COURSE SYLLABUS

1. Data about the program

1.1 Higher education institution	Babeș-Bolyai University
1.2 Faculty	Faculty of Biology and Geology
1.3 Doctoral school	**Doctoral School of Integrative Biology**
1.4 Field of study	**Integrative Biology**
1.5 Study cycle	Doctorate
1.6 Study program / Qualification	Doctoral training / PhD in Biology

2. Course data

2.1 Name of discipline	Electron Microscopy						
2.2 Teacher responsible for lectures	Assoc. prof. Lucian Barbu						
2.3 Teacher responsible for seminars	Assoc. prof. Lucian Barbu						
2.4 Year of study	I	2.5 Semester	I	2.6. Type of evaluation	E	2.7 Course framework	Opt.

3. Estimated total time of teaching activities (hours per semester)

3.1 Hours per week	4	Out of which: 3.2 Lectures	2	3.3 Seminars / Laboratory classes	2
3.4 Total hours in the curriculum	48	Out of which: 3.5 Lectures	24	3.6 Seminars / Laboratory classes	24

Allocation of study time:	Hs.
Study supported by textbooks, other course materials, recommended bibliography and personal student notes	50
Additional learning activities in the library, on specialized online platforms and in the field	25
Preparation of seminars / laboratory classes, topics, papers, portfolios and essays	50
Tutoring	0
Examinations	2
Other activities: -	0

3.7 Individual study (total hours)	127
3.8 Total hours per semester	175
3.9 Number of credits	7

4. Preconditions (where applicable)

4.1 Curriculum	•
4.2 Competences	•

5. Conditions (where applicable)

5.1 Conducting lectures	Classroom, equipped with laptop, video projector and suitable software, Power Point, Word, multimedia applications, Internet
5.2 Conducting seminars / laboratory classes	Properly equipped laboratory room: usual laboratory utensils, centrifuges, thermostats, hood, ultramicrotome, optical microscope and electron microscopes with transmission and scanning. All these devices and reagents are made available by the "C. Craciun" Laboratory of Electron Microscopy.

6. Specific competences acquired

Professional competences	C12. Knowledge and understanding of advanced concepts, theories, and methods of biology; their proper use in professional communication.
Transversal competences	CT1. Ability to work in life science research teams, solving problems and decision making, organizing group activities.

7. Course objectives (based on the acquired competencies grid)

7.1 The general objective of the course	The course aims to acquire the notions of cell biology (structure and ultrastructure) and familiarizing students with the principles of methods in morphological analyzes (optical and electron microscopy) used in biological sciences.
7.2 Specific objectives	Developing the ability to understand the basic principles of methods used in cell biology laboratories and current techniques in morphological diagnosis. Training in the ability to use techniques for cell biology in research laboratories.

8. Content

8.1 Lectures/8.2 Seminars / laboratory classes	Teaching methods	Comments
Introduction to cell biology. History of cell biology. The electron microscope.	Presentation, discussion, case studies, exercises	4 hs
Collection and chemical fixation of biological samples		4 hs
Dehydration and infiltration of samples.		4 hs
Sectioning and obtaining support films.		4 hs
Semi-fine sections and optical microscopy.		4 hs
Positive and negative coloration.		4 hs
Particularities of unicellular organisms.		4 hs
Particularities of plant tissue.		4 hs
Particularities of animal tissue.		4 hs
Immunological technique with colloidal gold.		4 hs
"Cryo" techniques.		4 hs
"Single Molecule" technique.		4 hs
Preparation of biological samples for scanning.		4 hs
Scanning or scanning imaging.		4 hs

Bibliography:

I. Principles and Techniques of Electron Microscopy: Biological Applications 4th Edition
by M. A. Hayat (Author): ISBN-13: 978-0521632874
II. Electron Microscopy: Principles and Techniques for Biologists. 2nd ed., J.J. Bozzola and L.D. Russell, Jones and Bartlett Publishers, 1999

9. Aligning the contents of the discipline with the expectations of the epistemic community representatives, professional associations and standard employers operating in the program field

The content of the discipline is in accordance with what is taught in other university centers in the country and in abroad.

10. Examination

Activity type	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Weight in the final grade
10.4 Lectures	Assessment of knowledge	Written exam	20%
10.5 Seminars / laboratory classes	Activity during seminars	Discussions, answers to questions	80%
10.6 Minimum performance standard			
Basic knowledge for obtaining the grade 5.			

Date of issue	Signature of the teacher responsible for lectures	Signature of the teacher responsible for seminars
30.07.2024		

Date of approval by the doctoral school council

Signature of the doctoral school director