

## COURSE SYLLABUS

### 1. Data about the program

1.1 Higher education institution	Babeş-Bolyai University
1.2 Faculty	Faculty of Physics
1.3 Doctoral school	Physics
1.4 Field of study	Physics
1.5 Study cycle	Doctorate
1.6 Study program / Qualification	Doctoral training / PhD in Physics

### 2. Course data

2.1 Name of discipline	<b>General research methods and methodology of scientific writing</b>						
2.2 Teacher responsible for lectures	Prof dr Neda Zoltan, Prof dr Simion Aştilean, Prof dr Coriolan Tiuşan, Prof dr Radu Fechetete,						
2.3 Teacher responsible for seminars	Prof dr Neda Zoltan, Prof dr Simion Aştilean, Prof dr Coriolan Tiuşan, Prof dr Radu Fechetete,						
2.4 Year of study	I	2.5 Semester	I	2.6. Type of evaluation	Exam	2.7 Course framework	DO

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

3.1 Hours per week	1.5	Out of which: 3.2 Lectures	1	3.3 Seminars / Laboratory classes	0,5
3.4 Total hours in the curriculum	<b>21</b>	Out of which: 3.5 Lectures	<b>14</b>	3.6 Seminars / Laboratory classes	<b>7</b>
Allocation of study time:					
Study supported by textbooks, other course materials, recommended bibliography and personal student notes					16
Additional learning activities in the library, on specialized online platforms and in the field					7
Preparation of seminars / laboratory classes, topics, papers, portfolios and essays					5
Tutoring					7
Examinations					2
Other activities: -					
3.7 Individual study (total hours)					<b>35</b>
3.8 Total hours per semester					<b>56</b>
3.9 Number of credits					<b>5</b>

### 4. Preconditions (where applicable)

4.1 Curriculum	•
4.2 Competences	•

### 5. Conditions (where applicable)

5.1 Conducting lectures	Classroom equipped with blackboard and projector, internet connexion. For online teaching specific platforms: MsTeams, Zoom, Skype will be used.
5.2 Conducting seminars / laboratory classes	Classroom equipped with blackboard and projector, internet connexion. For online teaching specific platforms: MsTeams, Zoom, Skype will be used.

### 6. Specific competences acquired

<b>Professional competences</b>	<ol style="list-style-type: none"> <li>1. Knowledge of scientific research methodologies.</li> <li>2. Knowledge of methodologies for writing scientific papers.</li> <li>3. Knowledge of the major implications of ethics in scientific research.</li> <li>4. Ability to communicate scientific ideas.</li> </ol>	
<b>Transversal competences</b>	<ol style="list-style-type: none"> <li>1. Ability to use scientific research methodologies in other related fields.</li> <li>2. Using methodologies for developing scientific papers in new contexts.</li> <li>3. Use of knowledge in debates on current issues of ethics and academic integrity.</li> </ol>	

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

7.1 The general objective of the course	<ol style="list-style-type: none"> <li>1. Knowledge and assimilation of scientific research methodologies and elaboration of scientific papers in the specific area of Physics.</li> <li>2. Development of critical thinking, scientific communication skills, logical argumentation, and cross-disciplinary thinking</li> </ol>	
7.2 Specific objectives	<ul style="list-style-type: none"> <li>- To know the specific aspects of scientific research activities in the field of Physics.</li> <li>- To know the stages of elaboration and development of some scientific research activities.</li> <li>- To know the main Scientometric indicators and to know how to access the main databases of the scientific literature.</li> <li>- To strengthen the ethical responsibility of doctoral students.</li> <li>- To know and assimilate the methodology of elaborating scientific papers (thesis, memoirs, papers, oral presentations, posters).</li> <li>- To know and assimilate the methodology of elaborating scientific research projects.</li> <li>- To assimilate competences regarding the rigorous, clear and attractive graphic presentation of the research results (scientific dissemination issues).</li> <li>- To contribute to the broadening of the horizon of knowledge and scientific culture of doctoral students.</li> </ul>	

### 8. Content

8.1 Lectures	Teaching methods	Comments (no of hours)
Introduction to the field of Scientometry. Scientometric indicators. Impact factor. Hirsch Index. Other classifications.		2
Accessing specific databases of scientific literature and bibliographic resources (En-formation, Scopus, ISI Web of Knowledge, etc.)		2
Methodology of scientific articles writing (scientific writing): the structure and content of the manuscript, the ethics of the co-author, the Acknowledgements, the Cover Letter, the different stages of publishing and revising a scientific article.		2
	Frontal lecture. Problematization.	

Strategies for publishing in top journals, the open-access journal policy, use of graphic illustrations, graphical / video-abstract, popularization and visibility of published articles.	Case study.	2
Specific issues of scientific research in the field of Physics. Defining and developing an original and relevant research topic in Physics.		2
General methodology of writing a research project. Content: novelty, context, impact, structure, description, implementation, risk factors. Scientific research methods and implementation in a Ph.D. Thesis. Structure and content of a Ph.D. thesis manuscript.		2
Methodologies for processing and graphical presentation of results in a doctoral thesis.		2
<b>Total</b>		<b>14 h</b>
<b>8.2 Seminars / laboratory classes</b>	<b>Teaching methods</b>	<b>Comments (no of hours)</b>
Critical aspects regarding the inflation of irrelevant scientific production, the inflation of irrelevant scientific publications, ethical issues in scientific publications.	Case study. Debates. Case studies prepared by students, based on their individual doctoral research topics	2
Methods of disseminating research results in the scientific community and in society (publications, workshops, web pages)		2
Case study: Elements of complex scientific graphics in two- and three-dimensional format		2
Case study: Presentation of the development of a topical research field		1
<b>Bibliography:</b> 1. David B. Resnik: The Ethics of Science: An Introduction, Philosophical Issues in Science (Routledge, 1998) 2. Michael Alley: The Craft of Scientific Writing (3rd Edition, Springer, 1998). 3. Science Rules: A Historical Introduction to Scientific Methods, Ed. Peter Achinstein, (Johns Hopkins University Press, 2004). 4. Writing Science: How to Write Papers That Get Cited and Proposals That Get Funded, (Oxford University Press; 1 edition, 2011). 5. Kerans ME, de Jager M. 2010. Handling plagiarism at the editor's desk. European Science Editing 36(3): 62-66. <a href="http://www.ease.org.uk/sites/default/files/ese_aug10.pdf">http://www.ease.org.uk/sites/default/files/ese_aug10.pdf</a> 6. Bernhard Blümich, NMR Imaging Of Materials (Oxford University Press, 2013)		

### **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 course is similar to the ones from other Western and Romanian universities. The course content intends to endeavour the students with specific skills that meet employment request in research institutions, universities, professional associations, etc: (i) deep knowledge of research methodology in Physics area and related fields, (ii) ability to access the scientific information using specific databases, (iii) perform methodologic analysis and develop critical thinking, (iv) develop the ability to write scientific papers, generate innovative ideas and find transdisciplinary solutions.

### **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 Understanding of concepts	Exam	75%

10.5 Seminars / laboratory classes	Activity during seminars	Oral presentations, Discussions,	25%
10.6 Minimum performance standard			
Knowledge of 60% from the content of the course			

Date of issue

Signature of the teacher  
responsible for lectures

Signature of the teacher  
responsible for seminars

21/09/2021

Prof dr Neda Zoltan  
Prof dr Simion Aştilean  
Prof Coriolan Tiuşan  
Prof dr Radu Feche

Prof dr Neda Zoltan  
Prof dr Simion Aştilean  
Prof dr Coriolan Tiuşan  
Prof dr Radu Fechete

Date of approval by the doctoral school council  
08/10/2021

Signature of the doctoral school director