

# CARDIAC ELECTROPHYSIOLOGY TECHNOLOGY – A.S.

## Program director

J. Robert Cruise

Electrophysiology is a subspecialty of cardiology that focuses on treating heart rhythm abnormalities. The cardiac electrophysiology technologist assists the cardiologist during invasive procedures, including diagnostic electrophysiology studies, arrhythmia mapping, catheter ablation for supraventricular and ventricular tachycardias; and for pacemaker, implantable cardioverter defibrillator, and cardiac resynchronization therapy device implantations.

The Cardiac Electrophysiology Technology Program leads to an Associate in Science degree. The program is based on one year of prerequisites completed at any regionally accredited college or university. The four quarters of coursework at Loma Linda University begin with Autumn Quarter of the sophomore year. All didactic coursework is taught online. Clinical experiences are conducted at affiliated cardiac electrophysiology departments within the State of California and other approved states.

## CPR certification

Students are required to have current health-care provider adult, child, and infant cardiopulmonary resuscitation (CPR) certification for all scheduled clinical experience. CPR certification must be completed at the American Heart Association health-care provider level. This may be completed prior to beginning the program of study or be obtained at Loma Linda University. Classes are available on campus at Life Support Education, University Arts building, 24887 Taylor Street, Suite 102.

## Program learning outcomes

By the end of this program, the graduate should be able to:

1. Demonstrate clinical competence;
2. Communicate effectively;
3. Exhibit critical-thinking and problem-solving skills;
4. Demonstrate the values and attitudes of an entry-level cardiac electrophysiology technologist.

## Certification

Upon completion of the program, students will be eligible for certification by the International Board of Heart Rhythm Examiners (IBHRE) and Cardiovascular Credentialing International (CCI).

## Accreditation

The Cardiac Electrophysiology Program is accredited by the the Commission on Accreditation of Allied Health Education Programs (CAAHEP) upon the recommendation of the Joint Review Committee on Education in Cardiovascular Technology (JRC-CVT), 25400 U.S. Highway 19 North, Suite 158, Clearwater, FL 33763; telephone: 727/210-2350; website: <[www.caahep.org](http://www.caahep.org) (<http://www.caahep.org/>)>.

## Admissions

In addition to Loma Linda University (<http://llucatalog.llu.edu/about-university/admission-policies-information/#admissionrequirements>)

and School of Allied Health Professions admissions requirements (<http://llucatalog.llu.edu/allied-health-professions/#generalregulationstext>), the applicant must also complete the following requirements:

Minimum G.P.A. of 2.4 and prerequisites as follow:

### Prerequisites

Religion: four units per year of attendance at a Seventh-day Adventist college or university

College algebra

Anatomy and physiology (complete sequence with lab)

Introductory physics or high school physics

Medical terminology

Choose one from the following: general psychology, general sociology, cultural anthropology

College English composition, complete sequence

Electives to meet the minimum total requirement of 39 quarter units or 26 semester units for the A.S. degree

## Program requirements

Autumn Quarter		Units
AHCJ 326	Fundamentals of Health Care	2
AHCJ 328 <sup>1</sup>	Wholeness Portfolio I	0
CEPT 245	Cardiovascular Anatomy and Physiology	3
CEPT 248	Cardiovascular Patient Assessment	2
CEPT 251	Cardiac Electrophysiology and Rhythm Recognition I	2
CEPT 258	Fundamentals of Biomedical Science	2
CEPT 261	Cardiac Electrophysiology Science I	3
CEPT 275	Cardiovascular Pharmacology	3
Winter Quarter		
AHCJ 328 <sup>1</sup>	Wholeness Portfolio I	0
AHCJ 402	Pathology I	4
CEPT 252	Cardiac Electrophysiology and Rhythm Recognition II	2
CEPT 262	Cardiac Electrophysiology Science II	3
CEPT 271	Cardiology Diseases and Therapeutics I	2
CEPT 281	Cardiac Electrophysiology Procedures I	3
CEPT 321	Cardiac Electrophysiology Clinical Practicum I	1.5
Spring Quarter		
AHCJ 305	Infectious Disease and the Health-Care Provider	1
AHCJ 328 <sup>2</sup>	Wholeness Portfolio I	1
CEPT 253	Cardiac Electrophysiology and Rhythm Recognition III	3
CEPT 263	Cardiac Electrophysiology Science III	3
CEPT 272	Cardiology Diseases and Therapeutics II	2
CEPT 282	Cardiac Electrophysiology Procedures II	3
CEPT 285	Cardiology	3
CEPT 322	Cardiac Electrophysiology Clinical Practicum II	1.5
Summer Quarter		
CEPT 323	Cardiac Electrophysiology Clinical Practicum III	2

CEPT 345	Case Studies in Cardiac Electrophysiology	2
CEPT 348	Cardiac Electrophysiology Seminar	3
RELE 457	Christian Ethics and Health Care	2
REL_ 4__ (Religion elective)		2
RTMR 284	Radiation Protection and Biology	2
<b>Total Units:</b>		<b>63</b>

- Students receive academic credit for this course in the third quarter of registration.
- Fulfills service learning requirement

## Normal time to complete the program

Two (2) years – One (1) year (four [4] academic quarters) at LLU, based on full-time enrollment

## Courses

### CEPT 245. Cardiovascular Anatomy and Physiology. 3 Units.

Explores normal and pathological cardiovascular anatomy and physiology. Emphasizes myocardial excitation, contraction, intracardiac flow, intracardiac pressure, valve function, coronary anatomy, and ventricular function. Studies in detail the electrical conduction system and cardiovascular hemodynamic principles. Introduces pathological coronary anatomy, as well as abnormalities of the cardiovascular system.

### CEPT 248. Cardiovascular Patient Assessment. 2 Units.

Principals of assessment for the patient with cardiovascular disorders, including: health history, physical assessment techniques, interpretation of laboratory data, diagnostic data, chest radiography, auscultation, and diagnostic procedures. Interview techniques and the development of patient care techniques specific to the cardiovascular patient.

### CEPT 251. Cardiac Electrophysiology and Rhythm Recognition I. 2 Units.

Clinical use of diagnostic tests and procedures related to cardiac electrophysiology disease states. Introduces anatomical and physiologic concepts of rhythm generation and cardiac electrophysiology pathways, with emphasis on basic rhythm recognition and evaluation.

### CEPT 252. Cardiac Electrophysiology and Rhythm Recognition II. 2 Units.

Application and interpretation of the 12-lead system. Emphasis on recognition of the acute myocardial infarction and common myocardial pathologies; includes axis deviation, acute ischemic conditions, electrolyte imbalances, bundle-branch block, and infarct imposters. Highlights patient assessment, data collection, and use of the 12-lead to guide rapid intervention. American Heart Association advanced cardiac life support certificate issued upon successful course completion.

### CEPT 253. Cardiac Electrophysiology and Rhythm Recognition III. 3 Units.

Clinical use of diagnostic tests and procedures related to intracardiac catheter placement and the electrograms created during EP studies/procedures. Improves recognition and interpretation of intracardiac electrograms. Introduces anatomical and physiological concepts of rhythm generation and cardiac electrophysiology pathways. Emphasizes basic intracardiac electrogram recognition, which, combined with practice, leads to greater interpretation proficiency during cardiac EP procedures/studies. Prerequisite: CEPT 251, CEPT 252.

### CEPT 258. Fundamentals of Biomedical Science. 2 Units.

Study and application of basic sciences related to physiology and pathophysiology, integrating the concepts into the fundamentals of biomedical electronics—specifically the physical sciences to cardiac management.

### CEPT 261. Cardiac Electrophysiology Science I. 3 Units.

Principles of cardiac electrophysiology, including electrophysiology conduction, pathways and mapping, measurements of refractory periods, aberrant conduction of the myocardium, tests of sinus node function, atrial and ventricular extrastimulus testing, pacing protocols for diagnostic electrophysiology studies, and cardiac resynchronization. Emphasizes application to the clinical setting.

### CEPT 262. Cardiac Electrophysiology Science II. 3 Units.

Medical instrumentation and clinical application used in cardiac electrophysiology. In-depth study of the technical knowledge used for diagnostic, interventional, and therapeutic modalities. Applies scientific principles to the operation of laboratory equipment. Identifies correct patient-specific or appropriate device system adjustments.

### CEPT 263. Cardiac Electrophysiology Science III. 3 Units.

Continues CEPT 261 and 262, developing advanced knowledge, skills, and application of mapping and monitoring systems. Explores device features, therapy options, and hands-on troubleshooting in depth. Includes case study review.

### CEPT 271. Cardiology Diseases and Therapeutics I. 2 Units.

Overview of pathophysiology of cardiac diseases. Describes appropriate therapy for acute and chronic cardiovascular disease states. Emphasizes scientific support for treatment modalities and reviews current treatment trends for cardiovascular diseases.

### CEPT 272. Cardiology Diseases and Therapeutics II. 2 Units.

Addresses major cardiac pathologies, congenital and acquired. Focuses on cardiac rehabilitation science and current therapy of the cardiac patient. Includes applied knowledge of relevant risk factors and fosters appreciation of cardiovascular disease prevention. Emphasizes the function of exercise in disease prevention, as well as the role nutrition plays in promoting cardiovascular health. Discusses testing protocols and exercise prescription, along with evidence-based therapies.

### CEPT 275. Cardiovascular Pharmacology. 3 Units.

Pharmacological agents currently used in the treatment of cardiovascular disease management, including biophysical, biochemical, and cellular basis of treatment, pharmacokinetics, pharmacodynamics, and therapeutics. Emphasizes pharmaceuticals commonly given to and used to treat cardiac patients.

### CEPT 281. Cardiac Electrophysiology Procedures I. 3 Units.

Indications for technology-based evaluations and diagnostic and therapy interventions. Focuses on interventions that minimize procedural and device-related complications. Includes information related to patient monitoring and comfort. Laboratory practice and techniques.

### CEPT 282. Cardiac Electrophysiology Procedures II. 3 Units.

Continues to explore advanced cardiovascular diagnostic and therapeutic procedures. Laboratory practice and techniques.

### CEPT 285. Cardiology. 3 Units.

Assists the health-care provider to develop assessment skills and to increase knowledge of medical management of the patient with acute and chronic cardiovascular disorders. Focuses on anatomy and physiology, underlying pathophysiology, advanced history taking and physical assessment, cardiovascular pharmacology, electrical modalities, cardiac diagnostic testing, and current research.

**CEPT 321. Cardiac Electrophysiology Clinical Practicum I. 1.5 Unit.**

Introduces the clinical setting. Orients the student to environments in which the CEP specialist works. Student participates in or conducts a health history and physical assessment of the cardiac patient and learns proper documentation procedures. Hands-on experience to assist development of basic clinical skills. Introduces procedures, diagnostic examinations, and equipment utilized in cardiac procedures. Three days of clinical rotations per week.

**CEPT 322. Cardiac Electrophysiology Clinical Practicum II. 1.5 Unit.**

Provides clinical experience and application of cardiac electrophysiology procedures, interventions, instrumentation, and patient-care interactions. Preceptors in clinical settings facilitate experiences that enable students to develop and enhance competencies related to cardiac testing and procedures. Includes practice with components of communicating effectively with clients, their families, and other members of the health-care team. Three days of clinical rotations per week. Prerequisite: CEPT 321.

**CEPT 323. Cardiac Electrophysiology Clinical Practicum III. 2 Units.**

Assists students in gaining specific experiences through clinical assignments, enabling them to develop and enhance competencies in cardiac testing and patient evaluation. Guided by clinical preceptors, students rotate through multiple environments relevant to the practice of cardiac electrophysiology, as well as several clinical environments, in order to gain advanced competencies in all content areas. Prerequisite: CEPT 322.

**CEPT 324. Cardiac Electrophysiology Clinical Practicum IV. 2 Units.**

Provides student rotations through several clinical environments in order to gain advanced competencies in all content areas. Includes but is not limited to Holter scanning, cardiac rehabilitation, exercise testing, pacemaker technologies, and cardiac mapping. Prerequisite: CEPT 323.

**CEPT 345. Case Studies in Cardiac Electrophysiology. 2 Units.**

Presents cardiac electrophysiology concepts through a case study model. Student reviews and presents case studies that integrate knowledge of cardiac disease, treatments, diagnostic tests, and procedures. Utilizes a simulated patient care setting to improve and develop critical thinking skills.

**CEPT 348. Cardiac Electrophysiology Seminar. 3 Units.**

A comprehensive view of the rapidly evolving field of interventional cardiology. Studies new developments, technological innovations, and advances in clinical application.