Professional, legal and socioeconomic issues.