SYLLABUS

REGARDING THE QUALIFICATION CYCLE FROM 2023/2024 TO 2026/2027

1. BASIC COURSE/MODULE INFORMATION

Course/Module title	**Lasers in medicine**
Course/Module code *	
Faculty (name of the unit offering the field of study)	College of Natural Sciences
Name of the unit running the course	Medical College of Rzeszów University
Field of study	Optometry
Qualification level	First degree, engineer
Profile	General academic
Study mode	Part-time
Year and semester of studies	4th year, 7th semester
Course type	Directional course
Language of instruction	English
Coordinator	**dr hab. n. med. David Aebisher, prof. UR**
Course instructor	dr hab. n. med. David Aebisher, prof. UR

* - as agreed at the faculty

1.1.Learning format – number of hours and ECTS credits

Semester (no.)	Lectures	Classes	Colloquia	Lab classes	Seminars	Practical classes	Internships	others	**ECTS credits**
7				9					**2**

1.2. Course delivery methods

- conducted in a traditional way

- involving distance education methods and techniques

1.3. Course/Module assessment (exam, pass with a grade, pass without a grade)

pass with a grade

2.PREREQUISITES

1. BASICS OF PHYSICS, CHEMISTRY AND BIOLOGY
2. Skills to operate on basic computer programs

3. OBJECTIVES, LEARNING OUTCOMES, COURSE CONTENT, AND INSTRUCTIONAL METHODS

3.1. Course/Module objectives

O1	Introduce students to aspects of laser use in medicine considering basic physics, tissue interactions, diagnostics and therapeutics, and therapeutic guidelines.
O2	Provide students with the technical basics of medical laser systems, associated instruments, modes of laser light delivery, and endoscopy.
O3	Provide students with an introduction to application of lasers to diagnostics and disease treatment in medical sub-disciplines including: ophthalmology, dermatology, cardiovascular disease, urology, otorhinolaryngology, neurology, dentistry, and oncology.

3.2 COURSE/MODULE LEARNING OUTCOMES

Learning Outcome	The description of the learning outcome defined for the course/module	Relation to the degree programme outcomes
LO_01	students knows and understands applications of lasers in diagnostics and disease treatment in medical sub-disciplines including: ophthalmology, dermatology, cardiovascular disease, urology, otorhinolaryngology, neurology, dentistry, and oncology	KW_02
LO_02	student knows and understands selected methods of statistical analysis used in diagnostic studies	K_W04
LO_03	student is able to use the basic equipment in physics, including lasers for restoring the proper functioning of the optical system of the eye	K_U02
LO_04	student is able to proceed with problems in laser laboratory	K_U04
LO_05	the student is ready to fulfill professional roles in a responsible manner thanks to the competences acquired in the process of education	K_K06

3.3 Course content

A. Lectures

Content outline
not applicable

B. Classes, tutorials/seminars, colloquia, **laboratories**, practical classes

Content outline
Basic physics of lasers and laser interaction with tissue

Understanding medical laser systems and laser safety
Understanding laser diagnostics and therapeutics
Lasers and associated laboratory equipment
Current Photobiology in laboratory expermients
Current Photochemistry in laboratory expermients
Current Photodiagnostics in laboratory expermients

3.4 **Methods of Instruction**

Laboratory classes: designing and conducting experiments

4. Assessment techniques and criteria

4.1 Methods of evaluating learning outcomes

Learning outcome	Methods of assessment of learning outcomes (e.g. test, oral exam, written exam, project, report, observation during classes)	Learning format (lectures, classes, ...)
LO–01	report, observation during classes	LABORATORY
LO–02	report, observation during classes, colloquium	LABORATORY
LO–03	report, observation during classes, colloquium	LABORATORY
LO–04	report, observation during classes	LABORATORY
LO–05	observation during classes	LABORATORY

4.2 Course assessment criteria

Pass with a grade. The condition for completing the classes is to pass the theoretical issues related to the subject of exercises, conduct the experiments according to the schedule, present reports and a multimedia presentation.

Grading scale:
3.0: 51-60% of points
3.5: 61-70% of points
4.0: 71-80% of points
4.5: 81-90% of points
5.0: 91-100% of points

5. Total student workload needed to achieve the intended learning outcomes – number of hours and ECTS credits

Activity	Number of hours
Scheduled course contact hours	9
Other contact hours involving the teacher (consultation hours)	2
Non-contact hours - student's own work (preparation for classes, projects)	39

Total number of hours	50
Total number of ECTS credits	**2**

* One ECTS point corresponds to 25-30 hours of total student workload

6. Internships related to the course/module

Number of hours	-
Internship regulations and procedures	-

7. Instructional materials

Compulsory literature: 1. The Science of Phototherapy: An Introduction. Leonard I. Grossweiner, Springer Science & Business Media 2005 (online e-book available); 2. Laser ablation: principles and applications. Miller, John Chester, Berlin: Springer- Verlag, 1994. 3. Laser applications in medicine and biology. Vol. 5. Wolbarsht, Myron L. New York; London: Plenum. 1991.
Complementary literature: 1. Laser ablation and its applications. Phipps Claude, New York: Springer, 2007.

Approved by the Head of the Department or an authorised person