



**RADIOLOGICAL TECHNOLOGY**

**UNDERGRADUATE UNIVERSITY**

**STUDY PROGRAMME CURRICULUM**

**Mostar, September 2022**

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## 1. INTRODUCTION

The curriculum of the undergraduate university study programme of Radiological Technology is the result of the regular review process, which began with the Decision of the Senate at the session held on February 26, 2022 (No. 01-993-1 / 22). The regular revision procedure was carried out according to the Rulebook on the procedure of adopting new and revisions of existing study programmes (No. 01-993-1 / 22). It stipulates that the Committee coordinates a revised curriculum. The Committee also includes student representatives and external users, and the scientific-teaching/artistic-teaching council of the organizational unit submits their proposal to the University Senate for adoption.

In order to involve all stakeholders in the process of improving the study programme, a public hearing was held on July 14, 2022 (No. 01-1086/22).

The conclusions of the public debate were taken into account during the development of the curriculum. In addition to the conclusions of the public debate, the recommendations of the Expert Committee from the last institutional accreditation in 2020 were taken into account. The recommendations include practical work outside the University (where applicable), application of legal and internal acts on the minimum share of pre-examination obligations in the final grade of all courses, and the application of modern teaching methods with the student at the center of the teaching process.

Also, during the development of the curriculum, all strategic tasks in the strategic area of education from the University Development Strategy 2018 – 2023, which relate to the curriculum and teaching process, were carried out (more in the chapter "3.1. Connection to the University Development Strategy").

In addition, when making decisions on the type of changes, all relevant statistical data and survey results collected and conducted in the period since the last revision/adoption of the study programme were analyzed on June 2, 2021 (No. 01-3666/21).

Taking into account all the above, the following changes have been made in this revised curriculum in comparison to the existing one. The changes can be classified into seven categories: amendments of course titles, amendments of course hours and ECTS points, elimination of outdated compulsory courses for the profession, and introduction of new compulsory courses that contribute to the acquisition of competences and learning outcomes defined by the EU occupational standard, and amendments of course status (elective/compulsory). The essential changes of this revision refer to the decrease in theoretical training, and the increase of the share of practical classes.

Bachelor of radiological technology is a highly educated expert whose education and practical training are aimed at work in medicine, dentistry and veterinary medicine. The field of his professional activity is limited to three special medical professions: diagnostic and interventional radiology, radiotherapy and oncology and nuclear medicine. Within these professions, an expert of this profile and education performs work and tasks in the field of diagnostics, intervention and therapy. The expediency of this study is reflected in the desire to meet the needs for professional staff of state health institutions and private employers in the health sector. Medical, dental and veterinary diagnostics are unimaginable without the application of procedures that use open and closed sources of ionizing radiation, ultrasound and magnetic resonance, while the role of radiotherapy and radioactive isotope therapy is an unavoidable method of treatment of malignant diseases. The mentioned methods could not be implemented without the presence of a bachelor of radiological technology. Radiology, radiotherapy and nuclear medicine in terms of technology and methodology are very propulsive professions characterized by constant progress and innovation. Practically every 10 years, significant developments occur where older methods give way to new ones. Analog display techniques, manual procedure management, the classic way of presenting data, their transfer and storage, etc., are continuously being replaced by digital procedures and high automation in diagnostic and therapeutic procedures. All three professions include a multitude of modern methods that need to be reliably managed and supervised, whereby professional communication with the patient and with a doctor of medicine, a specialist must be flawless. For such complex tasks, a bachelor in radiological technology must be highly educated and suitably trained.

## 2. GENERAL INFORMATION ABOUT THE STUDY PROGRAMME

<b>Study programme</b>	Radiological Technology
<b>Cycle</b>	1 <sup>st</sup> cycle (undergraduate study programme)
<b>Type</b>	University study programme
<b>Scientific area</b>	Biomedicine and Healthcare
<b>Scientific field</b>	Clinical Medical Sciences/Health Sciences
<b>Academic title</b>	Bachelor of Radiological technology
<b>EQF qualification level</b>	6
<b>Duration of study programme</b>	3 years, 180 ECTS
<b>Total number of ECTS credits</b>	3 years/180 ECTS
<b>Language</b>	Croatian language
<b>Mode of study</b>	Full time
<b>Awarding institution</b>	University of Mostar
<b>Institution administering study programme</b>	University of Mostar, Faculty of Health Studies
<b>Study programme objectives</b>	Training of experts to work in all three areas of radiological technology: diagnostic-interventional, nuclear medicine and radiotherapy technology in hospital and outpatient institutions. Professional training of bachelors in radiological technology who will operate the devices while protecting patients and professional staff from unnecessary exposure to ionizing radiation.
<b>Study programme competencies</b>	<p>Standard procedures of a bachelor of radiological technology are:</p> <ul style="list-style-type: none"> <li>- Admission, debriefing and preparation of patients for diagnostic or therapeutic procedures, as well as monitoring the legal and professional credibility of the referral for examination or therapy</li> <li>- Selection and preparation of radiological or radio therapeutic devices and equipment</li> <li>- Setting up, immobilizing and protecting the patient during examination or therapy, and monitoring the patient's condition during the procedure.</li> <li>- Planning, monitoring and carrying out the diagnostic procedure in standard or additional versions, application of modifications in cooperation with the doctor</li> <li>- Independent work on picture archiving and communication system (PACS)</li> <li>- Organization of patient reception and performance of other necessary tasks and activities related to patients and procedures in cooperation with hospital clinics, departments, clinics or departments of other health institutions</li> <li>- Efficient application of all measures of protect against ionizing radiation</li> </ul> <p>Additional and modified procedures of a bachelor of radiological technology:</p> <ul style="list-style-type: none"> <li>- Assisting in the planning of diagnostic and therapeutic procedures</li> </ul>

- Assisting the doctor with actions related to the procedure
- Positioning the patient in non-standard and modified positions for imaging and radiation
- Application of methods in patients with disturbed consciousness and those with infectious diseases
- Application of recording and monitoring methods in operating rooms, emergency clinics or intensive care units
- Intervention with drugs and patient resuscitation procedures in case of adverse reactions or side effects related to the radiological procedure, in accordance with the doctor's instructions
- Participation in professional development

**Competencies in diagnostic radiology:** independent guidance or work in a team with a radiologist in the performance of conventional and digital radiography, conventional contrast imaging methods, fluoroscopy with targeted radiographic imaging, conventional tomography, imaging with endoscopic retrograde cholangiopancreatography (ERCP), digital subtraction angiography (DSA), digital coronarography and ventriculography (CDSA), fluoroscopy and fluorography with mobile radiological devices, mammography, CT, dynamic CT and CTA examinations, US and Doppler dynamic examinations, MR and MRA examinations, dental radiographs.

**Competencies in interventional radiology:** for team work when performing percutaneous transluminal angioplasty (PTA), embolotherapy and occlusion procedures, placement of vascular stents, transcatheter application of cytostatics, fluoroscopically guided cytological punctures and biopsies, US guided cytological punctures and biopsies, nephrostomy placement, cyst and abscess drainage.

**Competencies in radiotherapy and oncology:** work on a linear accelerator, work on a device for telecobalt therapy, work on devices for surface radiotherapy, work on a simulator and preparation of the necessary instruments and other accessories needed in the planning of radiotherapy, participation in the production of radiotherapy masks, production of protective blocks including lung blocks, making casts (vaginal, extremities) for intracavitary radiotherapy and percutaneous isotope therapy, making splints for children to fix limbs, making boluses, recording radiation fields during planning, tattooing the center and edge points of the radiation field, daily recording information about radiation in patients' therapeutic protocols, control and maintenance of outlined radiation fields, talking with the patient about possible radiation complaints and referring patients to a doctor, referring patients about how to prevent radiation damage (surface and other).

**Competencies in nuclear medicine:** Independent preparation of radionuclides and participation in the labeling of radiopharmaceuticals, separation of individual doses (activity) and measurement of activity with dose calibrators, participation in taking anamnesis, preparing the patient for imaging with a gamma camera (in cooperation with the doctor), placing the patient in appropriate positions for imaging with a

	<p>gamma camera, independent handling of nuclear medical instrumentation in the sense of: setting parameters, taking statistical, dynamic and (one-photon emission computed tomography (SPECT)) digital images, controlling the image acquisition process, analyzing the quality and integrity of the image, changing the collimator, processing and printing of an accepted nuclear medicine display, working with a computer at the level of the basics of operating systems, computer applications (text processing and tabular calculations) and specific nuclear medicine programs for the acquisition and analysis of digital nuclear medicine images, participation in in vitro measurements, which require knowledge of the operation of a number of different scintillation counters and detectors, preparation of conditions and participation in the implementation of radionuclide therapy, quality assurance of work standards in nuclear medicine departments: daily quality control of procedures performed independently by IMRs and active participation in to the ionizing radiation protection program for staff and patients: knows the principles of protection, uses protective equipment, participates in the optimization of radiation protection and carries out decontamination measures (if necessary).</p>
<p><b>Study programme learning outcomes</b></p>	<ol style="list-style-type: none"> <li>1. Uses theoretical knowledge and practical skills in the field of radiology, radiotherapy, nuclear and dental medicine, which enables expert access, and conducts procedures independently and as a team in all diagnostic, interventional and therapeutic disciplines (FZSRTB-IU-1)</li> <li>2. Explains the basic terms and laws of biological functions, anatomy and physiology of the organism, and pharmacology, as well as the relationship between health and the physical and social environment of man and his behavior (FZSRTB-IU-2)</li> <li>3. Explains the principle of operation of devices and handles them, knows their technological and operational capabilities, purpose and limitations (FZSRTB-IU-3)</li> <li>4. Knows the scope of use of the device, its useful potential, limitations and the method of manifesting and objectively valorizing the results of each method (FZSRTB-IU-4)</li> <li>5. Applies basic knowledge at the level of radiological diagnostics or radiotherapy, and recognizes unwanted phenomena or complications accompanying the application of methods (FZSRTB-IU-5)</li> <li>6. Ensures understanding of work processes, prediction of procedure effects or monitoring of diagnostic or therapeutic results (FZSRTB-IU-6)</li> <li>7. Distinguishes expected positive effects or results from default or harmful ones; recognizes incorrect procedures, discovers their cause, and corrects them (FZSRTB-IU-7)</li> <li>8. Categorizes all actions and procedures that protect the patient from ionizing radiation or other side effects during the diagnostic or radiotherapy process (FZSRTB-IU-8)</li> <li>9. Participates in professional training and improvement of healthcare professionals and experience in work with them (FZSRTB-IU-9)</li> <li>10. Conducts professional development, uses new methods, participates in the transfer of knowledge, research, lifelong</li> </ol>

	<p>education, and support of younger and inexperienced colleagues (FZSRTB-IU-10)</p> <p>11. Adapts communication to the needs of the interlocutor and the situation (FZSRTB-IU-11)</p> <p>12. Maintains medical documentation, uses a computer to perform work tasks and communication with patients and colleagues (FZSRTB-IU-12)</p> <p>13. Explains the basic concepts and laws of science on which the work of radiology bachelors are based, the ethics of the profession and the provisions of legislation important for the profession (FZSRTB-IU-13)</p> <p>14. Finds and evaluates medical information in radiology, applying the principles of evidence-based medicine and critical thinking (FZSRTB-IU-14)</p> <p>15. Explains and applies methods of scientific research work and statistical data processing, independently. Uses sources of professional knowledge and data through the use of literature and electronic media in Croatian and English (FZSRTB-IU-15)</p> <p>16. Creates a structured text using basic medical and health terminology, elaborates professional health topics and presents professional works in a foreign language (FZSRTB-IU-16)</p>
<b>Opportunity after graduation</b>	<p>Upon completion of the undergraduate university study in Radiological Technology, the Bachelor of Radiological Technology acquires competencies for work in medical, dental and veterinary radiological diagnostics and intervention, as well as in radiotherapy and nuclear medicine. The knowledge acquired during the bachelor study can be further expanded in radiological technology by enrolling in the second cycle of the graduate university study in Radiological Technology.</p>
<b>Accreditation</b>	<p>The University of Mostar received a Decision on Institutional Reaccreditation on 14 January 2020 from the competent Ministry of Education, Science, Culture and Sports of the HNŽ on the recommendation of the Agency for Development of Higher Education and Quality Assurance of B&amp;H, after which the University was registered in the State Register of Accredited Higher Education Institutions.</p>

### 3. BASIC CHARACTERISTICS OF THE STUDY PROGRAMME

#### 3.1. Connection with the University development strategy

In the Development Strategy of the University of Mostar 2018 – 2023 in the strategic field of education, several strategic goals are related to the curriculum and its elements.

Objective 1 defines that the University, in cooperation with stakeholders, will develop, approve, implement and continuously monitor and improve study programmes at all levels. The following tasks arise from clearly defined learning outcomes related to labour market needs, following the European Qualifications Framework (EQF):

- Task 1: clearly define the objectives and anticipated learning outcomes of each study programme and harmonize the content of the study programme with them, following the appropriate level of the European Qualifications Framework and the qualification standard
- Task 2: Introduce a transparent and consistent process of revision and improvement of study programmes with the participation of students and other stakeholders
- Task 5: ensure realistic allocation of ECTS credits, through a defined system of ECTS coordination at all study levels
- Task 6: improve the interdisciplinarity of all study programmes by enabling elective courses at the university level.

Objective 3 refers to the development of a wide network of teaching bases, including organizations from different fields of activity, to establish cooperation that will enable the connection of practice, science, art, and higher education. The following tasks arise from it:

- Task 2: increase the number of hours and the share of teaching practice in the study programmes and the share of ECTS credits acquired by it
- Task 3: increase the number of bachelor/master papers related to the topic and content.

Key strategic postulates of the Faculty of Health Studies that lead to realization of the vision while respecting the mission and academic values of the University are modern study programmes that will be directed towards the development of a wide range of competencies, as well as education and activities that will be directed towards the development of the economy, society and culture.

University studies at the Faculty of Health Studies of the University of Mostar enable the establishment of a system of continuous training, refresher training and acquisition of latest cognitions, as well as constant monitoring and recognition of the priorities of healthcare needs in the country and the European environment. At the first level (undergraduate studies), training is focused on basic education. A special strategic goal is basic skills training necessary for independent work performance, and this includes a three-year education with a load of 180 ECTS-points, after which the student is awarded a title of bachelor.

#### 3.2. Compliance with the achievements of a certain scientific/artistic area and labor market and connection with the standards of occupations/qualifications

Objectives, competencies, and learning outcomes at the level of the study programme are defined in a way that is in line with the achievements of a particular Biomedicine and healthcare area and labour market and related to the standards profession. To harmonize with the achievements of the particular Biomedicine and healthcare, the representatives of teachers in the Committee for the development of the revised curriculum and other teachers who participated in the development of syllabi for each course took into account current achievements and trends in scientific area Biomedicine and healthcare, field Clinical Medical Sciences/Health Sciences, branches Radiological technology relating to undergraduate university study programme of Radiological Technology.

Also, student representatives and external users were appointed to the Committee for the development of the revised curriculum to harmonize with the labour market. Public hearing was organized with the participation of experts from practice and economics, and their suggestions were taken into account in the development of the curriculum.

Since no occupational standard or qualification standard has been defined at any level in B&H, the following documents have been taken into account:

In addition to the above document, the following documents were also considered:



- Review of the European Core Curriculum for Radiotherapy Technologists, Second review of the European Core Curriculum For RTs
- *(Bologna Declaration. The European Higher Education Area. The Bologna Declaration, a joint declaration of The European Ministers of Education convened in Bologna 19 June 1999*
- Goal 18 WHO – development of human resources in healthcare till 2010
- Healthcare for all in 2021, WHO
- *Confederation of EU Rectors' Conferences and the Association of European Universities. The Bologna Declaration on the European space for higher education: an explanation*
- *Joint declaration on harmonization of the architecture of the European higher education system Paris, Sorbonne, 1998*
- The Decision of the Council of Ministers of Bosnia and Herzegovina on the Adoption of the Road Map for Implementation of the EU Directive 2005/36/EC and 2013/55/EU on Regulated Profession (Official Gazette of B&H, no. 10/16),
- Law on Healthcare (Official Gazette of the Federation of B&H No. 41/10 and 75/13),
- Rulebook on internships and professional exams for health professionals (Official Gazette of the FB&H, 51/17),
- Rulebook on Amendments to the Rulebook on internship and professional examination of healthcare workers.

Jobs/competencies/learning outcomes from all the above documents are implemented in the competencies and learning outcomes at the level of the study programme listed in chapter "2. General information about the study programme". They are realized in core courses, in order to ensure that all students achieve them with the acquired qualification. The coverage of these learning outcomes at the level of the study programme with the learning outcomes at the level of core courses is presented in the chapter "3.12. Matrix of learning outcomes.

### **3.3. Comparability with study programmes in the country and abroad**

Study programme performed at the Radiological Technology department and the development of radiological engineers as a profession are in line with European standards, and the study programme is based on close cooperation with other institutions of a similar profile in the Republic of Croatia. Comparability is reflected exclusively in the competencies and learning outcomes at the level of study programmes and in the duration of studies, while the study programme retains its specifics mainly through the structure, course names, and ECTS credits.

### **3.4. Openness to Student mobility**

Student mobility is defined by the Rulebook on international mobility, which refers to administrative support for students, student mobility documents, insurance, method of application, the procedure for recognizing mobility and information package. The unique recognition methodology is defined at the university level by the Senate Decision on the adoption of a single form for the Decision on recognition of courses, ECTS credits, grades, and professional practice during student mobility, which is recorded in the diploma supplement. Students can find information on mobility programmes and accompanying forms on the University's website and through the Vice Dean for Quality and Inter-Institutional Cooperation who forwards information from the International Office to student representatives.

### **3.5. Conditions for enrolment in the study programme and transfer from other study programmes**

The Rulebook on Study of the University of Mostar defines the right to enroll in undergraduate, graduate, and integrated study programmes, which is done through a public competition. The Senate, at the proposal of the scientific-teaching / artistic-teaching council of the organizational unit, and with the consent of the Governing Board of the University and the competent Ministry of Education, Science, Culture and Sports of the Herzegovina Neretva County, announces a public tender. It is published on the website and bulletin board of the Faculty of Health Studies, which contains information on the conditions for enrolment, entrance examination, tuition fees, criteria for selecting candidates, and other information. When transferring from other study programmes, a request is submitted to the dean Faculty of Health Studies, and the appropriate committee decides on the possibilities and conditions for enrolment.

Applicants who enroll at the Faculty, and during their previous education did not study Latin for at least 1 year, must enroll in the Latin language course in the first year of study with the load of 20 hours of lectures and pass the same course before enrolling in the first year of study.

### **3.6. Conditions for enrolment in the next semester and year of study and graduation**

Conditions for enrollment in the next semester and year of study are defined by the Rulebook on Study of the University of Mostar and the general act of the Faculty of Health Studies.

The study program is completed by writing and defense of Bachelor's thesis worth 5 ECTS credits. The procedure of the defense and thesis's methodology are defined by Rulebook on Study of the University of Mostar and the general act of the Faculty of Health Studies.

### **3.7. Organization of the study programme**

The study is organized as a three-year study programme for a total of six semesters. Classes are organized in a block system, and detailed schedules are disclosed per semester and study group. In accordance with the principles of the Bologna Declaration, the proposed study program is structured and evaluated with ECTS credits. Study programs are divided into study years and semesters. In accordance with ECTS credits, one academic year of the study program is worth 60 ECTS, or 30 ECTS credits for one semester.

Students can study as full-time students. Full-time students are those who study according to the full-time teaching schedule.

Summer clinical practice is a mandatory form of the teaching process that is carried out in accordance with the study curriculum and the annual study plan. As a rule, the student performs clinical practice at the University Clinical Hospital Mostar as a constituent unit of the University of Mostar, the Healthcare Center Mostar or some other teaching base with which the Faculty has a contractual agreement, according to the schedule established by the competent Committee. With the approval of the Committee, a student can also perform the clinical in an institution or company that has an organizational unit that deals with professional tasks that are in line with the professional profile of his studies. During clinical practice, the student performs the skills prescribed by the study plan listed in the clinical practice booklet. Successful fulfillment of the above-mentioned obligations is a condition for semester verification and enrollment in the next semester/year of study.

### **3.8. Structure of the study programme**

The structure of the study programme is reflected in the number of hours of each type of teaching and teaching in total, the number of hours of practice, and the number of hours of independent student work in the total student workload of 5400 hours. According to the Rulebook on the procedure for adopting new and revisions of existing study programmes (No. 01-993-1/22), only core courses are listed in the curriculum, while electives are adopted in the annual curriculum for each academic year. Therefore, the table will show the number of hours of each type of teaching and teaching in total, the number of hours of practice, and the number of hours of independent work only in core courses.

The student is obliged to choose one of the offered foreign languages (English or German), which are offered in the first and fourth semesters, with 1,5 ECTS credits in the 1st semester and 1.5 ECTS credits in the 4th semester. Regardless of the foreign language the student chooses, they acquire competencies and learning outcomes defined at the level of the study programme in accordance with the EU directive.

In relation to the total number of ECTS credits, a sum of ECTS credits acquired in elective courses is 8 ECTS, and the student can choose a total of 8 elective courses. Besides core and elective courses at the level of the study programme and at the level of organizational unit, i.e., in addition to 30 ECTS credits per semester, a student can choose university elective courses from the list adopted by the Senate each academic year, which are recorded in diploma supplement. The purpose of elective courses at the study programme level is a more detailed elaboration of learning outcomes already acquired in core courses but following student preferences. The purpose of university elective courses is to acquire competencies not provided by the study programme, but that can help students achieve competitiveness in the market and contribute to building one's personality through education.

**Table 3.8.1** Representation of teaching load, hours of theory and practice, and the share of workload in the undergraduate university study programme of Radiological technology

Form of teaching	1 <sup>st</sup> year	2 <sup>nd</sup> year	3 <sup>rd</sup> year	Total	%
Lectures	325	335	330	990	18 %
Practicals	310	380	525	1215	23 %
Seminars	155	155	140	450	8 %
Summer clinical practice	360	315	330	1005	19 %
Independent work	650	615	475	1740	32 %
<b>Total</b>	<b>1800</b>	<b>1800</b>	<b>1800</b>	<b>5400</b>	<b>100%</b>

**Table 3.8.2** The share of workload in the study programme in relation to the theoretical and clinical training of the undergraduate university study of Radiological technology

Load type	Number of hours	Share %
Theoretical teaching	1440	39%
Clinical teaching	2220	61%
<b>Total</b>	<b>3660</b>	<b>100%</b>

In the three years of the undergraduate university study of Radiological technology there are active classes and independent student work of 5400 hours. Student independent work of 1740 hours includes the time a student needs for independent study of the subject, preparation of seminars, mid-terms, final tests, preparation and writing of final and diploma theses, not counting contact hours with the teacher (lectures, seminars, practicals, and professional practice).

The undergraduate university study programme of Radiological Technology consists 37 compulsory and 8 elective courses, summer clinical practice at the end of each year of study in the duration of 1005 hours, and the final thesis of 150 hours. Eight elective courses 4,4% of the total program points. The decision on elective courses to be taken in the current academic year is ruled by the Scientific Teaching Council of the Faculty of Health Studies in accordance with the needs for the improvement of the teaching program.

Learning outcomes that are acquired by fulfilling individual study obligations, as well as the number of hours expected for each study obligation that ensures the acquisition of the expected learning outcomes, are listed in the description of each individual subject from the study programme.

**Table 1. Structures of the undergraduate university study programme of Radiological Technology with shares of forms of teaching, clinical practice and independent work**

1 <sup>st</sup> year									
1 <sup>st</sup> Winter semester									
Course code	Course title	Teaching hours			I. In total teaching	II. Clinical practice	III. Independent work	Load hours (I.+II.+III.)	ECTS
		L*	p*	S*					
FZSRTB101	Introduction to Radiology	20	0	5	25	0	20	45	1,5
FZSRTB102	Anatomy	30	30	30	90	0	150	240	8
FZSRTB103	Physiology and Pathophysiology	50	40	20	110	0	100	210	7
FZSRTB104	Pathology	20	10	10	40	0	20	60	2
FZSRTB105	Physics	25	20	5	50	0	40	90	3
FZSRTB106	Health Statistics with Informatics	25	30	5	60	0	30	90	3
FZSRTB107	<i>Foreign Language I</i>	0	0	30	30	0	15	45	1,5
FZSRTB108	Communication Skills	10	10	10	30	0	30	60	2
Total		180	140	115	435	0	405	840	28
ECTS core courses									28
ECTS elective courses									2
ECTS TOTAL									30

1 <sup>st</sup> year									
2 <sup>nd</sup> Summer semester									
Course code	Course title	Teaching hours			I. In total teaching	II. Clinical practice	III. Independent work	Load hours (I.+II.+III.)	ECTS
		L*	p*	S*					
FZSRTB209	Physics of Radiation and Electronics	20	20	5	45	0	45	90	3
FZSRTB210	Radiological Propaedeutics, Vocabulary and Norms	25	30	5	60	0	30	90	3
FZSRTB211	Radiobiology and Radiation Protection	30	30	10	70	0	50	120	4
FZSRTB212	Radiological Anatomy and Pathology	30	30	0	60	0	90	150	5
FZSRTB213	Basics of Healthcare	10	30	5	45	0	15	60	2
FZSRTB214	Summer Clinical Practice I	0	0	0	0	360	0	360	12
Total		115	140	25	280	360	230	870	29
ECTS core courses									29
ECTS elective courses									1
ECTS TOTAL									30

2 <sup>nd</sup> year									
3 <sup>rd</sup> Winter semester									
Course code	Course title	Teaching hours			I. In total teaching	II. Clinical practice	III. Independent work	Load hours (I.+II.+III.)	ECTS
		L*	P*	S*					
FZSRTB315	Internal Medicine	30	20	0	50	0	40	90	3
FZSRTB316	Legislation in Health and Ethics	15	0	15	30	0	30	60	2
FZSRTB317	Health Psychology	15	15	10	40	0	20	60	2
FZSRTB318	Pharmacology	30	0	5	35	0	55	90	3
FZSRTB319	Contrast Agents	15	0	15	30	0	15	45	1,5
FZSRTB320	Radiography of the Skeleton	40	120	30	190	0	125	315	10,5
FZSRTB321	Radiological Devices and Process Control	40	40	10	90	0	60	150	5
FZSRTB322	Radiological Imaging of the Breast	15	15	5	35	0	25	60	2
Total		200	210	90	500	0	370	870	29
ECTS core courses									29
ECTS elective courses									1
ECTS TOTAL									30

2 <sup>nd</sup> year									
4 <sup>th</sup> Summer semester									
Course code	Course title	Teaching hours			I. In total teaching	II. Clinical practice	III. Independent work	Load hours (I.+II.+III.)	ECTS
		L*	P*	S*					
FZSRTB423	Surgery	15	15	0	30	0	30	60	2
FZSRTB424	Orthopedics and Traumatology	15	15	0	30	0	30	60	2
FZSRTB425	Anesthesia, Resuscitation and Intensive Care Treatment	20	20	0	40	0	20	60	2
FZSRTB426	<i>Foreign Language II</i>	0	0	30	30	0	15	45	1,5
FZSRTB427	Theory of Radiological Imaging	30	40	10	80	0	70	150	5
FZSRTB428	Conventional Radiological Methods	35	60	15	110	0	70	180	6
FZSRTB429	Summer Clinical Practice II	0	0	0	0	315	0	315	10,5
Total		115	150	55	320	315	235	870	29
ECTS core courses									29
ECTS elective courses									1
ECTS TOTAL									30

3 <sup>rd</sup> year									
5 <sup>th</sup> Winter semester									
Course code	Course title	Teaching hours			I. In total teaching	II. Clinical practice	III. Independent work	Load hours (I.+II.+III.)	ECTS
		L*	P*	S*					
FZSRTB530	Contemporary Diagnostic Methods	40	70	10	120	0	60	180	6
FZSRTB531	Nuclear Medicine	50	80	10	140	0	40	180	6
FZSRTB532	Interventional Radiology	20	40	5	65	0	25	90	3
FZSRTB533	Modified Radiological Methods	20	15	10	45	0	30	75	2,5
FZSRTB534	Basics of Scientific Research Work	20	20	15	55	0	20	75	2,5
FZSRTB535	Computational Radiological Methods	40	110	20	170	0	70	240	8
Total		190	335	70	595	0	245	840	28
ECTS core courses									28
ECTS elective courses									2
ECTS TOTAL									30

3 <sup>rd</sup> year									
6 <sup>th</sup> Summer semester									
Course code	Course title	Teaching hours			I. In total teaching	II. Clinical practice	III. Independent work	Load hours (I.+II.+III.)	ECTS
		L*	P*	S*					
FZSRTB636	Radiotherapy and Oncology	60	90	20	170	0	70	240	8
FZSRTB637	Dental Radiology	15	20	10	45	0	15	60	2
FZSRTB638	Artificial Intelligence in Radiology	25	0	15	40	0	20	60	2
FZSRTB639	Management in Healthcare	10	0	10	20	0	10	30	1
FZSRTB640	Summer Clinical Practice III	0	0	0	0	330	0	360	11
FZSZAB653	Bachelor's Thesis	0	50	0	50	0	100	150	5
Total		110	160	55	325	330	215	900	29
ECTS core courses									29
ECTS elective courses									1
ECTS TOTAL									30

\*L – lectures, P\* - practicals, S\*- seminars

### **3.9. Optimal number of enrolled students with regard to space, equipment and number of teachers**

Enrolment quotas before the beginning of each academic year are adopted by the Governing Board of the University, at the proposal of the Senate, and with the consent of the competent ministry.

Students can study as full-time students. Full-time students are those who study according to the programme with a full teaching schedule. Part-time students are students who attend the study programme in addition to work or other activities.

### **3.10. Resources needed for conducting the study programme**

Teachers from the University and teachers from reference higher education institutions in academic ranks from the relevant scientific area, field, and branch participate in the implementation of the study programme. Data on the structure of teaching staff by rank and education, gender and age structure, scientific research productivity, mobility, and project activities of teaching staff are regularly monitored through the bodies from the quality assurance system. These data are processed at the level of the study programme and organizational unit, and are published in annual reports.

In terms of physical resources for the implementation of study programmes, the Faculty of Health Studies has classrooms with classic and modern audio-visual equipment, a cabinet equipped with multimedia and video equipment, a TV system, IT equipment with a maximum of two students per computer, a library - an IT center, and a microbiological research laboratory. Healthcare cabinet with simulation models and clinical skills cabinet. Clinical hospital wards with equipment for performance of health care. The Faculty of Health Studies has a Clinical Skills Cabinet equipped with highly sophisticated models - simulators.

Based on the signed cooperation agreements, the resources of other institutions are also used for the performance of the undergraduate university study programme of Radiological Technology: University Clinical Hospital Mostar, The Vitalis Polyclinic, the Health center Mostar, and School of Medicine of the University of Mostar.

### **3.11. Quality assurance of the study programme**

The purpose, goal, structure, operation and areas of evaluation of the quality assurance system of the University of Mostar are defined by the Rulebook on the structure and operation of the quality assurance system of the University of Mostar.

According to the Rulebook, the quality assurance system at the University of Mostar consists of permanent bodies of the quality assurance system at the university level: the Quality Assurance and Improvement Committee and the Office for Quality Assurance and Improvement. The Faculty of Health Studies is operated by the Quality Assurance and Improvement Committee, which consists of the Vice Dean for Teaching, the Quality Coordinator, and the representative of the teaching staff, the student representative, and the representative of the administrative and technical staff. The Quality Coordinator Faculty of Health Studies is also a member of the Quality Assurance and Improvement Committee. The Rulebook defines the competencies and activities of each body from the quality assurance system. Bodies from the quality assurance system carry out regular activities defined by the University Quality Assurance Manual at the University of Mostar, which relate to conducting surveys and monitoring and data processing. Based on the implemented activities, annual reports are prepared at the level of the study programme, organizational unit, and the University.

### 3.12.Learning outcomes matrix

IU-study programme IU-course	FZSRTB-IU-1	FZSRTB-IU-2	FZSRTB-IU-3	FZSRTB-IU-4	FZSRTB-IU-5	FZSRTB-IU-6	FZSRTB-IU-7	FZSRTB-IU-8	FZSRTB-IU-9	FZSRTB-IU-10	FZSRTB-IU-11	FZSRTB-IU-12	FZSRTB-IU-13	FZSRTB-IU-14	FZSRTB-IU-15	FZSRTB-IU-16
IU-FZSRTB101	x		x	x	x		X	x								
IU-FZSRTB102		x														
IU-FZSRTB103		x														
IU-FZSRTB104		x							x	x						
IU-FZSRTB105		x	x		x					x						
IU-FZSRTB106												x		x	x	
IU-FZSRTB107																x
IU-FZSRTB107-A																x
IU-FZSRTB108										x	x					x
IU-FZSRTB209		x	x													x
IU-FZSRTB210	x		x	x	x	x	X	x			x	x				
IU-FZSRTB211	x	x	x		x			x								
IU-FZSRTB212	x			x				x								
IU-FZSRTB213							X	x								
IU-FZSRTB214	x	x						x			x		x			
IU-FZSRTB315		x			x	x	X				x	x				
IU-FZSRTB316													x			
IU-FZSRTB317		x														
IU-FZSRTB318		x														
IU-FZSRTB319	X	X			x	x	X	x		x				x		
IU-FZSRTB320	x	x	x	x	x	x		x			x	x				
IU-FZSRTB321	x		x	x	x	x	x	x								
IU-FZSRTB322			x	x	x		x			x			x	x		
IU-FZSRTB423		x	x	x	x	x	x	x			x	x				
IU-FZSRTB424	x	x			x	x	x	x			x			x	x	
IU-FZSRTB425	x	x					x	x		x						
IU-FZSRTB426																x
IU-FZSRTB426-A																x
IU-FZSRTB427	x		x	x		x	x	x				x	x			



<b>IU-study programme IU-course</b>	FZSRTB- IU-1	FZSRTB- IU-2	FZSRTB- IU-3	FZSRTB- IU-4	FZSRTB- IU-5	FZSRTB- IU-6	FZSRTB- IU-7	FZSRTB- IU-8	FZSRTB- IU-9	FZSRTB- IU-10	FZSRTB- IU-11	FZSRTB- IU-12	FZSRTB- IU-13	FZSRTB- IU-14	FZSRTB- IU-15	FZSRTB- IU-16
IU-FZSRTB428	x		x					x		x	x	x	x			
IU-FZSRTB429			x	x		x	x	x		x	x		x	x		
IU-FZSRTB530	x		x					x	x	x	x	x	x			
IU-FZSRTB531	x		x	x		x	x	x								
IU-FZSRTB532	x		x	x	x	x	x	x								
IU-FZSRTB533	x		x	x	x	x	x	x	x		x	x	x			
IU-FZSRTB534														x	x	
IU-FZSRTB535			x	x	x	x	x				x	x	x			
IU-FZSRTB636	x		x		x	x	x	x	x	x	x	x				
IU-FZSRTB637	x		x	x	x	x		x		x						
IU-FZSRTB638	x		x	x						x				x	x	
IU-FZSRTB639																
IU-FZSRTB640	x		x	x		x	x				x					

#### 4. STUDY PLAN

1 <sup>st</sup> year							
1 <sup>st</sup> Winter semester							
Course code	Course title	Course status	Teaching hours			Hours of practice	ECTS
			L	P	S		
FZSRTB101	Introduction to Radiology	Core	20	0	5	0	1,5
FZSRTB102	Anatomy	Core	30	30	30	0	8
FZSRTB103	Physiology and Pathophysiology	Core	50	40	20	0	7
FZSRTB104	Pathology	Core	20	10	10	0	2
FZSRTB105	Physics	Core	25	20	5	0	3
FZSRTB106	Health Statistics with Informatics	Core	25	30	5	0	3
FZSRTB107	<i>Foreign Language I</i>	Core	0	0	30	0	1,5
FZSRTB108	Communication Skills	Core	10	10	10	0	2
ECTS for core courses							28
ECTS for elective courses							2
ECTS IN TOTAL							30

1 <sup>st</sup> year							
2 <sup>nd</sup> Summer semester							
Course code	Course title	Course status	Teaching hours			Hours of practice	ECTS
			L	P	S		
FZSRTB209	Physics of Radiation and Electronics	Core	20	20	5	0	3
FZSRTB210	Radiological Propaedeutics, Vocabulary and Norms	Core	25	30	5	0	3
FZSRTB211	Radiobiology and Radiation Protection	Core	30	30	10	0	4
FZSRTB212	Radiological Anatomy and Pathology	Core	30	30	0	0	5
FZSRTB213	Basics of Healthcare	Core	10	30	5	0	2
FZSRTB214	Summer Clinical Practice I	Core	0	0	0	360	12
ECTS for core courses							29
ECTS for elective courses							1
ECTS IN TOTAL							30

2 <sup>nd</sup> year							
3 <sup>rd</sup> Winter semester							
Course code	Course title	Course status	Teaching hours			Hours of practice	ECTS
			L	P	S		
FZSRTB315	Internal Medicine	Core	30	20	0	0	3
FZSRTB316	Legislation in Health and Ethics	Core	15	0	15	0	2
FZSRTB317	Health Psychology	Core	15	15	10	0	2
FZSRTB318	Pharmacology	Core	30	0	5	0	3
FZSRTB319	Contrast Agents	Core	15	0	15	0	1,5
FZSRTB320	Radiography of the Skeleton	Core	40	120	30	0	10,5
FZSRTB321	Radiological Devices and Process Control	Core	40	40	10	0	5
FZSRTB322	Radiological Imaging of the Breast	Core	15	15	5	0	2
ECTS for core courses							29
ECTS for elective courses							1
ECTS IN TOTAL							30

2 <sup>nd</sup> year							
4 <sup>th</sup> Summer semester							
Course code	Course title	Course status	Teaching hours			Hours of practice	ECTS
			L	P	S		
FZSRTB423	Surgery	Core	15	15	0	0	2
FZSRTB424	Orthopedics and Traumatology	Core	15	15	0	0	2
FZSRTB425	Anesthesia, Resuscitation and Intensive Care Treatment	Core	20	20	0	0	2
FZSRTB426	<i>Foreign Language II</i>	Core	0	0	30	0	1,5
FZSRTB427	Theory of Radiological Imaging	Core	30	40	10	0	5
FZSRTB428	Conventional Radiological Methods	Core	35	60	15	0	6
FZSRTB429	Summer Clinical Practice II	Core	0	0	0	315	10,5
ECTS for core courses							29
ECTS for elective courses							1
ECTS IN TOTAL							30

3 <sup>rd</sup> year							
5 <sup>th</sup> Winter semester							
Course code	Course title	Course status	Teaching hours			Hours of practice	ECTS
			L	P	S		
FZSRTB530	Contemporary Diagnostic Methods	Core	40	70	10	0	6
FZSRTB531	Nuclear Medicine	Core	50	80	10	0	6
FZSRTB532	Interventional Radiology	Core	20	40	5	0	3
FZSRTB533	Modified Radiological Methods	Core	20	15	10	0	2,5
FZSRTB534	Basics of Scientific Research Work	Core	20	20	15	0	2,5
FZSRTB535	Computational Radiological Methods	Core	40	110	20	0	8
ECTS for core courses							28
ECTS for elective courses							2
ECTS IN TOTAL							30

3 <sup>rd</sup> year							
6 <sup>th</sup> Summer semester							
Course code	Course title	Course status	Teaching hours			Hours of practice	ECTS
			L	P	S		
FZSRTB636	Radiotherapy and Oncology	Core	60	90	20	0	8
FZSRTB637	Dental Radiology	Core	15	20	10	0	2
FZSRTB638	Artificial Intelligence in Radiology	Core	25	0	15	0	2
FZSRTB639	Management in Healthcare	Core	10	0	10	0	1
FZSRTB640	Summer Clinical Practice III	Core	0	0	0	330	11
FZSZAB653	Bachelor's Thesis	Core	0	50	0	100	5
ECTS for core courses							29
ECTS for elective courses							1
ECTS IN TOTAL							30

\*L – lectures, P\* - practicals, S\*- seminars

