

## COURSE SYLLABUS

University	<b>Alexandru Ioan Cuza University of Iași</b>	<b>Course title</b>	
Faculty	<b>Physics</b>	<b>IONIZING RADIATIONS INTERACTION WITH MATTER</b>	
Department	<b>Physics</b>		
Domain	<b>Physics</b>	<b>Course category (FC/SC/CC<sup>1</sup>): SC</b>	<b>Term (1-4): 1</b>
Level	<b>Postgraduate (MA)</b>	<b>Course type (Co/EI/F<sup>2</sup>): Co</b>	

### I. Course structure

Number of hours/week				Credits	Total class hours/semester	Total hours of individual activity	Examination type (C/Ex/CE <sup>3</sup> )	Teaching language
Course	Seminar	Lab.	Project	<b>6</b>	<b>56</b>	<b>124</b>	<b>C</b>	<b>English</b>
<b>2</b>		<b>2</b>						

### II. Instructors

	Academic degree <sup>4</sup>	Scientific degree	Name and surname	Faculty position (tenure/associate - organization)
Course	Lecturer	Ph. D.	Borcia Catalin-Gabriel	tenure
Seminar				
Laboratory	Lecturer	Ph. D.	Borcia Catalin-Gabriel	tenure

### III. Prerequisites

Electricity and magnetism, Atomic and molecular physics, Nuclear physics, Dosimetry and radioprotection, Plasma physics

### IV. Course objectives

Learn advanced knowledge of radiation interaction with matter; apply this knowledge for studying the transport of radiations through matter; apply the knowledge in practice; work in a team for solving experimental and technological issues; identify and use bibliographic resources for continuous formation.

### V. Course content

<b>Course</b>	<ol style="list-style-type: none"> <li>1) Fundamentals of ionizing radiation physics;</li> <li>2) Interaction of hard charged particles with matter;</li> <li>3) Interaction of light charged particles with matter;</li> <li>4) Elements of electron beam dosimetry;</li> <li>5) Interaction of photons with matter;</li> <li>6) Elements of photon beam dosimetry;</li> <li>7) Interaction of neutrons with matter;</li> <li>8) Ionizing radiations transport thorough matter;</li> <li>9) Elements of radiobiology;</li> <li>10) Ionizing radiations applications;</li> <li>11) Analysis and control techniques with ionizing radiations</li> </ol>
<b>Seminar</b>	
<b>Laboratory</b>	<ul style="list-style-type: none"> <li>- discussion and analysis of knowledge given during classes</li> <li>- Monte-Carlo simulation of practical problems;</li> <li>- work for preparing a project presentation</li> </ul>

### VI. Minimal required references

- [1] D. Mihăilescu, C. Borcia – “Interacțiunea radiațiilor ionizante cu substanța. Partea I: radiații încărcate electric”, Ed. Sedcom Libris, Iași, 2007.
- [2] E.B.Podgoršak - “Radiation Physics for Medical Physicists”, Springer Berlin Heidelberg, 2006, online at [www.springerlink.com](http://www.springerlink.com).
- [3] A. Bielajev – „Fundamentals of the Monte Carlo method for neutral and charged particle transport”, Univ. of Michigan, 2001.

<sup>1</sup> FC – fundamental course, SC – specialty course, CC – complementary course

<sup>2</sup> Co – compulsory, EI – elective, F – facultative

<sup>3</sup> C – colloquium, Ex – exam, CE – colloquium AND exam

<sup>4</sup> Professor / Associate professor / Lecturer / Assistant professor / Teaching assistant

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**VII. Didactic methods**

lecture, laboratory work, class discussion

**VIII. Assessment**

<b>Pre-conditions</b>	75% course attendance, 100% seminary attendance, project presentation.	
<b>Exam dates</b>	<b>1<sup>st</sup> Assessment</b>	<b>8<sup>th</sup> week</b>
	<b>2<sup>nd</sup> Assessment</b>	<b>16<sup>th</sup> week</b>

	<b>Assessment means and methods</b>	<b>Percentage of the final grade</b>
Exam/Colloquium	written	60
Seminar		
Laboratory	project presentation	40