

Study plan

Name of study plan: Radiological Assistant - full-time

Faculty/Institute/Others:

Department: Department of Health Care Disciplines and Population Protection

Branch of study guaranteed by the department: Radiological Assistant

Garantor of the study branch: prof. MUDr. Jozef Rosina, Ph.D., MBA

Program of study: Specializations in Health Service

Type of study: Bachelor full-time

Required credits: 180

Elective courses credits: 0

Sum of credits in the plan: 180

Note on the plan:

Name of the block: Compulsory courses

Minimal number of credits of the block: 175

The role of the block: Z

Code of the group: 17PBR POV 15

Name of the group: Radiological Assistant compulsory course 15

Requirement credits in the group: In this group you have to gain 175 credits

Requirement courses in the group: In this group you have to complete 65 courses

Credits in the group: 175

Note on the group:

Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
17PBRAOF1	Human Anatomy and Physiology I Yulia Čuprová, Raděk Matlach Ivan Dylevský Yulia Čuprová (Gar.)	Z	5	2P+2S	Z	z
17PBRAOF2A	Human Anatomy and Physiology II Yulia Čuprová Ivan Dylevský Yulia Čuprová (Gar.)	Z,ZK	4	2P+2S	L	z
17PBRAR	Angiography and Interventional Radiology František Jira František Jira František Jira (Gar.)	ZK	1	1P	Z	z
17BOZP	Occupational Safety and Health, Fire Protection and First Aid Petr Kudrna Petr Kudrna Petr Kudrna (Gar.)	Z	0	1P	Z	z
17PBRERF	Radiation Protection Jana Hudzietzová Jana Hudzietzová Jana Hudzietzová (Gar.)	Z	1	1C	L	z
17PBRIOP	Individual Nursing Practice Martina Dingová Šliková Martina Dingová Šliková (Gar.)	Z	4	4XT	L	z
17PBRIPR	Individual Summer Practice Zdeněk Hon Jana Hudzietzová (Gar.)	Z	3	160XH	L	z
17PBRISZ	Information Systems in Healthcare Zoltán Szabó, Radim Krupička, Dagmar Brechlerová, Martin Bejtíc, Anna Schlenker Radim Krupička Zoltán Szabó (Gar.)	KZ	2	1P+1S	L	z
17PBRKVZ	Communication in Healthcare Martina Dingová Šliková Monika Donevová Martina Dingová Šliková (Gar.)	KZ	1	1C	L	z
17PBRKR1	Conventional Radiology I Ondřej Krahula Ondřej Krahula (Gar.)	Z	2	1P+1C	Z	z
17PBRKR2	Conventional Radiology II Jana Hudzietzová, Ondřej Krahula Ondřej Krahula (Gar.)	ZK	1	1P	L	z
17PBRKZP1	Conventional Imaging Procedures I - Practical Lessons Ondřej Krahula Ondřej Krahula (Gar.)	Z	5	4C	Z	z
17PBRKZP2	Conventional Imaging Procedures II - Practical Lessons Jana Hudzietzová, Ondřej Krahula Zdeněk Hon Ondřej Krahula (Gar.)	KZ	2	4C	L	z
17PBRMAZ	Management and Administration in Healthcare Jiří Černý Jiří Černý Jiří Černý (Gar.)	KZ	2	1P	L	z
17PBRMT	Medical Terminology Jitka Zacharovová Jitka Zacharovová Jitka Zacharovová (Gar.)	KZ	2	1S	Z	z
17PBRMVP	Methodology of Scientific Research Monika Donevová, Leoš Navrátil Leoš Navrátil Leoš Navrátil (Gar.)	Z	2	1P+1S	Z	z
17PBRNM1	Nuclear Medicine I Petra Dostálová Petra Dostálová Jozef Rosina (Gar.)	KZ	2	1P+1C	Z	z

17PBRNM2	Nuclear Medicine II Jitka Svobodová, Petr Vlček, Tereza Kráčmerová Petr Vlček Petr Vlček (Gar.)	Z	2	1P+1C	L	Z
17PBRNM3	Nuclear Medicine III Jitka Svobodová, Petr Vlček, Lucie Lančová, Kateřina Michalová Jitka Svobodová Petr Vlček (Gar.)	Z,ZK	3	2P+1C	Z	Z
17PBRNMK	Nuclear Medicine - Practice Jana Hudzietzová, Eva Švarcpíková, Markéta Novotná, Jaromíra Turková Zdeněk Hon Jana Hudzietzová (Gar.)	Z,ZK	7	80XH	L	Z
17PBRNMP	Nuclear Medicine - Practice Petr Vlček Petr Vlček Petr Vlček (Gar.)	Z	4	4C	Z	Z
17PBROOP	Professional Nursing Care Martina Dingová Šliková Martina Dingová Šliková (Gar.)	Z	3	2XT	L	Z
17PBROTP	Orthopedics and Traumatology of the Locomotor Apparatus Jan Ježek, Radek Bartoška, Jiří Záhorka Radek Bartoška Radek Bartoška (Gar.)	ZK	2	2P	Z	Z
17PBRPZM	The Status of Imaging Methods in Clinical Diagnostics Tomáš Tůma Tomáš Tůma Tomáš Tůma (Gar.)	KZ	2	1P	Z	Z
17PBRPSB	Block Practical Training During the Semester (11th to 14th week) Zdeněk Hon Jana Hudzietzová (Gar.)	Z	3	160XH	L	Z
17PBRPPP	Pre-Medical Assistance and Care Pavel Böhm Pavel Böhm Pavel Böhm (Gar.)	Z,ZK	3	1P+1C	Z	Z
17PBRPTN	Devices in Nuclear Medicine Jana Hudzietzová, Jiří Hozman Jiří Hozman Jiří Hozman (Gar.)	KZ	2	1P+1C	L	Z
17PBRPTD	Devices in Radiology Jiří Hozman Jiří Hozman Jiří Hozman (Gar.)	Z,ZK	2	1P+1C	L	Z
17PBRPTR	Devices in Radiotherapy Ondřej Krahula Ondřej Krahula (Gar.)	KZ	1	1P	Z	Z
17PBRRAOA	Radiation Protection Jana Hudzietzová, Ondřej Krahula František Podzimek Ondřej Krahula (Gar.)	ZK	2	2P	L	Z
17PBRRDB	Radiobiology Jana Hudzietzová, Leoš Navrátil, Emil Kormuth, Renata Havránková, Daniela Obítková Leoš Navrátil Jana Hudzietzová (Gar.)	KZ	4	2P	Z	Z
17PBRRAD1	Radiodiagnosics I Kamila Harasová Kamila Harasová Kamila Harasová (Gar.)	KZ	2	1P+1C	Z	Z
17PBRRAD2	Radiodiagnosics II František Jira František Jira František Jira (Gar.)	Z	1	1P	L	Z
17PBRRF1	Radiological Physics I. František Podzimek František Podzimek František Podzimek (Gar.)	Z,ZK	4	2P+1C	Z	Z
17PBRFY2	Radiological Physics II. František Podzimek František Podzimek František Podzimek (Gar.)	Z,ZK	3	2P+1C	L	Z
17PBRRKA	Radiological Case Report Jiří Vrána Jiří Vrána Jiří Vrána (Gar.)	Z	1	1S	L	Z
17PBRZK	Radiological Imaging Methods-Clinical Practice Jana Hudzietzová, Ondřej Krahula Zdeněk Hon Ondřej Krahula (Gar.)	Z,ZK	9	200XH	L	Z
17PBRZM	Radiological Imaging Methods - Training Ondřej Krahula Zdeněk Hon Ondřej Krahula (Gar.)	Z	4	4C	Z	Z
17PBRRA1	Radiotherapy I Pavla Nováková, Veronika Paštyková, Pavla Buřičová Pavla Buřičová Pavla Buřičová (Gar.)	KZ	2	1P+1C	Z	Z
17PBRRA2	Radiotherapy II Pavla Nováková, Pavla Buřičová Pavla Buřičová Pavla Buřičová (Gar.)	Z	3	2P+1C	L	Z
17PBRRA3	Radiotherapy III Pavla Buřičová, Jiří Kubeš Zuzana Šebelová Jiří Kubeš (Gar.)	Z,ZK	4	2P+2C	Z	Z
17PBRKK	Radiotherapy - Clinical Training Jana Hudzietzová, Pavla Buřičová, Zuzana Šebelová Zdeněk Hon Jana Hudzietzová (Gar.)	Z,ZK	8	120XH	L	Z
17PBRRAP	Radiotherapy - Training Zuzana Šebelová Zdeněk Hon Zuzana Šebelová (Gar.)	Z	4	4C	Z	Z
17PBRRA	X-ray Anatomy Jiří Vrána Jiří Vrána Jiří Vrána (Gar.)	Z,ZK	2	1P+1C	Z	Z
17PBRSBK	Bachelor Thesis Seminar František Podzimek Monika Donevová Monika Donevová (Gar.)	Z	1	0.5S	L	Z
17PBRTA	Topographic Anatomy Jiří Vrána Jiří Vrána Jiří Vrána (Gar.)	Z,ZK	2	1P	L	Z
17PBRVKM	Selected Chapters in Applied Mathematics Jana Urzová, Svitlana Strunina Jana Urzová Jana Urzová (Gar.)	Z,ZK	4	1P+2C	Z	Z
17PBRVKR	Selected Chapters of Radiology - Specifics of Children's Age, Contrast Media & Traumatology František Jira František Jira František Jira (Gar.)	ZK	2	1P	Z	Z
17PBRVTU	Computed Tomography, Ultrasound Jana Hudzietzová, Ondřej Krahula, Jiří Hozman, Tomáš Dřížďal, Martin Rožánek Martin Rožánek Jiří Hozman (Gar.)	Z,ZK	3	2P+1C	L	Z
17PBRZBF	Medical Biophysics Jana Hudzietzová, Jozef Rosina Jozef Rosina Jozef Rosina (Gar.)	Z,ZK	2	1P+1C	Z	Z

17PBRZET	Medical Ethics <i>Tibor Brečka Tibor Brečka Tibor Brečka (Gar.)</i>	KZ	2	2P	Z	z
17PBRZLN	Health Legislation and Standards <i>Ivana Kubátová, Vojtěch Kamenský, Peter Kneppo, Ondřej Gajdoš Vojtěch Kamenský Peter Kneppo (Gar.)</i>	Z,ZK	2	1P+1S	Z	z
17PBRZPS	Health Psychology <i>Dana Rebeka Ralbovská Dana Rebeka Ralbovská Dana Rebeka Ralbovská (Gar.)</i>	KZ	2	1P+1C	L	z
17PBRZMR	Magnetic Resonance Imaging <i>Jaroslav Ráček Ondřej Krahula (Gar.)</i>	Z,ZK	2	1P+1C	Z	z
17PBRZBP	Bachelor Thesis <i>Jozef Rosina Jozef Rosina (Gar.)</i>	Z	6	4XT	L	z
17PBRZSP	Fundamental Sciagraphic Projections <i>Žaneta Honová Žaneta Honová Žaneta Honová (Gar.)</i>	Z	2	1P+1C	L	z
17PBRZKO1A	Principals of Clinical Branches I <i>Leoš Navrátil, Tomáš Heřman Leoš Navrátil Leoš Navrátil (Gar.)</i>	Z	4	2P+2C	Z	z
17PBRZKO2	Principles of Clinical Branches II <i>Leoš Navrátil, Tomáš Heřman Leoš Navrátil Leoš Navrátil (Gar.)</i>	Z,ZK	3	2P+2C	L	z
17PBRZCHB	Fundamentals of Medical Chemistry and Biochemistry <i>Daniela Obítková, Jaroslav Racek, Zdeněk Hon Daniela Obítková Jaroslav Racek (Gar.)</i>	ZK	1	1P+1C	L	z
17PBRZPF	Fundamental Pathophysiology <i>František Jira František Jira (Gar.)</i>	ZK	2	2P	Z	z
17PBRZP	Fundamentals of Pathology <i>Ivan Dylevský Ivan Dylevský Ivan Dylevský (Gar.)</i>	ZK	3	2P	Z	z
17PBRZPE	Fundamentals of Pedagogy and Education <i>Dana Rebeka Ralbovská Dana Rebeka Ralbovská Dana Rebeka Ralbovská (Gar.)</i>	KZ	1	2P	L	z
17PBRZPP	Fundamentals of the Psychotherapeutic Approach <i>Monika Donevová Monika Donevová Monika Donevová (Gar.)</i>	KZ	1	1C	L	z
17PBRZSI	Fundamentals of Statistics and Informatics <i>Hana Schaabová, Vladimír Rogalewicz, Marek Piorecký Hana Schaabová Vladimír Rogalewicz (Gar.)</i>	Z,ZK	2	1P+2C	Z	z
17PBRZTO	Fundamentals of Nursing Theory <i>Martina Dingová Šliková Martina Dingová Šliková (Gar.)</i>	KZ	2	1P+1C	L	z

Characteristics of the courses of this group of Study Plan: Code=17PBR POV 15 Name=Radiological Assistant compulsory course 15

17PBRAOF1	Human Anatomy and Physiology I		Z	5
17PBRAOF2A	Human Anatomy and Physiology II		Z,ZK	4
17PBRAR	Angiography and Interventional Radiology		ZK	1
Students are acquainted with imaging techniques in the examination of cerebral arteries, peripheral and central vascular bed, in the examination of the heart and in the examination of the venous system. They are furthermore acquainted with vascular as well as non-vascular interventional methods, with strategies of particular procedures and risks of intervention procedures. Basic information on angiographic and intervention instruments is presented.				
17BOZP	Occupational Safety and Health, Fire Protection and First Aid		Z	0
17PBRERF	Radiation Protection		Z	1
To acquaint students with the principles and tasks of radiation protection, without which they inevitably can not do any IT application and use of radionuclides. They are summarized fundamental quantities and units needed to quantify the exposure of individuals. Are discussed in detail issues associated with the determination of contributions of individual components of irradiation (external and internal components) for total effective dose. Particular attention is paid to control the exposure of workers, residents and patients. They include the relevant dose limits and their interpretation in terms of the relevant legislative requirements. They also discussed emergency situations related to nuclear and radiation accidents. At the end of the main documents are presented and recommendations on radiation protection.				
17PBRIOP	Individual Nursing Practice		Z	4
The individual nursing practice is presented next to the subject Special nursing practice and in enables the students to use theoretical knowledge and practical skill obtained by the study of theoretical and theoretical-practical study disciplines under conditions of clinical institutions. The clinical institutions for the teaching process are selected based on standards established.				
17PBRIPR	Individual Summer Practice		Z	3
Practice will take place in selected departments always under the supervision of a designated radiological physics lecturer and responsible of the technical department. In the course of individual holiday experience, students in a practical form of practice theoretical knowledge in fields of conventional radiology, radiotherapy and nuclear medicine. They should be able to correctly perform basic diagnostic and therapeutic procedures, to communicate with the patient and understand the organization of traffic at individual workplaces.				
17PBRISZ	Information Systems in Healthcare		KZ	2
The scope of the subject is teaching of method of planning and implementation of application of information technologies in health services. In the introduction, the student will be acquainted with problems of database systems in general. These are particularly hospital information systems, manager information systems, integration of healthcare information systems, implementation of systems for connection to the individual electronic health book, i.e. implementation of the interface between the information systems and health book, systems for planning visits of patients and supporting associated processes (which can be integrated into hospital integration systems), laboratory information systems, facility management, PACS, DICOM, electronic archives, data storing and also outsourcing, which is one of variants how to effectively solve problems of hospitals having enhanced requirements for personal, financial and knowledge sources in innovation and administration of information systems. Attestation of information systems according to Law No. 365/2000 Sb. - support and safety of information systems in healthcare. eHealth - priority of the programme eEurope and crucial application for wide-band initiative.				
17PBRKVZ	Communication in Healthcare		KZ	1
17PBRKR1	Conventional Radiology I		Z	2
The purpose of the subject is to acquaint students with basic imaging techniques employed in radiodiagnostics. Special attention will be paid to classical skiagraphy and skiascopy. In addition to outline of particular organ projections, the students will be acquainted with the risk nature of the discipline, protection from radiation, preparation of patients for radiodiagnostic examinations and course of basic and special conventional radiodiagnostic examinations. The target of the subject is to explain problems of making X-ray images and provide orientation in a wide spectrum of radiodiagnostic projections.				

17PBRKR2	Conventional Radiology II	ZK	1
A subject presented next to conventional radiology I. The target of the subject is to deepen knowledge and extent it by knowledge of special examination projections and procedures. Special attention will be paid to the digitalization of the image in skiagraphic as well as skiascopic examinations. The students will be acquainted with the operation at X-ray departments. They will master an outline concerning work of scanning tools and skiagraphic systems.			
17PBRKZP1	Conventional Imaging Procedures I - Practical Lessons	Z	5
The subject is presented next to the subject Conventional radiology. Theoretical knowledge based on teaching the subject will be trained in practice and supplemented by practical experience. Practical class will be conducted by an experienced registered radiological assistant.			
17PBRKZP2	Conventional Imaging Procedures II - Practical Lessons	KZ	2
Continuation of the subject from the winter semester, second year. The subject is presented next to the subject Conventional radiology. Theoretical knowledge based on teaching the subject will be trained in practice and supplemented by practical experience. Practical class will be conducted by an experienced registered radiological assistant.			
17PBRMAZ	Management and Administration in Healthcare	KZ	2
The student is acquainted with the structure of the health sector and furthermore with model of financing health services. He/she will know problems of administrative procedures at different types of institutions and their necessary interconnections. He/she will be acquainted with specific features of certain health institutions and systems of European health institutions.			
17PBRMT	Medical Terminology	KZ	2
17PBRMVP	Methodology of Scientific Research	Z	2
Students are taught how to read and write a scholarly text in the social sciences, how to write and lecture about science, how to write professional work and a thesis.			
17PBRNM1	Nuclear Medicine I	KZ	2
The target of the subject is to acquaint students with physical principles related to nuclear medicine where radioactive substances are used, prevalently for diagnostic purposes, but also for therapeutic purposes (mainly palliative therapy). It is particularly necessary to understand the role of radionuclides in radiopharmaceuticals used and also functions of particular elements of imaging systems. Principles of imaging techniques are detailed based on single-photon and positron emission tomography and also on other tomographic methods. Attention is also paid to methods of establishing doses received by the patient due to internal irradiation. The area of radiation protection is also an important part of the teaching process, which is associated with the use of unsealed sources in nuclear medicine. This problem concerns the patient as well as staff members. Radiation accidents are also discussed, which can potentially occur at departments of nuclear medicine.			
17PBRNM2	Nuclear Medicine II	Z	2
The subject is presented next to Nuclear medicine I but it primarily brings information about the clinical part of the branch nuclear medicine. In the subject, the students are acquainted with problems of radionuclide diagnostic and therapeutic methods. Specific problems of radiation protection at nuclear medicine institutions are furthermore presented.			
17PBRNM3	Nuclear Medicine III	Z,ZK	3
The subject is presented next to Nuclear medicine II. It is aimed at deepening knowledge and skill in diagnostic and therapeutic procedures in nuclear medicine.			
17PBRNMK	Nuclear Medicine - Practice	Z,ZK	7
The students will deepen theoretical and practical knowledge based on a practical form of study. Under supervision by radiological assistants, they will perform particular radionuclide diagnostic and therapeutic methods. They will learn to cooperate with staff members from other clinical departments of the hospital.			
17PBRNMP	Nuclear Medicine - Practice	Z	4
The practice is focused at mastering handling with diagnostic instruments at the department of nuclear medicine, Central Military Hospital under a supervision of a radiological assistant and work on computerized evaluation devices under a supervision of an expert physician. The students should be oriented in the use of basic methods and special techniques. The practice includes organization of the work at department of nuclear medicine and control of quality of the instruments used.			
17PBROOP	Professional Nursing Care	Z	3
Special nursing practice enables the students to take advantage of knowledge and skill mastered by the study of theoretical and theoretical-practical subjects under conditions of clinical institutions. It offers opportunity for upgrading the skill and habits and leads student to independence, responsibility and team work. It is implemented according to the plan of clinical teaching under supervision of a teacher of nursing or trained qualified mentor sharing the responsibility for the student and participating in the teaching process. The clinical institutions are selected for the teaching process based on standards established. The extent and scope of the special practice is delimited by the study plan, nature of the study practice and internal directives establishing the form and contents of practical teaching. The student will be acquainted with the medical environment and will form his/her relationship to patients. The target of the practice is enhancement of the skill and deepening of practical knowledge. The students have an opportunity of confrontation, application and development of knowledge mastered in theoretical education. The subject synthesizes theoretical knowledge and manual skill mastered by students in the subject basic nursing and teaches the students using knowledge and skill under natural conditions. The student will be acquainted with the organization of work at a nursing unit and with the operation of hospital and will master principles of the protection and safety at work. The student will master experience and deepen skill in communication with patients and with further members of the healthcare team. The student performs the following nursing procedures - all the student activity is carried out under a control of an experienced nurse assigned by the management of the clinical department.			
17PBROTP	Orthopedics and Traumatology of the Locomotor Apparatus	ZK	2
Basic orthopaedics and traumatology of the locomotor apparatus. Complex outline of the prevention, diagnostics and therapy of locomotor apparatus disorders with the use of the most modern trends in orthopaedic surgery techniques, with emphasize on the subsequent rehabilitation. The complex outline of the locomotor apparatus traumatology with subsequent conservative therapy and use of modern procedures of subsequent rehabilitation and incorporation of the patient into the society.			
17PBRPZM	The Status of Imaging Methods in Clinical Diagnostics	KZ	2
The subject acquaints students with a typical examination algorithm in different diseases. It shows them individual imaging techniques in particular pathological findings. It informs them about diagnostic advantages and drawbacks of individual methods for particular diseases of patients.			
17PBRPSB	Block Practical Training During the Semester (11th to 14th week)	Z	3
The practice will be implemented at special departments of the Central Military Hospital and Institute of Radiation Oncology, Faculty Hospital Bulovka under supervision of selected radiological assistants - physicists of the institutions. The students will train the mastered theoretical knowledge in practice in the fields of conventional radiology, radiotherapy and nuclear medicine. They should be able to perform basic diagnostic and therapeutic procedures. The practice includes organization of work at particular departments.			
17PBRPPP	Pre-Medical Assistance and Care	Z,ZK	3
17PBRPTN	Devices in Nuclear Medicine	KZ	2
The main goal is to give review of the technology for nuclear medicine with accent on the basic physical principles, technology structure, parameters, data processing and application specifics in clinical practice. Students will be able to consider of the application of the selected devices for selected purpose in clinical practice.			
17PBRPTD	Devices in Radiology	Z,ZK	2
Basic concept, function principle and X-ray imaging system review. Basic block scheme. Basic X-ray setup. Stable and mobile systems. Mamograph, Dental X-ray, panoramic X-ray. Cassette type. X-ray tube with stable and rotational anode. X-ray tube foci. X-ray tube parameters. Anode voltage, current, proton number and material effect on the X-ray spectrum. Exposure and expositional machine. X-ray detectors. X-ray TV systems. Image intensifier basic principle and parameters. DSA principle. Basics of digital radiography. Categorization and review of the systems. CR systems. Direct and in-direct digital radiography. Basic criteria of the output image data quality.			
17PBRPTR	Devices in Radiotherapy	KZ	1
17PBRRAOA	Radiation Protection	ZK	2
17PBRRDB	Radiobiology	KZ	4

17PBRRAD1	Radiodiagnostics I	KZ	2
The subject is oriented at understanding the principle and function of particular elements of radiodiagnostic systems (X-ray tube, generator, film, amplifier of the image, processing and evaluation of the image information). The students are familiarized with characteristics of the use of the interaction of X-rays for obtaining the diagnostic information required. Particular radiodiagnostic modalities are considered including routine skiascopy, skiagraphy, computerized tomography and also specific questions concerning mammography and dental diagnostics. Attention is also paid to the control of quality and its effects on minimizing radiation load to patients. Principles of radiation protection are discussed resulting in minimizing the personnel as well as public. Possibilities of potential accidents in radiodiagnostics and their prevention are also considered.			
17PBRRAD2	Radiodiagnostics II	Z	1
The target of the subject is to acquaint students with principles of examination with X-rays, ultrasound and magnetic resonance. The students will master the history of the branch, its position in contemporary medicine, risk nature, protection from radiation, preparation of patients for X-ray examinations and course of basic X-ray examinations.			
17PBRRF1	Radiological Physics I.	Z,ZK	4
17PBRFY2	Radiological Physics II.	Z,ZK	3
17PBRRKA	Radiological Case Report	Z	1
The scope of the subject is demonstration of most frequent pathological findings in X-ray documentation. Diagnostic possibilities of conventional radiology, computerized tomography, digital subtraction angiography and magnetic resonance will be discussed.			
17PBRRZK	Radiological Imaging Methods-Clinical Practice	Z,ZK	9
Individual practical exercises for students. Use of still existing theoretical knowledge and practical skill to a maximum extent. The target of the subject is training of basic practical habits for the preparation for future occupational position. The students will be conducted by registered radiological assistants.			
17PBRRZM	Radiological Imaging Methods - Training	Z	4
Individual practical exercises for students. Use of still existing theoretical knowledge and practical skill to a maximum extent. The target of the subject is training of basic practical habits for the preparation for future occupational position. The students will be conducted by registered radiological assistants .			
17PBARRA1	Radiotherapy I	KZ	2
The target of the subject is to acquaint students with principles of the use of ionizing radiation in the treatment of malignant tumours. An outline is presented of the main radiotherapeutic methods including applications of external beams of gamma radiation and electrons and also use of radioactive sources in brachytherapy. Radiotherapeutic appliances using ⁶⁰ Co and linear accelerator are detailed. Attention is also paid to the problems of the quality control and beam calibration. Problems are also discussed associated with brachytherapy including determination of doses and certain specific requirements for radiation protection. In the lectures, new radiotherapeutic possibilities are also mentioned in terms of the use of neutrons and heavy charged particles. Requirements are conclusively presented concerning radiation protection in the field of radiotherapy, the special attention being paid to radiation accidents, their prevention and minimizing of their radiological consequences.			
17PBARRA2	Radiotherapy II	Z	3
The student will be acquainted with the importance of radiotherapy in context of complex oncological therapy, with types, principles of the function, use of irradiation technique, physical-technical aspects of the radiotherapeutic technique operation, planning of the treatment, importance of dosage and fractionation in radiotherapy and with modern techniques in radiotherapy.			
17PBARRA3	Radiotherapy III	Z,ZK	4
The student will be acquainted with the importance of radiotherapy in particular clinical diagnoses and method of irradiation in particular situations including the use of fixation tools, preparation for controlling target volumes and critical organs, dose limits and administered doses, compilation of plans, performance of irradiation and evaluation of the radiotherapy quality.			
17PBRRKK	Radiotherapy - Clinical Training	Z,ZK	8
The student will be acquainted with the practical form and problems of location of patients for radiotherapy, manufacture of fixating tools, blocks, performance of planning CT examinations, work with the obtained image material for purposes of planning radiotherapy, basic principles of compiling irradiation plans. He/she will be able to perform individual irradiations, i.e. setting of patients, performance of verification scans, use of image-directed radiotherapy. He/she should be oriented in the use of special techniques, such as TBI, hyperthermia. The practice includes the work with therapeutic X-ray apparatus and with the operation of brachyradiotherapy.			
17PBRRAP	Radiotherapy - Training	Z	4
The student will be acquainted with the practical form and problems of location of patients for radiotherapy, manufacture of fixating tools, blocks, performance of planning CT examinations, work with the obtained image material for purposes of planning radiotherapy, basic principles of compiling irradiation plans. He/she will be able to perform individual irradiations, i.e. setting of patients, performance of verification scans, use of image-directed radiotherapy. He/she should be oriented in the use of special techniques, such as TBI, hyperthermia. The practice includes the work with therapeutic X-ray apparatus and with the operation of brachyradiotherapy.			
17PBARRA	X-ray Anatomy	Z,ZK	2
The students are acquainted with details of imaging organs and body parts in X-ray images made by classical conventional procedures.			
17PBRSBK	Bachelor Thesis Seminar	Z	1
Familiarization with the principles of information collection, processing and presentation of written and oral form, what is literature search, citation index, database specialist.			
17PBRTA	Topographic Anatomy	Z,ZK	2
The target of the subject is acquainting students with basic anatomy of the human body in the form of transverse sections and other standard planes employed in radiological imaging. These are examinations carried out based on computerized tomography and magnetic resonance. 3D models and other diagnostic computerized reconstructions obtained by post-processing will be discussed.			
17PBVRKM	Selected Chapters in Applied Mathematics	Z,ZK	4
The student is acquainted with extended knowledge of mathematics; the subject matter is practically trained in tutorials.			
17PBVRKR	Selected Chapters of Radiology - Specifics of Children's Age, Contrast Media & Traumatology	ZK	2
The subject acquaints students with special chapters of radiodiagnostics concerning examination of paediatric patients. Projections will be discussed, which are specific for this group of patients. Specific features of radiation protection and system of work at paediatric X-ray working sites will also be considered. The students will also master basic knowledge of contrast media used in radiodiagnostics. Terminology, composition, use and undesirable reactions will be presented. Special chapter will be aimed at conventional radiological procedures at X-ray departments of traumatological centres.			
17PBVRTU	Computed Tomography, Ultrasound	Z,ZK	3
The subject acquaints students with principles of imaging with the help of computerized tomography. Assisting tools in CT examination of particular regions examined will be detailed. Preparation of patients for examination and procedures for administration of contrast media are described. The student is acquainted with post-processing data arrangement, data transfer and possibilities of filing. The students will master knowledge of the application of programmes of quality assurance and tests of operational stability in the field of CT imaging and of adhering to rules of radiation hygiene in CT examinations. In the field of sonographic examinations the students are acquainted with principles of the origination of the sonographic image, use of B-, M-mode, colour Doppler analysis, harmonic imaging. Constructions of ultrasound instruments and differences in their equipment are described. Assisting components in sonographic imaging of particular organs and relevant sonographic anatomy are presented.			
17PBRZBF	Medical Biophysics	Z,ZK	2
17PBRZET	Medical Ethics	KZ	2
Subject introduces students to fundamental ethical issues in medical ethics due to future professional orientation. It develops students' ability to think in ethical contexts, discuss, argue and defend their views in ethical dilemma situations, which brings medical environment.			

17PBRZLN	Health Legislation and Standards	Z,ZK	2
Principles of the formation of healthcare legislation. Law on public health. Law on professional capability of performing healthcare professions and further education in the healthcare system (law on healthcare professions) and appropriate executive regulations. EU directives related to means of healthcare technique. Law on technical requirements for products. Decision of the government concerning the law on technical requirements for products. Atomic Act and its application to the healthcare sector. Formation of technical standardization in the world, in Europe and in the Czech Republic. Structure of institutions in the field of technical standards in healthcare services. Technical standards related to tools of healthcare technique. Practical implementation of laws, regulations and standards in clinical practice. Procedures in marketing new healthcare technique means. Clinical tests of instruments. The role of testing stations. Certain facts and experience from abroad. Importance, principles and legal arrangements of so called good manufacture laboratory and clinical practice (GMP, GLP and GCP). Industrial property and its protection (patents, samples). Legal protection of the intangible property. Technology centres, parks, spin-off companies. Bonds between legal and electrical engineering regulations. Risks and causes of injuries in electrical engineering. Expert capability in electrical engineering - Regulation No. 50/78 Sb. Competence of persons depending on the degree of electrical engineering qualification, revisions and controls of installations and electric appliances. Standards related to the above mentioned problems.			
17PBRZPS	Health Psychology	KZ	2
17PBRZMR	Magnetic Resonance Imaging	Z,ZK	2
The subject acquaints students with principles of magnetic resonance and procedures employed in magnetic resonance imaging and furthermore with examination strategy of particular organs and body parts. Contrast media employed in MR examinations are discussed.			
17PBRZBP	Bachelor Thesis	Z	6
Independent final project for the Bachelor's degree study program. Student will choose a topic from a range of topic related to his or her branch of study that will be specified by branch department. The Bachelor's project will be defended in front of the board of examiners for the comprehensive final examination.			
17PBRZSP	Fundamental Sciagraphic Projections	Z	2
17PBRZKO1A	Principals of Clinical Branches I	Z	4
The student is acquainted with principal problems of particular clinical branches, with most important features of diseases and possibilities of their treatment. Emphasize is put on diseases principally contributing to the mortality in the Czech Republic and those, in which non-pharmacological prevention is effective and feasible.			
17PBRZKO2	Principles of Clinical Branches II	Z,ZK	3
The student is acquainted with basic problems of particular clinical disciplines, with most important features of diseases and possibilities of their treatment. Emphasize is put on diseases principally contributing to the mortality in the Czech Republic and to those, in which non-pharmacological prevention is effective and feasible.			
17PBRZCHB	Fundamentals of Medical Chemistry and Biochemistry	ZK	1
17PBRZPF	Fundamental Pathophysiology	ZK	2
This course provides a brief overview of the pathophysiology of organ systems, based on knowledge of their normal function. Attention is focused on the failure of organ function, leading to the emergence of specific pathophysiological syndromes. Knowledge of these general pathophysiological mechanisms to the understanding of the genesis of specific diseases.			
17PBRZP	Fundamentals of Pathology	ZK	3
The subject serves understanding basic pathological processes in the human organism. The tutorial teaching is closely related to themes of lectures and interconnected with practical exercises. It is considerably focused on problems and takes advantage of activation methods for enhancement of the motivation of students. Modern multimedia programmes are obviously used (as e.g. ADAM, etc.).			
17PBRZPE	Fundamentals of Pedagogy and Education	KZ	1
17PBRZPP	Fundamentals of the Psychotherapeutic Approach	KZ	1
The target of the subject is acquainting of students with particular assisting components and methods helping the individual to face stress, conflict a crisis situations. It will help him/her better self-knowledge and knowledge of the other individuals, capability of empathy, congruence and acceptance. An integral part is practical training of particular assisting components, works in the group and conclusive inquiry integrating the knowledge acquired and experience of meaningful whole.			
17PBRZSI	Fundamentals of Statistics and Informatics	Z,ZK	2
17PBRZTO	Fundamentals of Nursing Theory	KZ	2

Name of the block: Compulsory elective courses

Minimal number of credits of the block: 5

The role of the block: S

Code of the group: 17PBR PV 1S

Name of the group: Radiological Assistant compulsory optional course 1st semester 13_14_15

Requirement credits in the group: In this group you have to gain at least 2 credits (at most 4)

Requirement courses in the group: In this group you have to complete at least 1 course (at most 2)

Credits in the group: 2

Note on the group:

Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
17PBRAOT	English-Language Terminology Eva Motyčková, Jitka Mariňáková Eva Motyčková Eva Motyčková (Gar.)	KZ	2	2S	Z	s
17PBRROT	Russian Language - Terminology Yulia Čuprová	KZ	2	2S	Z	s

Characteristics of the courses of this group of Study Plan: Code=17PBR PV 1S Name=Radiological Assistant compulsory optional course 1st semester 13_14_15

17PBRAOT	English-Language Terminology	KZ	2
The aim of the course is to introduce the basic medical vocabulary related to radiology. Students learn basic vocabulary related to the anatomy of human body and communication with a patient.			

17PBRROT	Russian Language - Terminology	KZ	2
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The subject Russian language - special terminology is designed for students, who intend to learn using Russian language or repeat, deepen and extend Russian language knowledge. In the first part of the subject (special terminology I), particular themes cover basic areas of the general communication (common phrases, man, school, orientation in city, sightseeings, food, culture, sport, hobby, travelling, etc.). Particular lessons exert principally the same arrangement. They start from the recommended minimum of words related to the themes, which are designed for exercising and this material is reflected in subsequent dialogues, which concern realistic situations from common life. Exercises are aimed at training and strengthening the appropriate vocabulary and partially also grammar related to the theme. Emphasize is put on active use of the Russian language, understanding similarities and different features of Czech and Russian languages, capability of speaking in most frequent situations and prompt expressing.

Code of the group: 17PBR PV 3S

Name of the group: Radiological Assistant compulsory optional course 3rd semester 13_14_15

Requirement credits in the group: In this group you have to gain at least 3 credits (at most 6)

Requirement courses in the group: In this group you have to complete at least 1 course (at most 2)

Credits in the group: 3

Note on the group:

Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
17PBREICH	Epidemiology of Infectious Diseases	KZ	3	2P	Z	s
17PBRITR	Information Technologies Zoltán Szabó, Karel Hána Zoltán Szabó Zoltán Szabó (Gar.)	KZ	3	2P	Z	s

Characteristics of the courses of this group of Study Plan: Code=17PBR PV 3S Name=Radiological Assistant compulsory optional course 3rd semester 13_14_15

17PBREICH	Epidemiology of Infectious Diseases	KZ	3
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Students are acquainted with detailed methods employed in epidemiology of transmissible diseases and in epidemiology of the environment and with diseases of non-infectious origin and are able to prepare and provide solution of a number of priorities of the public health protection.

17PBRITR	Information Technologies	KZ	3
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The subject acquaints the students with problems of information technologies employed in radiology. Considerable attention will be paid to problems of the PACS, electronic archiving of the image documentation, DICOM format, NIS, internet communication between particular subjects, interconnection of individual imaging modalities. The students will master basic knowledge of most widely employed user environments in radiology, software possibilities of adjustment, processing and reconstructions of the image, formation of 3D models and most recent IT trends.

List of courses of this pass:

Code	Name of the course	Completion	Credits
17BOZP	Occupational Safety and Health, Fire Protection and First Aid	Z	0
17PBRAOF1	Human Anatomy and Physiology I	Z	5
17PBRAOF2A	Human Anatomy and Physiology II	Z,ZK	4
17PBRAOT	English-Language Terminology	KZ	2
The aim of the course is to introduce the basic medical vocabulary related to radiology. Students learn basic vocabulary related to the anatomy of human body and communication with a patient.			
17PBRAR	Angiography and Interventional Radiology	ZK	1
Students are acquainted with imaging techniques in the examination of cerebral arteries, peripheral and central vascular bed, in the examination of the heart and in the examination of the venous system. They are furthermore acquainted with vascular as well as non-vascular interventional methods, with strategies of particular procedures and risks of intervention procedures. Basic information on angiographic and intervention instruments is presented.			
17PBREICH	Epidemiology of Infectious Diseases	KZ	3
Students are acquainted with detailed methods employed in epidemiology of transmissible diseases and in epidemiology of the environment and with diseases of non-infectious origin and are able to prepare and provide solution of a number of priorities of the public health protection.			
17PBRERF	Radiation Protection	Z	1
To acquaint students with the principles and tasks of radiation protection, without which they inevitably can not do any IT application and use of radionuclides. They are summarized fundamental quantities and units needed to quantify the exposure of individuals. Are discussed in detail issues associated with the determination of contributions of individual components of irradiation (external and internal components) for total effective dose. Particular attention is paid to control the exposure of workers, residents and patients. They include the relevant dose limits and their interpretation in terms of the relevant legislative requirements. They also discussed emergency situations related to nuclear and radiation accidents. At the end of the main documents are presented and recommendations on radiation protection.			
17PBRFY2	Radiological Physics II.	Z,ZK	3
17PBRIOP	Individual Nursing Practice	Z	4
The individual nursing practice is presented next to the subject Special nursing practice and in enables the students to use theoretical knowledge and practical skill obtained by the study of theoretical and theoretical-practical study disciplines under conditions of clinical institutions. The clinical institutions for the teaching process are selected based on standards established.			
17PBRIPR	Individual Summer Practice	Z	3
Practice will take place in selected departments always under the supervision of a designated radiological physics lecturer and responsible of the technical department. In the course of individual holiday experience, students in a practical form of practice theoretical knowledge in fields of conventional radiology, radiotherapy and nuclear medicine. They should be able to correctly perform basic diagnostic and therapeutic procedures, to communicate with the patient and understand the organization of traffic at individual workplaces.			

17PBRISZ	Information Systems in Healthcare	KZ	2
The scope of the subject is teaching of method of planning and implementation of application of information technologies in health services. In the introduction, the student will be acquainted with problems of database systems in general. These are particularly hospital information systems, manager information systems, integration of healthcare information systems, implementation of systems for connection to the individual electronic health book, i.e. implementation of the interface between the information systems and health book, systems for planning visits of patients and supporting associated processes (which can be integrated into hospital integration systems), laboratory information systems, facility management, PACS, DICOM, electronic archives, data storing and also outsourcing, which is one of variants how to effectively solve problems of hospitals having enhanced requirements for personal, financial and knowledge sources in innovation and administration of information systems. Attestation of information systems according to Law No. 365/2000 Sb. - support and safety of information systems in healthcare. eHealth - priority of the programme eEurope and crucial application for wide-band initiative.			
17PBRITR	Information Technologies	KZ	3
The subject acquaints the students with problems of information technologies employed in radiology. Considerable attention will be paid to problems of the PACS, electronic archiving of the image documentation, DICOM format, NIS, internet communication between particular subjects, interconnection of individual imaging modalities. The students will master basic knowledge of most widely employed user environments in radiology, software possibilities of adjustment, processing and reconstructions of the image, formation of 3D models and most recent IT trends.			
17PBRKR1	Conventional Radiology I	Z	2
The purpose of the subject is to acquaint students with basic imaging techniques employed in radiodiagnosics. Special attention will be paid to classical skiagraphy and skiascopy. In addition to outline of particular organ projections, the students will be acquainted with the risk nature of the discipline, protection from radiation, preparation of patients for radiodiagnostic examinations and course of basic and special conventional radiodiagnostic examinations. The target of the subject is to explain problems of making X-ray images and provide orientation in a wide spectrum of radiodiagnostic projections.			
17PBRKR2	Conventional Radiology II	ZK	1
A subject presented next to conventional radiology I. The target of the subject is to deepen knowledge and extent it by knowledge of special examination projections and procedures. Special attention will be paid to the digitalization of the image in skiagraphic as well as skiascopic examinations. The students will be acquainted with the operation at X-ray departments. They will master an outline concerning work of scanning tools and skiagraphic systems.			
17PBRKVZ	Communication in Healthcare	KZ	1
17PBRKZP1	Conventional Imaging Procedures I - Practical Lessons	Z	5
The subject is presented next to the subject Conventional radiology. Theoretical knowledge based on teaching the subject will be trained in practice and supplemented by practical experience. Practical class will be conducted by an experienced registered radiological assistant.			
17PBRKZP2	Conventional Imaging Procedures II - Practical Lessons	KZ	2
Continuation of the subject from the winter semester, second year. The subject is presented next to the subject Conventional radiology. Theoretical knowledge based on teaching the subject will be trained in practice and supplemented by practical experience. Practical class will be conducted by an experienced registered radiological assistant.			
17PBRMAZ	Management and Administration in Healthcare	KZ	2
The student is acquainted with the structure of the health sector and furthermore with model of financing health services. He/she will know problems of administrative procedures at different types of institutions and their necessary interconnections. He/she will be acquainted with specific features of certain health institutions and systems of European health institutions.			
17PBRMT	Medical Terminology	KZ	2
17PBRMVP	Methodology of Scientific Research	Z	2
Students are taught how to read and write a scholarly text in the social sciences, how to write and lecture about science, how to write professional work and a thesis.			
17PBRNM1	Nuclear Medicine I	KZ	2
The target of the subject is to acquaint students with physical principles related to nuclear medicine where radioactive substances are used, prevalently for diagnostic purposes, but also for therapeutic purposes (mainly palliative therapy). It is particularly necessary to understand the role of radionuclides in radiopharmaceuticals used and also functions of particular elements of imaging systems. Principles of imaging techniques are detailed based on single-photon and positron emission tomography and also on other tomographic methods. Attention is also paid to methods of establishing doses received by the patient due to internal irradiation. The area of radiation protection is also an important part of the teaching process, which is associated with the use of unsealed sources in nuclear medicine. This problem concerns the patient as well as staff members. Radiation accidents are also discussed, which can potentially occur at departments of nuclear medicine.			
17PBRNM2	Nuclear Medicine II	Z	2
The subject is presented next to Nuclear medicine I but it primarily brings information about the clinical part of the branch nuclear medicine. In the subject, the students are acquainted with problems of radionuclide diagnostic and therapeutic methods. Specific problems of radiation protection at nuclear medicine institutions are furthermore presented.			
17PBRNM3	Nuclear Medicine III	Z,ZK	3
The subject is presented next to Nuclear medicine II. It is aimed at deepening knowledge and skill in diagnostic and therapeutic procedures in nuclear medicine.			
17PBRNMK	Nuclear Medicine - Practice	Z,ZK	7
The students will deepen theoretical and practical knowledge based on a practical form of study. Under supervision by radiological assistants, they will perform particular radionuclide diagnostic and therapeutic methods. They will learn to cooperate with staff members from other clinical departments of the hospital.			
17PBRNMP	Nuclear Medicine - Practice	Z	4
The practice is focused at mastering handling with diagnostic instruments at the department of nuclear medicine, Central Military Hospital under a supervision of a radiological assistant and work on computerized evaluation devices under a supervision of an expert physician. The students should be oriented in the use of basic methods and special techniques. The practice includes organization of the work at department of nuclear medicine and control of quality of the instruments used.			
17PBROOP	Professional Nursing Care	Z	3
Special nursing practice enables the students to take advantage of knowledge and skill mastered by the study of theoretical and theoretical-practical subjects under conditions of clinical institutions. It offers opportunity for upgrading the skill and habits and leads student to independence, responsibility and team work. It is implemented according to the plan of clinical teaching under supervision of a teacher of nursing or trained qualified mentor sharing the responsibility for the student and participating in the teaching process. The clinical institutions are selected for the teaching process based on standards established. The extent and scope of the special practice is delimited by the study plan, nature of the study practice and internal directives establishing the form and contents of practical teaching. The student will be acquainted with the medical environment and will form his/her relationship to patients. The target of the practice is enhancement of the skill and deepening of practical knowledge. The students have an opportunity of confrontation, application and development of knowledge mastered in theoretical education. The subject synthesizes theoretical knowledge and manual skill mastered by students in the subject basic nursing and teaches the students using knowledge and skill under natural conditions. The student will be acquainted with the organization of work at a nursing unit and with the operation of hospital and will master principles of the protection and safety at work. The student will master experience and deepen skill in communication with patients and with further members of the healthcare team. The student performs the following nursing procedures - all the student activity is carried out under a control of an experienced nurse assigned by the management of the clinical department.			
17PBROTP	Orthopedics and Traumatology of the Locomotor Apparatus	ZK	2
Basic orthopaedics and traumatology of the locomotor apparatus. Complex outline of the prevention, diagnostics and therapy of locomotor apparatus disorders with the use of the most modern trends in orthopaedic surgery techniques, with emphasis on the subsequent rehabilitation. The complex outline of the locomotor apparatus traumatology with subsequent conservative therapy and use of modern procedures of subsequent rehabilitation and incorporation of the patient into the society.			
17PBRPPP	Pre-Medical Assistance and Care	Z,ZK	3

17PBRPSB	Block Practical Training During the Semester (11th to 14th week)	Z	3
The practice will be implemented at special departments of the Central Military Hospital and Institute of Radiation Oncology, Faculty Hospital Bulovka under supervision of selected radiological assistants - physicists of the institutions. The students will train the mastered theoretical knowledge in practice in the fields of conventional radiology, radiotherapy and nuclear medicine. They should be able to perform basic diagnostic and therapeutic procedures. The practice includes organization of work at particular departments.			
17PBRPTD	Devices in Radiology	Z,ZK	2
Basic concept, function principle and X-ray imaging system review. Basic block scheme. Basic X-ray setup. Stable and mobile systems. Mamograph, Dental X-ray, panoramic X-ray. Cassette type. X-ray tube with stable and rotational anode. X-ray tube foci. X-ray tube parameters. Anode voltage, current, proton number and material effect on the X-ray spectrum. Exposure and expositional machine. X-ray detectors. X-ray TV systems. Image intensifier basic principle and parameters. DSA principle. Basics of digital radiography. Categorization and review of the systems. CR systems. Direct and in-direct digital radiography. Basic criteria of the output image data quality.			
17PBRPTN	Devices in Nuclear Medicine	KZ	2
The main goal is to give review of the technology for nuclear medicine with accent on the basic physical principles, technology structure, parameters, data processing and application specifics in clinical practice. Students will be able to consider of the application of the selected devices for selected purpose in clinical practice.			
17PBRPTR	Devices in Radiotherapy	KZ	1
17PBRPZM	The Status of Imaging Methods in Clinical Diagnostics	KZ	2
The subject acquaints students with a typical examination algorithm in different diseases. It shows them individual imaging techniques in particular pathological findings. It informs them about diagnostic advantages and drawbacks of individual methods for particular diseases of patients.			
17PBRRA	X-ray Anatomy	Z,ZK	2
The students are acquainted with details of imaging organs and body parts in X-ray images made by classical conventional procedures.			
17PBRRA1	Radiotherapy I	KZ	2
The target of the subject is to acquaint students with principles of the use of ionizing radiation in the treatment of malignant tumours. An outline is presented of the main radiotherapeutic methods including applications of external beams of gamma radiation and electrons and also use of radioactive sources in brachytherapy. Radiotherapeutic appliances using ⁶⁰ Co and linear accelerator are detailed. Attention is also paid to the problems of the quality control and beam calibration. Problems are also discussed associated with brachytherapy including determination of doses and certain specific requirements for radiation protection. In the lectures, new radiotherapeutic possibilities are also mentioned in terms of the use of neutrons and heavy charged particles. Requirements are conclusively presented concerning radiation protection in the field of radiotherapy, the special attention being paid to radiation accidents, their prevention and minimizing of their radiological consequences.			
17PBRRA2	Radiotherapy II	Z	3
The student will be acquainted with the importance of radiotherapy in context of complex oncological therapy, with types, principles of the function, use of irradiation technique, physical-technical aspects of the radiotherapeutic technique operation, planning of the treatment, importance of dosage and fractionation in radiotherapy and with modern techniques in radiotherapy.			
17PBRRA3	Radiotherapy III	Z,ZK	4
The student will be acquainted with the importance of radiotherapy in particular clinical diagnoses and method of irradiation in particular situations including the use of fixation tools, preparation for controlling target volumes and critical organs, dose limits and administered doses, compilation of plans, performance of irradiation and evaluation of the radiotherapy quality.			
17PBRRAD1	Radiodiagnostics I	KZ	2
The subject is oriented at understanding the principle and function of particular elements of radiodiagnostic systems (X-ray tube, generator, film, amplifier of the image, processing and evaluation of the image information). The students are familiarized with characteristics of the use of the interaction of X-rays for obtaining the diagnostic information required. Particular radiodiagnostic modalities are considered including routine skiascopy, skiagraphy, computerized tomography and also specific questions concerning mammography and dental diagnostics. Attention is also paid to the control of quality and its effects on minimizing radiation load to patients. Principles of radiation protection are discussed resulting in minimizing the personnel as well as public. Possibilities of potential accidents in radiodiagnostics and their prevention are also considered.			
17PBRRAD2	Radiodiagnostics II	Z	1
The target of the subject is to acquaint students with principles of examination with X-rays, ultrasound and magnetic resonance. The students will master the history of the branch, its position in contemporary medicine, risk nature, protection from radiation, preparation of patients for X-ray examinations and course of basic X-ray examinations.			
17PBRRAOA	Radiation Protection	ZK	2
17PBRRAP	Radiotherapy - Training	Z	4
The student will be acquainted with the practical form and problems of location of patients for radiotherapy, manufacture of fixing tools, blocks, performance of planning CT examinations, work with the obtained image material for purposes of planning radiotherapy, basic principles of compiling irradiation plans. He/she will be able to perform individual irradiations, i.e. setting of patients, performance of verification scans, use of image-directed radiotherapy. He/she should be oriented in the use of special techniques, such as TBI, hyperthermia. The practice includes the work with therapeutic X-ray apparatus and with the operation of brachyradiotherapy.			
17PBRRDB	Radiobiology	KZ	4
17PBRRF1	Radiological Physics I.	Z,ZK	4
17PBRRKA	Radiological Case Report	Z	1
The scope of the subject is demonstration of most frequent pathological findings in X-ray documentation. Diagnostic possibilities of conventional radiology, computerized tomography, digital subtraction angiography and magnetic resonance will be discussed.			
17PBRRKK	Radiotherapy - Clinical Training	Z,ZK	8
The student will be acquainted with the practical form and problems of location of patients for radiotherapy, manufacture of fixing tools, blocks, performance of planning CT examinations, work with the obtained image material for purposes of planning radiotherapy, basic principles of compiling irradiation plans. He/she will be able to perform individual irradiations, i.e. setting of patients, performance of verification scans, use of image-directed radiotherapy. He/she should be oriented in the use of special techniques, such as TBI, hyperthermia. The practice includes the work with therapeutic X-ray apparatus and with the operation of brachyradiotherapy.			
17PBRROT	Russian Language - Terminology	KZ	2
The subject Russian language - special terminology is designed for students, who intend to learn using Russian language or repeat, deepen and extend Russian language knowledge. In the first part of the subject (special terminology I), particular themes cover basic areas of the general communication (common phrases, man, school, orientation in city, sightseeings, food, culture, sport, hobby, travelling, etc.). Particular lessons exert principally the same arrangement. They start from the recommended minimum of words related to the themes, which are designed for exercising and this material is reflected in subsequent dialogues, which concern realistic situations from common life. Exercises are aimed at training and strengthening the appropriate vocabulary and partially also grammar related to the theme. Emphasize is put on active use of the Russian language, understanding similarities and different features of Czech and Russian languages, capability of speaking in most frequent situations and prompt expressing.			
17PBRZK	Radiological Imaging Methods-Clinical Practice	Z,ZK	9
Individual practical exercises for students. Use of still existing theoretical knowledge and practical skill to a maximum extent. The target of the subject is training of basic practical habits for the preparation for future occupational position. The students will be conducted by registered radiological assistants.			
17PBRZM	Radiological Imaging Methods - Training	Z	4
Individual practical exercises for students. Use of still existing theoretical knowledge and practical skill to a maximum extent. The target of the subject is training of basic practical habits for the preparation for future occupational position. The students will be conducted by registered radiological assistants .			

17PBRBKB	Bachelor Thesis Seminar Familiarization with the principles of information collection, processing and presentation of written and oral form, what is literature search, citation index, database specialist.	Z	1
17PBRTA	Topographic Anatomy The target of the subject is acquainting students with basic anatomy of the human body in the form of transverse sections and other standard planes employed in radiological imaging. These are examinations carried out based on computerized tomography and magnetic resonance. 3D models and other diagnostic computerized reconstructions obtained by post-processing will be discussed.	Z,ZK	2
17PBRVKM	Selected Chapters in Applied Mathematics The student is acquainted with extended knowledge of mathematics; the subject matter is practically trained in tutorials.	Z,ZK	4
17PBRVKR	Selected Chapters of Radiology - Specifics of Children's Age, Contrast Media & Traumatology The subject acquaints students with special chapters of radiodiagnostics concerning examination of paediatric patients. Projections will be discussed, which are specific for this group of patients. Specific features of radiation protection and system of work at paediatric X-ray working sites will also be considered. The students will also master basic knowledge of contrast media used in radiodiagnostics. Terminology, composition, use and undesirable reactions will be presented. Special chapter will be aimed at conventional radiological procedures at X-ray departments of traumatological centres.	ZK	2
17PBRVTU	Computed Tomography, Ultrasound The subject acquaints students with principles of imaging with the help of computerized tomography. Assisting tools in CT examination of particular regions examined will be detailed. Preparation of patients for examination and procedures for administration of contrast media are described. The student is acquainted with post-processing data arrangement, data transfer and possibilities of filing. The students will master knowledge of the application of programmes of quality assurance and tests of operational stability in the field of CT imaging and of adhering to rules of radiation hygiene in CT examinations. In the field of sonographic examinations the students are acquainted with principles of the origination of the sonographic image, use of B-, M-mode, colour Doppler analysis, harmonic imaging. Constructions of ultrasound instruments and differences in their equipment are described. Assisting components in sonographic imaging of particular organs and relevant sonographic anatomy are presented.	Z,ZK	3
17PBRZBF	Medical Biophysics	Z,ZK	2
17PBRZBP	Bachelor Thesis Independent final project for the Bachelor's degree study program. Student will choose a topic from a range of topic related to his or her branch of study that will be specified by branch department. The Bachelor's project will be defended in front of the board of examiners for the comprehensive final examination.	Z	6
17PBRZCHB	Fundamentals of Medical Chemistry and Biochemistry	ZK	1
17PBRZET	Medical Ethics Subject introduces students to fundamental ethical issues in medical ethics due to future professional orientation. It develops students' ability to think in ethical contexts, discuss, argue and defend their views in ethical dilemma situations, which brings medical environment.	KZ	2
17PBRZKO1A	Principals of Clinical Branches I The student is acquainted with principal problems of particular clinical branches, with most important features of diseases and possibilities of their treatment. Emphasize is put on diseases principally contributing to the mortality in the Czech Republic and those, in which non-pharmacological prevention is effective and feasible.	Z	4
17PBRZKO2	Principles of Clinical Branches II The student is acquainted with basic problems of particular clinical disciplines, with most important features of diseases and possibilities of their treatment. Emphasize is put on diseases principally contributing to the mortality in the Czech Republic and to those, in which non-pharmacological prevention is effective and feasible.	Z,ZK	3
17PBRZLN	Health Legislation and Standards Principles of the formation of healthcare legislation. Law on public health. Law on professional capability of performing healthcare professions and further education in the healthcare system (law on healthcare professions) and appropriate executive regulations. EU directives related to means of healthcare technique. Law on technical requirements for products. Decision of the government concerning the law on technical requirements for products. Atomic Act and its application to the healthcare sector. Formation of technical standardization in the world, in Europe and in the Czech Republic. Structure of institutions in the field of technical standards in healthcare services. Technical standards related to tools of healthcare technique. Practical implementation of laws, regulations and standards in clinical practice. Procedures in marketing new healthcare technique means. Clinical tests of instruments. The role of testing stations. Certain facts and experience from abroad. Importance, principles and legal arrangements of so called good manufacture laboratory and clinical practice (GMP, GLP and GCP). Industrial property and its protection (patents, samples). Legal protection of the intangible property. Technology centres, parks, spin-off companies. Bonds between legal and electrical engineering regulations. Risks and causes of injuries in electrical engineering. Expert capability in electrical engineering - Regulation No. 50/78 Sb. Competence of persons depending on the degree of electrical engineering qualification, revisions and controls of installations and electric appliances. Standards related to the above mentioned problems.	Z,ZK	2
17PBRZMR	Magnetic Resonance Imaging The subject acquaints students with principles of magnetic resonance and procedures employed in magnetic resonance imaging and furthermore with examination strategy of particular organs and body parts. Contrast media employed in MR examinations are discussed.	Z,ZK	2
17PBRZP	Fundamentals of Pathology The subject serves understanding basic pathological processes in the human organism. The tutorial teaching is closely related to themes of lectures and interconnected with practical exercises. It is considerably focused on problems and takes advantage of activation methods for enhancement of the motivation of students. Modern multimedia programmes are obviously used (as e.g. ADAM, etc.).	ZK	3
17PBRZPE	Fundamentals of Pedagogy and Education	KZ	1
17PBRZPF	Fundamental Pathophysiology This course provides a brief overview of the pathophysiology of organ systems, based on knowledge of their normal function. Attention is focused on the failure of organ function, leading to the emergence of specific pathophysiological syndromes. Knowledge of these general pathophysiological mechanisms to the understanding of the genesis of specific diseases.	ZK	2
17PBRZPP	Fundamentals of the Psychotherapeutic Approach The target of the subject is acquainting of students with particular assisting components and methods helping the individual to face stress, conflict a crisis situations. It will help him/her better self-knowledge and knowledge of the other individuals, capability of empathy, congruence and acceptance. An integral part is practical training of particular assisting components, works in the group and conclusive inquiry integrating the knowledge acquired and experience of meaningful whole.	KZ	1
17PBRZPS	Health Psychology	KZ	2
17PBRZSI	Fundamentals of Statistics and Informatics	Z,ZK	2
17PBRZSP	Fundamental Sciagraphic Projections	Z	2
17PBRZTO	Fundamentals of Nursing Theory	KZ	2

For updated information see <http://bilakniha.cvut.cz/en/FF.html>

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