Medicinski fakultet u Rijeci

IZVEDBENI NASTAVNI PLAN
2025/2026

Za kolegij

Physics of Medical Diagnostics

Studij:	**Medical Studies in English (R)** Sveučilišni integrirani prijediplomski i diplomski studij
Katedra:	**Katedra za medicinsku fiziku i biofiziku**
Nositelj kolegija:	**prof. dr. sc. Jurković Slaven, spec. med. fiz.**
Godina studija:	**3**
ECTS:	**1**
Stimulativni ECTS:	**0 (0.00%)**
Strani jezik:	**Mogućnost izvođenja na stranom jeziku**

Podaci o kolegiju:

Physics of Medical Diagnostics is a course which gives students an insight into the physical principles required for the acquisition of acceptable diagnostic information. The main part of the course will be dedicated to application of ionizing radiation for imaging. Also, the introduction into physics principles of use non-ionizing radiation (ultrasound and magnetic resonance imaging) for imaging will be presented. The purpose of this course is to introduce students into physical principles of medical imaging and devices used for this purpose.

Popis obvezne ispitne literature:

1. P. Allisy-Roberts and J. Williams:Farr’s Physics for Medical Imaging 2nd edition, Elsevier, 2008.

Popis dopunske literature:

1. D.R.Dance, S.Cristofides; A.D.A.Maidment, I.D.McLean, K.H.Ng: Diagnostic Radiology Physics-A Handbook for Teachers and Students, http://www.pub.iaea.org/MTCD/Publications/PDF/Pub1564webNew-74666420.pdf
2. D.L. Bailey, J.L. Humm, A. Todd-Pokropek, A. van Aswegen: Nuclear Medicine Physics-A Handbook for Teachers and Students, http://www-pub.iaea.org/MTCD/publications/PDF/Pub1617web-1294055.pdf
3. P. Fish: Physics and Instrumentation of Diagnostic Medical Ultrasound, John Wiley & Sons, 1996.
4. C.R. Hill, J.C. Bamber, G.R. ter Haar: Physical Principles of Medical Ultrasonics, John Wiley & Sons, 2004.

Nastavni plan:

Predavanja popis (s naslovima i pojašnjenjem):

L1 Physics of ionizing radiation

Physics of ionizing radiation

L2 Interaction of X irradiation with matter

Interaction of X irradiation with matter

L3 Dosimetry, principles of quality assurance and radiation protection

Dosimetry, principles of quality assurance and radiation protection

L4 Basic physics of magnetic resonance imaging

Basic physics of magnetic resonance imaging

L5 Physics of ultrasound

Physics of ultrasound

L6 Bioeffects, dosimetry and safety of ultrasound; New methods in ultrasound imaging

Bioeffects, dosimetry and safety of ultrasound. New methods in ultrasound imaging.

Seminari popis (s naslovima i pojašnjenjem):

S1. Mammography, digital radiography, fluoroscopy, computed tomography

Mammography
Digital radiography
Fluoroscopy
Computed tomography

S2. Single photon emission tomography (SPECT), positron emission tomography (PET), magnetic resonance imaging (MRI), devices for radiation oncology treatment planning

Single photon emission tomography (SPECT)
Positron emission tomography (PET)
Magnetic resonance imaging (MRI)
Devices for radiation oncology treatment planning

S3. Physical principles of medical ultrasound imaging, doppler ultrasound methods, bioeffects, dosimetry and safety of ultrasound, application of ultrasound in therapy, quality assurance in ultrasound

Physical principles of medical ultrasound imaging
Doppler ultrasound methods
Bioeffects, dosimetry and safety of ultrasound
Application of ultrasound in therapy
Quality assurance in ultrasound

Obveze studenata:

The attendance at lectures and seminars is mandatory. If necessary, a student can be absent from 30% of the classes of the overall course workload. Students’ obligations are course attendance, active participation, preparation of the seminar and presentation in front of the group.

Ispit (način polaganja ispita, opis pisanog/usmenog/praktičnog dijela ispita, način bodovanja, kriterij ocjenjivanja):

Students who: cannot take the final exam.
• They did not prepare a seminar before presenting it in front of the group and who have 30% or more unexcused absences from classes
Such a student is graded F (fail), cannot earn ECTS credits or take the final exam, that is, must re-enroll in the course the following academic year.

The final exam can be taken by students who:
• have create a seminar that was positively evaluated and successfully presented it front of the group.

For the final exam It is enough to register the final exam through the STUDOMAT and if the previously mentioned conditions are met, in the ISVU system will be entered "passed".

Ostale napomene (vezane uz kolegij) važne za studente:

Professors and associates are available every day during working hours through e-mail addresses for all questions regarding classes.
Slaven Jurković, PhD, Associate Professor slaven.jurkovic@uniri.hr
Gordana Žauhar, PhD, Full Professor gordana.zauhar@uniri.hr
Marijana Majetić, senior laboratory technician marijana.majetic@uniri.hr - administrator

SATNICA IZVOĐENJA NASTAVE 2025/2026

Physics of Medical Diagnostics

Predavanja (mjesto i vrijeme / grupa)	**Seminari** (mjesto i vrijeme / grupa)
06.03.2026	

L1 Physics of ionizing radiation:
• P01 (08:00 - 10:00) [252]
  ○ POMD
 	
L2 Interaction of X irradiation with matter:
• P01 (08:00 - 10:00) [252]
  ○ POMD	

prof. dr. sc. Jurković Slaven, spec. med. fiz. [252]	
17.03.2026	
	S1. Mammography, digital radiography, fluoroscopy, computed tomography: • ONLINE (13:00 - 15:30) [252] ○ PMD S A
prof. dr. sc. Jurković Slaven, spec. med. fiz. [252]	
19.03.2026	

L3 Dosimetry, principles of quality assurance and radiation protection:
• P01 (11:00 - 13:00) [252]
  ○ POMD
 	
L4 Basic physics of magnetic resonance imaging:
• P01 (11:00 - 13:00) [252]
  ○ POMD
	S1. Mammography, digital radiography, fluoroscopy, computed tomography:
	• ONLINE (08:30 - 11:00) [252]
	  ○ PMD S B

prof. dr. sc. Jurković Slaven, spec. med. fiz. [252]	
24.03.2026	
	S2. Single photon emission tomography (SPECT), positron emission tomography (PET), magnetic resonance imaging (MRI), devices for radiation oncology treatment planning: • ONLINE (13:00 - 15:30) [252] ○ PMD S A
prof. dr. sc. Jurković Slaven, spec. med. fiz. [252]	
26.03.2026	

L5 Physics of ultrasound:
• P01 (11:00 - 13:00) [149]
  ○ POMD
 	
L6 Bioeffects, dosimetry and safety of ultrasound; New methods in ultrasound imaging:
• P01 (11:00 - 13:00) [149]
  ○ POMD
	S2. Single photon emission tomography (SPECT), positron emission tomography (PET), magnetic resonance imaging (MRI), devices for radiation oncology treatment planning:
	• ONLINE (08:30 - 11:00) [252]
	  ○ PMD S B

prof. dr. sc. Jurković Slaven, spec. med. fiz. [252] · prof. dr. sc. Žauhar Gordana, prof. fizike i kemije [149]	
31.03.2026	

	S3. Physical principles of medical ultrasound imaging, doppler ultrasound methods, bioeffects, dosimetry and safety of ultrasound, application of ultrasound in therapy, quality assurance in ultrasound: • ONLINE (14:00 - 16:30) [149] ○ PMD S A
prof. dr. sc. Žauhar Gordana, prof. fizike i kemije [149]	
02.04.2026	
	S3. Physical principles of medical ultrasound imaging, doppler ultrasound methods, bioeffects, dosimetry and safety of ultrasound, application of ultrasound in therapy, quality assurance in ultrasound: • ONLINE (08:30 - 11:00) [149] ○ PMD S B
prof. dr. sc. Žauhar Gordana, prof. fizike i kemije [149]	

Popis predavanja, seminara i vježbi:

PREDAVANJA (TEMA)	Broj sati	Mjesto održavanja
L1 Physics of ionizing radiation	1	P01
L2 Interaction of X irradiation with matter	1	P01
L3 Dosimetry, principles of quality assurance and radiation protection	1	P01
L4 Basic physics of magnetic resonance imaging	1	P01
L5 Physics of ultrasound	1	P01
L6 Bioeffects, dosimetry and safety of ultrasound; New methods in ultrasound imaging	1	P01

SEMINARI (TEMA)	Broj sati	Mjesto održavanja
S1. Mammography, digital radiography, fluoroscopy, computed tomography	3	ONLINE
S2. Single photon emission tomography (SPECT), positron emission tomography (PET), magnetic resonance imaging (MRI), devices for radiation oncology treatment planning	3	ONLINE
S3. Physical principles of medical ultrasound imaging, doppler ultrasound methods, bioeffects, dosimetry and safety of ultrasound, application of ultrasound in therapy, quality assurance in ultrasound	3	ONLINE

ISPITNI TERMINI (završni ispit):

1.	16.04.2026.
2.	24.06.2026.
3.	08.07.2026.
4.	14.09.2026.