

# CARDIOLOGY – educational programme

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## 1 The goal of specialized education

The goal of specialized education in the field of cardiology is to obtain the necessary theoretical knowledge and practical skills in the areas of pathophysiology, diagnosis, differential diagnosis, prevention and treatment of cardiovascular diseases, allowing independent outpatient and inpatient work of the cardiologist within the scope of the field as defined below.

## 2 Minimum requirements for specialized education

The condition for inclusion in the specialized education in the field of Cardiology is the acquisition of a professional qualification to practise the profession of a physician by completing at least six years of full-time study at a medical faculty, which includes theoretical and practical training in an accredited master's degree programme of general medicine.

Specialized education is implemented simultaneously with the exercise of the medical profession in the form of full-time training in the extent corresponding to the stated weekly working time according to the provisions of § 79 of the Act No. 262/2006 Coll., Labor Code, as amended.

Specialized education may run as a part-time training, i.e. at a lower extent than the stated weekly working time. In this case, the overall duration, level and quality must not be lower than in the case of full-time training.

Internships in the basic internal module can be completed in any order.

The condition for obtaining specialized qualification in the field of Cardiology is the inclusion in the field, completion of the basic internal module (24 months), specialized training in Cardiology (36 months) and passing the Board Exam. The total period of specialized education is at least 5 years, of which

### 2.1 Basic internal module – for a period of at least 24 months

#### Part I

#### a) general compulsory practice

Accredited facility	Number of months
Anesthesiology and intensive medicine <sup>1), 2)</sup> - provider of health services providing acute in-patient intensive and resuscitation health	2
Surgery <sup>1), 3)</sup> - provider of health services providing in-patient health care in general surgery	2
Internal medicine <sup>1), 4)</sup> - provider of health services providing in-patient health care across the full spectrum of internal diseases	2

#### b) mandatory practice in the field of the module

Accredited facility	Number of months
Internal medicine <sup>1), 4), 5)</sup> - provider of health services providing in-patient health care across the full spectrum of internal diseases with accreditation type I or II.	12
Internal medicine <sup>1) 6)</sup> - cardiology-oriented intensive care unit	6

Training runs at providers of health care services or other natural or legal persons who have obtained the accreditation pursuant to Act No. 95/2004 Coll., on conditions for the acquisition and recognition of professional qualification and specialized qualification for the practice of the medical profession of a physician, dentist and pharmacist, as amended by later regulations (hereinafter referred to as “Act No. 95/2004 Coll.”).

General compulsory practice as well as mandatory practice in the field of the module runs in the facilities of the same or different in-patient provider of health services. The requirements of the educational programme can be met through more contractual providers of health services, if they are not provided in their entirety by one provider of health services. Provider of health services or another natural or legal person that does not have an accreditation, shall be accredited under the applicant's accreditation procedure according to § 14 par. 2 point. c) Act no. 95/2004 Coll.

Provider of health services meets the staffing according to Decree No. 99/2009 Coll., on minimum staffing requirements for health services, as amended by later regulations (hereinafter referred to as "Decree No. 99/2012 Coll."), and the minimum technical and material equipment according to Decree No. 92/2012 Coll., on the requirements for the minimum technical and material equipment of health care facilities and home care contact centers, as amended (hereinafter "Decree No. 92/2012 Coll.").

Provider of health services has an appropriate personnel and instrumentation equipment and background for trainees, and meets the other minimum conditions referred to in the requirements for accredited facilities (hereinafter referred to as "accredited facility").

## 2.2 The actual specialized training – for a period of at least 36 months

Entry into the specialized training is subject to compliance with all the requirements laid down for the training in the framework of the basic internal module (including the completion of the mandatory course News from internal medicine, after the basic internal module). Specialized training runs in accredited facilities for specialized education in the field of Cardiology and cardiac surgery.

### Part II

#### c) mandatory practice

Accredited facility		Number of months
Cardiology <sup>1) 7)</sup>		36
<i>out of which</i>	Cardiology – provider of health services providing in-patient health care at a cardiological in-patient department	9
	Arrhythmology center (provider of health services providing in-patient and out-patient health care and an electrophysiological / pacemaker room)	3
	Non-invasive cardiology and imaging (echocardiography, stress methods, Holterite ECG, Ambulatory BP monitoring, nuclear cardiology, cardiology-oriented CT, or MR)	6
	catheterization laboratory (Interventional Cardiology department)	3
	Cardiological intensive care unit <sup>7)</sup>	6
	Cardiac surgery <sup>1), 8)</sup>	2
	Anesthesiology and intensive medicine <sup>1), 2)</sup>	1
	any of the abovementioned facilities according to the needs of the training site, taking into account the interest of the applicant (during this time,	6

	under the expert guidance of a supervisor, the trainee can already head towards the individual sub specializations within cardiology)	
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## 2.3 The theoretical part of the educational programme

### Part III

#### d) participation in other educational activities – mandatory

Courses, seminars	Number of days
Medical first aid course <sup>9)</sup>	3
Introduction to healthcare legislation, ethics and communication course <sup>9)</sup>	2
Prevention of harmful use of addictive substances (AS) and treatment of addictions course <sup>9)</sup>	1
Radiation protection course <sup>10)</sup>	1
News from internal medicine course <sup>11)</sup>	5
Cardiology pre-degree course <sup>11)</sup>	5

#### e) participation in educational activities - recommended

Courses, seminars	Duration
other specialized events organized and guaranteed by the Czech Society of Cardiology and the European Society of Cardiology (especially annual congresses) or by the Institute of Postgraduate Medical Education (hereinafter referred to as "IPME") or the Czech Medical Chamber (hereinafter referred to as "CMC") or medical faculties (hereinafter referred to as "MF") or by accredited establishments, etc.	for a period of at least 15 days

If the trainee took the courses Medical first aid and Basics of health care legislation, ethics and communication in the context of another educational programme no more than 5 years ago, they do not have to be taken again and will be accepted.

If the trainee took the courses Prevention of harmful use of addictive substances and treatment of addictions and Radiation protection in the context of another educational programme in a time of not more than 10 years, they do not have to be taken again and will be accepted.

## 3 The scope of the required theoretical knowledge and practical skills, a list of the required performances

The progress of the educational programme is recorded as a record of performances (**logbook**) and a certificate of the doctor's professional competence (specialization index). Confirmed performances must be provable in medical documentation. The number of performances stated in the logbook is laid down as the minimum. The trainee is expected to complete or assist at such a number of performances as to be able to handle the issues on both theoretical and practical level.

### 3.1 The scope of the required theoretical knowledge and practical skills completed at the end of training within the basic internal module

Theoretical knowledge and practical skills - 6 months of specialized training (general compulsory practice)

#### Anesthesiology and intensive medicine – 2 months internship at an accredited facility of type I or II under the expert supervision of a supervisor

<i>Theoretical knowledge</i>	<ul style="list-style-type: none"> <li>• The contents of anesthesiological care (pre-anesthetic examination, preparation before anesthesia, premedication; basic specialized procedures of general anesthesia; basic specialized procedures of local anesthesia; principles of patient care after anesthesia, recovery rate evaluation, detection and management of common complications; principles of postoperative analgesia).</li> <li>• Knowledge of the fundamentals of pathophysiology, pathogenesis, differential diagnosis and first aid for life-threatening conditions or disorders of vital functions.</li> <li>• Basic types of analgesia, their options and risks.</li> <li>• Extended care for the injured Advanced Trauma Life Support (ATLS).</li> <li>• The operation of departments of anesthesiology and intensive medicine; keeping medical records.</li> </ul>
<i>Practical skills</i>	<ul style="list-style-type: none"> <li>• Performance of basic and advanced emergency resuscitation.</li> <li>• Detection and evaluation of the severity of states of sudden health disturbance or failure of vital functions.</li> <li>• Performance of medical first aid for life-threatening conditions or disorders of vital functions.</li> <li>• Performance of basic operations – securing the peripheral venous catheter; securing free airway by head position; putting into the recovery position on the side.</li> </ul>
<i>Competences after practice completion</i>	<ul style="list-style-type: none"> <li>• Detection and evaluation of the severity of states of sudden health disturbance or failure of vital functions.</li> <li>• Performance of medical first aid for life-threatening conditions or disorders of vital functions.</li> <li>• Performance of basic operations – securing the peripheral venous catheter; securing free airway by head position; putting into the recovery position on the side.</li> <li>• Performance of advanced emergency resuscitation.</li> <li>• Keeping medical records.</li> </ul>
<h4>Surgery – 2 months internship (including the provision of health care in the period from 4 p.m. to 7 a.m. and on Saturday and Sunday and on public holidays at least once a week) at an accredited facility of type I or II under the expert supervision of a supervisor</h4>	
<i>Theoretical knowledge</i>	<ul style="list-style-type: none"> <li>• Basic knowledge of general and specialized surgery.</li> <li>• The basics of treatment of burns, frostbites and chemical injuries.</li> <li>• The differences in practical surgery according to age categories.</li> </ul>
<i>Practical knowledge</i>	<ul style="list-style-type: none"> <li>• Case history and physical examination.</li> </ul>

	<ul style="list-style-type: none"> <li>• Operation of clinics and wards; keeping medical records.</li> <li>• Indications for outpatient, urgent and elective surgeries.</li> <li>• Assistance at outpatient diagnostic and therapeutic procedures, assistance during normal operations.</li> <li>• Preoperative preparation of patients.</li> <li>• Principles of asepsis and antisepsis, preparation of the operating field and washing for the operation.</li> <li>• Requirements for the performance of local and general anesthesia.</li> <li>• Basic postoperative care and vital functions monitoring.</li> <li>• Presence during the examination and treatment of injuries to bones, joints and soft tissues, including immobilization.</li> <li>• Indications for and interpretation of the core laboratory and imaging methods.</li> <li>• Prevention and therapy of thromboembolic disease.</li> <li>• Preoperative and postoperative rehabilitation.</li> <li>• The technique of administering blood transfusions and blood derivatives, prevention and treatment of post-transfusion complications.</li> <li>• Prevention and basic treatment of pressure ulcers.</li> <li>• Basic examination and differential diagnosis of sudden abdominal and thoracic events.</li> <li>• Basic procedures for the diagnosis and treatment of multiple trauma.</li> </ul>
<i>Practical skills</i>	<ul style="list-style-type: none"> <li>• Examination of the head, chest, arms and legs and abdomen (including rectal examination).</li> <li>• Insertion of the nasogastric tube, urinary catheter, collection of biological material.</li> <li>• Insertion of the peripheral venous catheter, central venous catheter care, including the administration of infusion solutions.</li> <li>• Injection techniques – s.c., i.m., i.v., i.d.</li> <li>• Bandage technique, different methods of immobilization.</li> <li>• The basic technique of treating and sewing surface wounds.</li> <li>• <b>Stoma care.</b></li> </ul>
<i>Competences after practice completion</i>	<ul style="list-style-type: none"> <li>• Taking the case history and performance of physical examination of the patient.</li> <li>• Insertion of the nasogastric tube, urinary catheter, collection of biological material.</li> <li>• Insertion of the peripheral venous catheter, central venous catheter care, including the administration of infusion solutions.</li> <li>• Application of injections s.c., i.m., i.v., i.d.</li> <li>• Administration of blood transfusions and blood derivatives.</li> <li>• Treatment of uncomplicated injuries of the skin and subcutaneous tissue (including local anesthesia and sewing).</li> <li>• Assistance during surgical operating procedures.</li> <li>• Basic treatment of burns, frostbites, chemical and radiation injuries.</li> <li>• Re-bandaging of surgical wounds and application of bandaging technique.</li> <li>• Keeping medical records.</li> </ul>

<b>Internal medicine – 2 months internship at an accredited facility of type I or II under the expert supervision of a supervisor</b>	
<i>Theoretical knowledge</i>	<ul style="list-style-type: none"> <li>• Basics of internal diseases.</li> <li>• Specifics of diseases in advanced age.</li> </ul>
<i>Practical knowledge</i>	<ul style="list-style-type: none"> <li>• Case history and physical examination.</li> <li>• Operation of clinics and wards; keeping medical records.</li> <li>• The most frequently occurring internal diseases, clinical manifestations, diagnosis, treatment and prevention.</li> <li>• Basic examination methods.</li> <li>• Indications for and interpretation of the core laboratory and imaging methods.</li> <li>• The technique of administering blood transfusions and blood derivatives, prevention and treatment of post-transfusion complications.</li> <li>• The most commonly used groups of drugs in the treatment of internal diseases.</li> <li>• Acute conditions in internal medicine.</li> </ul>
<i>Practical skills</i>	<ul style="list-style-type: none"> <li>• Performance of a full internal examination.</li> <li>• Insertion of the peripheral venous catheter, central venous catheter care, including the administration of infusion solutions.</li> <li>• Injection techniques – s.c., i.m., i.v., i.d.</li> <li>• Insertion of the nasogastric tube, urinary catheter, collection of biological material, suction of secretions from the respiratory tract.</li> </ul>
<i>Competences after practice completion</i>	<ul style="list-style-type: none"> <li>• Taking the case history and performance of physical examination of patients.</li> <li>• Application of injections s.c., i.m., i.v., i.d.</li> <li>• Insertion of the peripheral venous catheter, central venous catheter care, including the administration of infusion solutions.</li> <li>• Insertion of the nasogastric tube, collection of biological material.</li> <li>• Administration of blood transfusions and blood derivatives.</li> <li>• Keeping medical records.</li> </ul>

**Theoretical knowledge and practical skills - first and second year of specialized training (general compulsory practice in the core field)**

<b>Internal medicine – 12 months internship at an accredited facility of type I or II under the expert supervision of a supervisor</b>	
<i>Theoretical knowledge</i>	<ul style="list-style-type: none"> <li>• Continuous expansion and deepening of knowledge about clinics, diagnosis, treatment and prevention of internal diseases with emphasis on:             <ul style="list-style-type: none"> <li>– differential diagnosis and treatment of diseases of infectious etiology including principles of antibiotic policy</li> <li>– specifics of diseases in advanced age.</li> <li>– the most frequent diseases of individual organs,</li> <li>– disorders of internal environment,</li> <li>– polymorbidity and polymedication,</li> <li>– integrative and coordinative function of internal medicine.</li> </ul> </li> </ul>

<i>Practical knowledge</i>	<ul style="list-style-type: none"> <li>• Recognition of and procedures for the most commonly occurring internal diseases, especially in acute internal events.</li> <li>• Basic evaluation of chest x-ray and ECG, results of laboratory examinations, indications, contraindications, side effects, and dosage of the most commonly used medicines.</li> </ul>
<i>Practical skills</i>	<ul style="list-style-type: none"> <li>• Comprehensive internal examination.</li> <li>• Application of injections s.c., i.m., i.v., i.d., including the administration of infusion solutions, transfusions of blood and blood derivatives.</li> <li>• Insertion of the peripheral venous catheter (ten times), central venous catheter care, measurement of central venous catheter.</li> <li>• Insertion of the nasogastric tube, urinary catheter.</li> <li>• Gastric lavage.</li> <li>• Suction of secretions from the respiratory tract.</li> <li>• Defibrillation.</li> <li>• Cardiopulmonary resuscitation.</li> <li>• Thoracentesis.</li> <li>• Puncture of ascites.</li> </ul>
<b>Internal medicine - cardiologically-oriented intensive care unit * – 6 months internship at an accredited facility under the expert supervision of a supervisor</b>	
<i>Theoretical knowledge</i>	<ul style="list-style-type: none"> <li>• Continuous expansion and deepening of knowledge about clinics, diagnosis, treatment and prevention of diseases of the heart and circulation with emphasis on: <ul style="list-style-type: none"> <li>– differential diagnosis and treatment</li> <li>– specifics of diseases in advanced age.</li> <li>– the most frequent diseases of the heart, circulation and respiratory system,</li> <li>– disorders of internal environment,</li> <li>– polymorbidity and polymedication,</li> </ul> </li> </ul>
<i>Practical knowledge</i>	<ul style="list-style-type: none"> <li>• Recognition and procedures for the most commonly occurring acute cardiac (or internal related) events.</li> <li>• Detailed and complete knowledge of the ECG diagnosis.</li> <li>• Basic evaluation of chest x-ray, results of laboratory examinations, indications, contraindications, side effects, and dosage of the most commonly used medicines.</li> </ul>
<i>Practical skills</i>	<ul style="list-style-type: none"> <li>• Comprehensive internal examination.</li> <li>• Detailed and full description of the ECG curve.</li> <li>• Application of injections s.c., i.m., i.v., i.d., including the administration of infusion solutions, transfusions of blood and blood derivatives.</li> <li>• Insertion of the peripheral venous catheter (ten times), central venous catheter care, measurement of central venous catheter.</li> <li>• Suction of secretions from the respiratory tract.</li> <li>• Cardiopulmonary resuscitation.</li> <li>• Thoracentesis.</li> </ul>
<i>Competences</i>	<ul style="list-style-type: none"> <li>• Taking the case history and performance of physical examination of the patient.</li> </ul>



<i>After practice completion</i>	<ul style="list-style-type: none"> <li>• Application of injections s.c., i.m., i.v., i.d.</li> <li>• Administration of blood transfusions and blood derivatives.</li> <li>• Insertion of the peripheral venous catheter, central venous catheter care, including the administration of infusion solutions.</li> <li>• Insertion of the nasogastric tube and collection of biological material.</li> <li>• Suction of secretions from the respiratory tract.</li> <li>• Keeping medical records.</li> </ul>
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\* Intensive care unit within the framework of the internal department of the provider of health services providing in-patient health care across the whole spectrum of internal diseases for the specialized training of internal medicine with accreditation of type I or II (the accredited facility must have a supervisor with the highest education in the field of Cardiology or with specialized competence in the field of Cardiology), or intensive care unit within the framework of an accredited facility for specialized training in Cardiology (the accredited facility must have a supervisor with the highest education in the field of Cardiology or with specialized competence in the field of Cardiology).

#### Competence of the doctor to perform the following activities independently under the consultation guidance after completion of the internal module

- Performance of examinations and receiving patients, keeping medical records.
- Submission of proposal for further diagnostic and therapeutic procedures.
- Release of patients.
- The provision of health care in the period from 4 p.m. to 7 a.m. and on Saturday and Sunday and on public holidays at least once a week.
- Performance of other activities and operations within the framework of specialized training as stated in the educational programme and logbook.
- Performance of advanced emergency resuscitation.

### 3.2 The scope of the required theoretical knowledge and practical skills completed at the end of specialized training

#### Theoretical knowledge

Candidate for specialization has to master etiology, pathogenesis, clinics, diagnosis and differential diagnosis, therapy and prevention of diseases of blood circulation, including new knowledge in the field. The candidate shall demonstrate in particular:

- a) A thorough knowledge of
  - Physiology and pathophysiology of the cardiovascular system, including basic data on coronary flow, myocardial metabolism, neurohormonal control of cardiovascular functions and the basics of hemodynamics, knowledge of pathological anatomy of the cardiovascular system and the basics of cardiopulmonary function.
- b) Detailed knowledge of the issues in the following clinical tracks – incidence, pathogenesis, pathophysiology, diagnosis, treatment and prevention of the following conditions in particular

- Coronary heart disease, especially myocardial infarction and its complications, the various forms of angina pectoris.
  - Heart rhythm disorders.
  - Heart failure.
  - Essential and secondary hypertension.
  - Acquired valvular heart anomalies.
  - Congenital heart anomalies.
  - Cardiomyopathy.
  - Pulmonary embolism.
  - Myocarditis, endocarditis and pericarditis.
  - Dyslipidaemia.
  - Pulmonary hypertension and chronic cor pulmonale.
  - Diseases of peripheral arteries, veins, capillaries and lymph vessels.
  - Functional disorders of the cardiovascular system.
  - Cardiological problems of pregnancy and cardiological indications for its interruption.
  - Other cardiovascular diseases.
- c) Knowledge of the recommendations for diagnostic and therapeutic procedures of cardiovascular diseases ("guidelines") of the Czech Society of Cardiology and the European Society of Cardiology.
- d) Mastery of
- Determination of indications for cardiosurgical operations.
  - Postoperative monitoring of patients after these operations.
  - Evaluation of the risks of non-cardiac operations for cardiac patients.
  - The basics of diagnosis and treatment of vascular diseases of the brain.
- e) Good knowledge of particularly
- Principles of cardiopulmonary resuscitation and its application in practice.
  - Diagnosis and treatment of emergency circulation conditions on coronary units.
  - Non-pharmacological treatment of arrhythmias.
  - Cardiovascular pharmacotherapy, particularly the knowledge of thrombolytic therapy, antiplatelet and anticoagulant therapy, lipid-lowering therapy, treatment with ACE inhibitors, beta blockers, diuretics, calcium channel blockers, antiarrhythmics, and other medicinal products used in cardiology.
  - Indications and contraindications, dosage, method of application, side effects and drug interactions.
  - The problems of treatment of coronary heart disease by interventional (PCI) and surgical procedures, interventional and surgical treatment of acquired and congenital anomalies of the heart from the perspective of a cardiologist. Indications, results and postoperative care for patients and their medical procedures including assessment aspects.
  - Indications for temporary and permanent cardiac pacing and control of patients with pacemakers.

- Indications and contraindications to cardiac transplantation, including further monitoring and treatment of these patients.
  - Indication and clinical interpretation of findings of imaging methods: nuclear cardiology, cardiologically-oriented CT, or MR.
  - Preventive cardiology.
  - The principles of a comprehensive treatment regime for chronic cardiac patients including drug therapy, dietary treatment, physical exercise regime, indications for exercise and physical rehabilitation and spa treatment.
- f) Mastery of peculiarities in symptomatology, diagnosis and differential diagnosis, therapy and assessment in elderly patients.
- g) Mastery of assessment activity for both short and long term incapacity for all purposes of expert opinion in the field of cardiology.

### Practical skills

The candidate for specialization must demonstrate the following practical skills and knowledge

- a) Active mastery of auxiliary examination methods
- Electrocardiography, including Holterite (see below).
  - Echocardiography (see below).
  - Cardiac stress test (see below).
  - Outpatient blood pressure monitoring (see below).
- b) Interpretation of examination methods
- of the results of the catheter examination, including the floating catheter (Swan-Ganz).
  - Interpretation of angiocardiographic and angiographic examinations.
  - X-RAY diagnosis of heart diseases.
  - Spirometry and blood gases examination.
- c) Mastery of diagnostic or therapeutic procedures
- Cannulation of central veins (see below).
  - Cardioversion (see below).
  - Temporary cardiac pacing (see below).
  - Arterial puncture.

### Minimum number of performances

Performance	Certificate
Central vein cannulation	Submission of a list of at least 20 patients for whom the candidate independently performed the central vein cannulation.
Temporary transvenous cardiac pacing	Submission of a list of at least 5 patients for whom the candidate independently performed the installation of temporary pacemaker.
Electric cardioversion	Submission of a list of at least 5 patients for whom the candidate independently performed electric cardioversion.

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Echocardiography	Submission of a list of at least 300 patients for whom the candidate independently performed and interpreted the echocardiographic examination.
Stress tests	Submission of a list of at least 50 patients for whom the candidate independently performed and interpreted the stress ECG.
Holterite ECG	Submission of a list of at least 50 patients for whom the candidate performed and independently interpreted Holterite ECG.
Outpatient blood pressure monitoring	Submission of a list of at least 25 patients for whom the candidate performed and independently interpreted the record of outpatient blood pressure monitoring.

### **Assistance at other performances**

Experience with indications, contraindications, complications and therapeutic implications (assistance with the performance or presence at the performance)

<b>Assistance</b>	<b>Number</b>
Right-sided and left-sided heart catheterization	25
Coronarography	50
PCI	25
Invasive electrophysiology with RFA	10
Implantation of devices (pacemakers, defibrillators)	25

The sick lists must contain the medical report number and other performance data, so that in the case of checks it is possible to verify their authenticity.

The lists must be authorized by the head of the accredited facility (senior doctor or head of department) on which they were made. The medical documentation of these patients must clearly state that the observed performance was really carried out by the trainee.

## **4 General requirements**

The graduate of specialized education

- according to Decree No. 98/2012 Coll., on medical documentation (hereinafter referred to as "Decree No. 98/2012 Coll. ") must know the medical documentation that is used in the industry, the proposal of spa treatment, oncology reports, reports on some infectious diseases, occupational accident reports, reports on adverse reaction to medicinal products, the particulars of a medical report, documentation for the needs of insurance companies,
- according to Decree No. 297/2012 Coll., on the terms of the Deceased's examination sheet, how to fill it out and forward it to points of destination, and on the requirements of a termination of pregnancy by the birth of a stillborn child report, on the death of a child and the death of the mother report (Decree on the Deceased's examination sheet), as amended, must be familiar with the Deceased's examination sheet,

- will have reached the necessary level of ability to communicate with patients, relatives and co-workers,
- has a basic knowledge of assessment and review medicine, medical ethics, the laws in force in the health sector, organization of health services and the economy of health care,
- will have mastered the operational and administrative activities and team work management,
- will have mastered the basics of computer technology as a resource for the storage and retrieval of data, technical information and communication.

## **5 Assessment of specialized education**

Specialized education is conducted under the guidance of an assigned supervisor at an accredited facility.

- a) Continuous assessment by the supervisor
  - a record of completed practice and training events in the skill card (at six-month intervals), records of the performed activities and performances in the logbook. Overall assessment at the end of the basic internal module (recorded in the logbook).
- b) Criteria for the issue of a certificate of completion of the basic internal module of the educational programme
  - completing the general compulsory practice and mandatory practice in the field of the module confirmed by all supervisors with the appropriate specialized competences at an accredited facility (see table Part I), in the scope set by the educational programme for a period of at least 24 months,
  - submission of confirmation of the performed procedures in the logbook,
  - completing the mandatory course News from internal medicine after completion of the internal module and other training events.
- c) Prerequisite for access to the Board Exam
  - completion of the required practice confirmed by all supervisors with specialized competences and the actual specialized training,
  - submission of confirmation of the performed complete procedures in the logbook,
  - completion of mandatory training events,
  - proof of completion of recommended learning activities,
  - written recommendation by the supervisor,
  - mandatory submission of one publication from the field of Cardiology in extenso in the official magazine of the Czech Society of Cardiology or in any academic journal with impact factor, the candidate must be the first author,
  - active participation (at least one lecture or one poster) at the Congress of the Czech Society of Cardiology, the candidate must be the first author,

- confirmation of the completion of courses, scientific and educational events (see table Part III).
- d) The actual Board Exam (each section will be taken in this order, without successful completion of the previous stage it is not possible to proceed to the next )
  - the practical part – description of three ECG curves, independent performance and interpretation of two echocardiographic examinations, analysis of the case (casuistics). The practical part can be tested by a supervisor/cardiologist from another accredited facility (who is on the list of supervisors),
  - the theoretical part - three drawn questions from cardiology.

## **6 Characteristics of the activities for which the graduate of specialized education has qualified**

Doctor with specialized competence in the field of Cardiology must (in addition to the above knowledge and skills in the field) know the concept of the field of Cardiology, as well as organizational, administrative and economic obligations in terms of the organizational and operational regulations and other regulations so that they are able to:

- work independently on a cardiological device in a cardio center or on the cardiologicaly-oriented equipment of the provider of health care services,
- work independently on a coronary unit or intensive care unit with cardiac focus, including the performance of electrical cardioversion, central vein cannulation and temporary cardiac pacing,
- independently carry out an outpatient cardiac practice,
- know the basics of cardiac pacing and electrophysiology,
- perform and independently evaluate the cardiac stress test, echocardiography and Holterite monitoring of ECG and blood pressure,
- perform consulting services in the field of Cardiology and participate in the education of specialists in their field. Must know the status and perspective of problems in their field.

Doctor with specialized competence in the field will demonstrate professional and pedagogical capabilities of postgraduate education in the field of Cardiology for general medical practitioners, at least in the place of action; also desirable is a publishing and lecturing activity in the field of cardiovascular diseases.

## **7 Characteristics of the accredited facility**

The medical facility in which the provider of health care services is entitled to provide health care must be accredited (provision of § 13 of Act No. 95/2004 Coll.). Accredited facility offering the education of trainees must ensure the completion of the educational programme for the trainee. This effect is ensured by a proper and full incorporation of the trainee into work (including participation in the provision of health care in the period from 4 p.m. to 7 a.m. and on Saturday and Sunday and on public holidays at least once a week) and

the possibility to stay and study at another accredited facility that can provide part of the training not available in the original accredited facility. Contractual cooperation is documented in the application for granting/renewing accreditation (provider of health services or another natural or legal person that does not have an accreditation, shall be accredited under the applicant's accreditation procedure according to § 14 par. 2 point. c) Act no. 95/2004 Coll.). The minimum requirements for the accredited facility are dictated by the fulfillment of both staffing according to Decree No. 99/2012 Coll., and compliance with the technical and material equipment according to Decree No. 92/2012 Coll. Due to variations in the scope and content of the training there exist the following types of facilities at which the practice takes place according to the provisions of § 5 para. 6 of Act No. 95/2004 Coll.

An integral part of the application for granting accreditation is the certification plan of the trainee.

### 7.1 Accredited facility

<b>Personnel requirements</b>	<ul style="list-style-type: none"><li>• The supervisor has a specialized competence in the field of Cardiology and at least 5 years of experience in the field of Cardiology from the day of acquiring specialized qualifications and with a minimum employment of 0.5 with the given provider of health care services.</li><li>• At least 4 supervisors must work at the accredited facility, with at least 3 supervisors working full-time.</li><li>• The supervisor/trainee ratio in the context of the internal module – 1:2.</li><li>• The supervisor/trainee ratio in the context of specialized training - 1:3.</li><li>• The supervisor documents their competence alongside the application for accreditation of facility with a professional CV.</li><li>• Alongside the application for the grant/renewal of accreditation it is necessary to submit a plan for meeting the obligations set by the educational programme.</li></ul>
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<p><b>Material and technical equipment</b></p>	<ul style="list-style-type: none"> <li>• A separate cardiological or internal-cardiological department or clinic.</li> <li>• Department of intensive cardiological care (coronary care unit) providing acute in-patient health care across the full spectrum of cardiac patients from the field (i.e. including people at an advanced age, heart failures, patients after cardiopulmonary resuscitation, etc.).</li> <li>• Accredited facility equipment according to Decree No 92/2012 Coll. and Decree No. 99/2012 Coll.:             <ul style="list-style-type: none"> <li>– Cath Lab for interventional cardiology and non-stop programme of acute percutaneous coronary interventions. At least one documented functional license for interventional cardiology,</li> <li>– Hall for electrophysiology and implantation of instruments. Must implant pacemakers and should carry out the catheter ablation and implant an ICD. At least one documented functional license for pacing (cardiac and surgical part),</li> <li>– non-invasive cardiology department, including transesophageal echocardiography, stress testing and Holterite ECG monitoring. At least one documented functional license for transesophageal echocardiography (TEE),</li> <li>– Cardiology Clinic (receipt and specialized),</li> <li>– Cardiac surgery (may be contractually ensured at another accredited facility for the specialized field of cardiac surgery).</li> </ul> </li> <li>• The accredited facility documents in the application the provision of Part I - "Basic internal module" for a period of 24 months in full range or under contractual cooperation.</li> <li>• The accredited facility documents in the application the provision of Part II - "Compulsory practice" in full range or under contractual cooperation.</li> </ul>
<p><b>Organizational and operational requirements</b></p>	<ul style="list-style-type: none"> <li>• Necessary components involved in the activities of an accredited facility:             <ul style="list-style-type: none"> <li>– echocardiography,</li> <li>– transesophageal echocardiography,</li> <li>– stress tests,</li> <li>– outpatient blood pressure monitoring,</li> <li>– selective coronarography,</li> <li>– percutaneous coronary intervention (PCI)</li> </ul> </li> </ul>
	<ul style="list-style-type: none"> <li>– double-sided cardiac catheterization,</li> <li>– prime implantation of a permanent pacemaker.</li> <li>• Recommended components involved in the activities of an accredited facility:             <ul style="list-style-type: none"> <li>– invasive electrophysiological examination with radiofrequency ablation,</li> <li>– implantation of ICD (implantable cardioverter defibrillator)</li> </ul> </li> </ul>

## 7.2 Explanatory notes — requirements for accredited facilities

- 1) Provider of health care services is accredited for joint internships within the educational programme of this and another field within its own medical facility or that of a contractual provider of health care services.
- 2) Provider of health care services must comply with the conditions laid down by the educational programme of Anesthesiology and Intensive medicine, namely in the section
- 3) Provider of health care services must comply with the conditions laid down by the educational programme of Surgery, namely in the section "accredited facility type I".



- 4) Provider of health care services must comply with the conditions laid down by the educational programme of Internal medicine, namely in the section "accredited facility type
- 5) Provider of health care services must comply with the conditions laid down by the educational programme of Internal medicine, namely in the section "accredited facility type
- 6) Provider of health care services must comply with the conditions laid down by the educational programme of Internal medicine, namely in the section "accredited facility type I or II" – intensive care unit as part of an internal department providing in-patient health care across the full spectrum of internal diseases of the field of Internal medicine specialized education with accreditation of type I or II (the accredited facility must have a supervisor with the highest education in the field of Cardiology or with specialized competence in the field of Cardiology) or intensive care unit within an accredited facility for the field of Cardiology specialized education (the accredited facility must have a supervisor with the highest education in the field of Cardiology or with specialized competence in the field of Cardiology).
- 7) Provider of health care services must comply with the conditions laid down by the educational programme of Cardiology, namely in the section "accredited facility".
- 8) Provider of health care services must comply with the conditions laid down by the educational programme of Cardiac surgery, namely in the section "accredited facility".
- 9) ... in any educational programme.
- 10) ... completion concerns doctors who in the exercise of their profession only indicate medical radiation to their patients, i.e., they are not radiation workers, or applied experts and have no specialized competence pursuant to Act No. 18/1997 Coll., "Atomic Act", as amended.
- 11) ... in the stated educational programme.

## 8 Programmes of mandatory educational activities and the personnel and technical resources for their implementation

### 8.1 Characteristics of educational activities

#### 8.1.1 Programme of the course Medical first aid

Subject	Minimum number of hours
Sudden arrest of blood circulation, incidence, diagnosis, basic and enhanced emergency resuscitation including defibrillation (Basic Life Support and Advanced Cardiac Life Support).	2
Unexplained unconsciousness, convulsions, syncope; strokes, diagnostic procedures, therapeutic window, systemic and intra-arterial thrombolysis.	2
Shortness of breath, main causes: respiratory etiology – bronchial asthma, status asthmaticus, inhalation trauma etc., cardiovascular etiology – cardiac failure, cardiac asthma, pulmonary edema, embolism of pulmonary artery, special conditions: drowning and asphyxiation by drowning, strangulation, etc., diagnosis, differential diagnosis, therapeutic procedures, principles of artificial lung ventilation.	2
Chest pain, acute coronary syndrome, principles of thrombolysis indication, PTCA (Percutaneous Transluminal Coronary Angioplasty), serious dysrhythmias and therapeutic approaches.	2
Traumatology – serious injuries, head injury, spinal, chest, abdomen injuries, injuries of the extremities, multiple trauma, injuries from electric current, thermal injuries, main principles of ATLS (Advanced Trauma Life Support).	2
Shock, diagnosis, classification, causes, therapeutic approaches.	1
Mass occurrence of the wounded, main principles of BATLS (Battlefield Advanced Trauma Life Support).	1
Integrated rescue system and crisis logistics.	1
Peculiarities of urgent conditions in children.	2
Extramural childbirth, care of the newborn and mother, gynecological acute conditions.	1
Practical training.	4
Knowledge verification test.	
<b>In total</b>	<b>20</b>

**Personnel and technical resources for the course Medical first aid****Personnel resources**

- Doctors with specialized competence or special competence in the field of emergency medicine and practical experience of at least 5 years in the field, possibly with specialized competence in the taught issues.
- Guarantor of the course has the highest education in the field and at least 10 years of experience practising as a doctor in the field of specialization.
- Together with the invitation to the course, the course participants will receive on a CD textbooks for Medical first aid so as to get familiar with the topics, which will enable in due time to discuss such extensive and challenging issues.

**Technical resources**

- Classroom for theoretical instruction with the appropriate equipment.
- Classroom for practical training with equipment: model (adult, child and newborn) enabling practical training in both basic and advanced emergency resuscitation with simultaneous record of the monitored vital signs (especially respiratory and circulation) for purposes of objectification of the effectiveness of the resuscitation carried out and with the option to save the monitored data into the PC and the final evaluation.  
The model must enable the practice of:
  - ensuring airflow through the respiratory tract using Combi-tube air conduits, laryngeal tube, laryngeal mask (including intubation) and the various techniques of tracheal intubation,
  - artificial pulmonary ventilation from lungs to lungs through the mouth, mask, manual breathing apparatus  
/transport ventilator,
  - practice of intubation of children/infants and artificial pulmonary ventilation,
  - ensuring airflow through the respiratory tract using coniotomy, minitracheostomy (cricotomy),
  - puncture of pneumothorax,
  - ensuring entry into the bloodstream - puncture and cannulation of the peripheral central vein (the subclavian artery, the jugular int.), v. femoralis and the various techniques of intraosseous access,
  - diagnosis of simulated rhythm disturbances on cardioscope and the choice of pharmaco- and electro impulse therapy.
- Computer lab for the final testing of knowledge. For an objective assessment it is necessary to work at least with a certified quasi-standardized test.

### 8.1.2 Programme of the course Introduction to healthcare legislation, ethics and communication

Subject	Minimum number of hours
<b>Legislation</b>	8
Basic regulations on health care and their hierarchy.	
Organization and management of health care.	
The patient's decision-making (informed consent, refusal of care).	
Provision of health care without consent of, the means of restraint.	
Mandatory confidentiality of health care professionals.	
Keeping and management of health-care documentation.	
The appropriate expertise (lege artis).	
Complaints in the health sector.	
Legal liability of doctors and providers of health-care services.	
Provision of health care in the European Union and cross-border health care.	
<b>The system of public health insurance.</b>	2
Health-care services paid for by health insurance.	
Health insurance payers, the rights and obligations of insured persons.	
The system of payments for medical care.	
<b>The social security system and medical advisory service.</b>	2
Sickness insurance.	
Pension insurance.	
Social assistance and social services.	
<b>Medical ethics.</b>	2
Codes of ethics, ethical behavior of health care professionals.	
The basic codes and ethical principles.	
Ethical problems in today's medicine.	
<b>Communication in health care.</b>	2
The basic codes and specifics.	
Communication between health care professionals, patients and those close to them.	
Crisis communication.	
<b>In total</b>	<b>16</b>

**Personnel and technical resources for the course Fundamentals of health legislation, ethics and communication**

<b>Personnel resources</b>
<ul style="list-style-type: none"> <li>• A minimum of two tutors with the knowledge of medical law and public health, a degree in law and professional experience in the field of medical law for a period of at least 5 years. Tutors of medical law submit and overview of publishing activities for the last 5 years and pedagogical activities.</li> <li>• Part of the team of tutors must be tutors holding a university degree with a relevant focus and having at least 5 years of professional experience in the field of the taught issues (ethics, communication and social security).</li> </ul>
<b>Technical resources</b>
<ul style="list-style-type: none"> <li>• Classroom for theoretical instruction with the appropriate equipment; the provision of textbooks for Introduction to medical legislation, or other.</li> </ul>

**8.1.3 Programme of the course Prevention of harmful use of addictive substances (AS) and treatment of addictions**

<b>Subject</b>	<b>Minimum number of hours</b>
Harmful use of AS and addictions to AS in the Czech Republic.	1
Overview of addictive substances abused in the Czech Republic and their	1
Health aspects of harmful use of AS and addictions to AS.	1
Issues of harmful use of AS and addictions to AS in the specific conditions of individual medical fields, the possibility of prevention.	2
Overview of specific treatment modalities for persons harmfully using AS and addicts.	1
Legal aspects related to the abuse of AS and addictions to AS.	1
Conclusion of the course, discussion.	1
<b>In total</b>	<b>8</b>

**Personal and technical resources for the course Prevention of harmful use of addictive substances (AS) and treatment of addictions**

<b>Personnel resources</b>
<ul style="list-style-type: none"> <li>• Doctors with specialized competence or special competence in the field of addiction disease and practical experience of at least 5 years in the field, possibly with specialized competence in the taught issues.</li> </ul>
<b>Technical resources</b>
<ul style="list-style-type: none"> <li>• Classroom for theoretical instruction with the appropriate equipment.</li> </ul>

## 8.1.4 Programme of the course Radiation protection

Subject	Minimum number of hours
a) effects of ionizing radiation on living systems, the nature of deterministic and stochastic effects. Quantities and units used for the purposes of radiation protection.	1
b) System of radiation protection, application of the basic principles of radiation protection in the contemporary concept and legislation of the EU and the Czech Republic.	1
c) Radiation burden on the population from a variety of sources of ionizing radiation. The specific nature of medical radiation, the dosage size of patients for typical radiological procedures.	1
d) the role of doctors indicating a diagnosis or treatment with the use of sources of ionizing radiation – the importance of indication criteria (Journal of MZ, 11, November 2003).	1
e) Principles of implementation of requirements for radiation protection of patients when performing and managing medical procedures using sources of ionizing radiation - optimization of radiation protection during medical radiation (diagnostic reference levels, the principle of ALARA "As Low As Reasonably Achievable").	1
f) Practical methods of protection of radiological and other workers, other patients and the population when using the sources of ionizing radiation in a medical facility (controlled and monitored zone, system of monitoring, documentation keeping, programme of quality assurance).	1
g) Responsibility for ensuring radiation protection requirements in the use of sources of ionizing radiation in medicine: the role of indicating physician, applying specialist, radiological physicist. The importance of continuous supervision by the supervising person and person with direct responsibility.	1
h) occupational-medical care of radiation workers. Medical assistance to people irradiated as a result of radiation accident.	1
<b>In total</b>	<b>8</b>

**Personnel and technical resources for the course Radiation protection****Personnel resources**

- Tutors with specialized competence in the field of radiology and imaging methods, specialization in the field radiological physicist, or specialization in radiation protection (National Institute of Radiation Protection (hereinafter referred to as "NIRP"), the State Office for Nuclear Safety (hereinafter referred to as "SONS")) for subjects in points a), b), c), (e), f) and g).
- Tutors with specialized competence or specialized professional competence in the field of radiology and imaging methods, neuroradiology and pediatric radiology for the subject in point (d).
- Tutors with specialized competence or specialized professional competence in the field of occupational medicine, radiology, or with specialized competence in radiation protection (NIRP, SONS) for the subject in point h).

**Technical resources**

- Classroom for theoretical instruction with the appropriate equipment, provision of learning materials.

### 8.1.5 Programme of the course News from internal medicine

Subject	Minimum number of hours
News in the diagnosis and treatment of cardiovascular diseases, in particular: acute coronary syndromes, arterial hypertension, pulmonary embolism, ischemic disease of lower limbs, prevention of cardiovascular diseases.	6
Current views on urgent resuscitation. Requirements of the anaesthetist for pre-operation examination.	3
News in diagnosis and treatment of gastrointestinal diseases, in particular: ulcer disease of the stomach and duodenum, bleeding in the digestive tube cancer bowel syndrome, idiopathic inflammatory bowel diseases, pancreas diseases, infectious hepatitis, cirrhosis of the liver.	4
Current views on surgical diagnosis and treatment of surgical sudden events - abdominal, thoracic and vascular (for internists).	2
Current view on the diagnosis and treatment of the most common pulmonary diseases, in particular: lung cancer, bronchial asthma and chronic obstructive pulmonary disease, respiratory insufficiency, tuberculosis.	3
Blood diseases: an overview with emphasis on news in the field, particularly: anemia, blood transfusion and blood derivatives, coagulation disorders, hematological malignancy.	3
Current view on the diagnosis and treatment of the most common nephrological diseases.	2
Current issues in endocrinology, related to diseases monitored by an internist.	2
Current view on the diagnosis and treatment of diabetes (for internists).	2
News in approaches to rheumatological diseases (for internists).	2
Current issues in the diagnosis and treatment of geriatric patients and their solutions.	2
News in neurology, in particular approaches to vascular brain events.	2
News in the rationalization of prescribing and adverse reactions to drugs.	1
Occupational medicine and toxicology: current overview for internists.	1
<b>In total</b>	<b>35</b>



**Personnel and technical resources for the course News from internal medicine**

<b>Personnel resources</b>
<ul style="list-style-type: none"> <li>• Doctors with specialized competence or specialized professional competence in the field of internal medicine, or specialized competence in the taught issues and practical experience of at least 10 years in the field.</li> <li>• Guarantor of the course has the highest education in the field and at least 10 years of experience practising as a doctor in the field of specialization.</li> </ul>
<b>Technical resources</b>
<ul style="list-style-type: none"> <li>• Classroom/lecture hall for theoretical instruction with the appropriate equipment.</li> <li>• Computer lab for the final testing of knowledge.</li> </ul>

**8.1.6 Programme of the pre-certification course in Cardiology**

<b>Subject</b>	<b>Minimum number of hours</b>
Atherosclerosis. Primary and secondary prevention of atherosclerosis.	1
Diagnosis and treatment of primary hypertension.	1
Secondary hypertension.	1
Diabetes mellitus and heart disease.	1
Dyslipidemia, diagnosis and treatment.	1
Practical use of nuclear cardiology.	1
Practical use of CT and NMR in cardiology.	1
Evidence based medicine. Studies in cardiology and their assessment.	1
Chronic coronary heart disease.	1
Diagnostic cardiac catheterization and hemodynamics.	1
Acute coronary syndromes.	2
Cardiomyopathy and myocarditis. Pericarditis.	2
Acute heart failure.	2
Chronic heart failure.	2
Heart transplantation (including mechanical circulation support).	2
Acquired valvular heart anomalies.	2
Congenital heart anomalies.	1
Infectious endocarditis.	1
Heart and vascular disease in pregnancy. Care for cardiac patients before non-cardiac operations.	2
Diagnosis and treatment of pulmonary embolism. Pulmonary hypertension.	2
Diagnosis and treatment of diseases of peripheral veins. Prevention of venous thrombosis and pulmonary embolism. Diseases of peripheral arteries.	2

<i>Ministry of Health of the Czech Republic</i>	<b>CARDIOLOGY - educational programme</b>
Diseases of the aorta.	1
Pharmacotherapy and drug interactions in cardiology.	1
Sudden death and its prevention.	1
Bradyarrhythmias and their treatment.	1
Supraventricular arrhythmias and their treatment.	2
Ventricular arrhythmias, diagnosis and treatment.	2
Nonpharmacological treatment of arrhythmias.	1
<b>In total</b>	<b>39</b>

### **Personnel and technical resources for the pre-certification course in Cardiology**

<b>Personnel resources</b>
<ul style="list-style-type: none"> <li>• Doctors with specialized competence in the field of cardiology and/or specialized competence in the taught issues and practical experience of at least 10 years in the field.</li> <li>• Guarantor of the course has the highest education in the field and at least 10 years of experience practising as a doctor in the field of specialization.</li> </ul>
<b>Technical resources</b>
<ul style="list-style-type: none"> <li>• Classroom/lecture hall for theoretical instruction with the appropriate equipment.</li> </ul>