

Faculty of Medicine

Course title: Physics of Medical Diagnostics

Course coordinator: Slaven Jurković, PhD, Assistant Professor

Collaborators: Gordana Žauhar, PhD, Associate Professor

Study program: Integrated Undergraduate and Graduate University Study of Medicine in English

Course status: compulsory

Year: third

ECTS workload coefficient: 1.0

Workload (L+S) 15 (L6+S9)

SYLLABUS

COURSE DESCRIPTION (Course information, basic description, general information, teaching overview, required equipment and preparation, etc.)

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

COURSE STRUCTURE

Formal lectures: 6 hours

Seminars: 9 hours

Total hours: 15

Assigned reading:

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

Optional / additional reading:

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

COURSE TEACHING PLAN

The list of lectures with titles:

- L1 Physics of ionizing radiation**
- L2 Interaction of X i γ radiation with matter**
- L3 Dosimetry, principles of quality assurance and radiation protection**
- L4 Basic physics of magnetic resonance imaging**
- L5 Physics of ultrasound**
- L6 Bioeffects, dosimetry and safety of ultrasound. New methods in ultrasound imaging.**

The list of seminars with descriptions:

- S1**
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
- 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

Students' obligations:

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.

EXAM:

Final written exam has 15 multiple choice questions. Each question has five offered answers. Correct answer gain 1 credit. There are no negative credits for incorrect answer.
 Prepared and presented seminar is obligatory prior final exam.
 Positively evaluated seminar and at least 8 credits on final exam are required for student to pass the course.

Possibility of teaching in another language:

Croatian

COURSE SCHEDULE (for academic year 2021/2022)

Date	Lectures (time and location)	Seminars (time and location) Medical faculty	Practicals (time and location)	Instructor
4/3/2022 Friday	L1 (11.00-12.00) MS Teams			Slaven Jurković, PhD, Assistant Professor
15/3/2022 Tuesday		S1 G1 (13.00-15.30) MS Teams		Slaven Jurković, PhD, Assistant Professor
17/3/2022 Thursday	L2-3 (11.00-13.00) MS Teams			Slaven Jurković, PhD, Assistant Professor
		S1 G2 (8.30-11.00) MS Teams		Slaven Jurković, PhD, Assistant Professor
22/3/2022 Tuesday		S2 G1 (13.00-15.30) MS Teams		Slaven Jurković, PhD, Assistant Professor
24/3/2022 Thursday	L4-5 (11.00-13.00) MS Teams			Gordana Žauhar, PhD, Associate Professor
		S2 G2 (8.30-11.00) MS Teams		Slaven Jurković, PhD, Assistant Professor
29/3/2022 Tuesday		S3 G1 (14.00-16.30) MS Teams		Gordana Žauhar, PhD, Associate Professor
31/3/2022 Thursday		S3 G2 (8.30-11.00) MS Teams		Gordana Žauhar, PhD, Associate Professor
1/4/2022 Friday	L6 (11.00-12.00) MS Teams			Slaven Jurković, PhD, Assistant Professor

	Final Exam Dates
1.	06.04.2022.
2.	23.06.2022.
3.	05.07.2022.
4.	09.09.2022.