

COURSE INFORMATION

Course Title	Code	Semester	L+P Hour	Credits	ECTS
Particles & Interactions	PHYS 611		3	3	10

Language of Instruction	English
Course Level	Postgraduate
Course Type	Elective
Course Coordinator	Asst. Prof. Ertuğrul Demir
Instructors	Asst. Prof. Ertuğrul Demir, Asst. Prof. Ercüment Akat
Assistants	
Goals	To make the postgraduate students have a good understanding of the basic concepts of particle physics and interactions.
Content	Atoms and Energy, Nuclear Physics, Historical introduction to the elementary particles, the interaction of radiation with matter, nuclear instability, nuclear collisions and reactions, nuclear models, particle accelerators and particle detection, forces and interactions, strong interactions, electromagnetic interactions

Learning Outcomes	Teaching methods	Assessment Methods
1- Knows radiation and radiation interaction with matter	1,5,15	A, B, C
2- Knows particles and its interaction	1,5,15	A, B, C
3- Knows particle accelerators and particle detections	1,5,15	A, B, C

Teaching methods	1: Lecture, 5: Problem solving, 15: Homework
Assessment Methods	A: Exam, B: Final C: Homework

Course Content

Week	Topics	Study Materials
1	Atom and Energy	Textbook, Lecture notes

2	Nuclear Physics	Textbook, Lecture notes
3	Historical Introduction to the Elementary Particles	Textbook, Lecture notes
4	The Interaction of Radiation with Matter	Textbook, Lecture notes
5	Nuclear Instability	Textbook, Lecture notes
6	Nuclear Collisions and Reactions	Textbook, Lecture notes
7	Nuclear Models	Textbook, Lecture notes
8	Particle Accelerators and Particle Detection	Textbook, Lecture notes
9	Forces and Interactions	Textbook, Lecture notes
10	The Strong Interaction	Textbook, Lecture notes
11	The Electromagnetic Interaction	Textbook, Lecture notes
12	The Weak Interaction	Textbook, Lecture notes
13	The Electroweak Interaction	Textbook, Lecture notes
14	Nuclear and Particle Astrophysics	Textbook, Lecture notes

Recommended Sources

Textbook	Nuclear and Particle Physics, W.S.C. Williams, Department of Physics, University of Oxford.
Additional Sources	Particle Physics Reference Library, Volume 2: Detectors for Particles and Radiation, Springer. Particle and Fundamental Interactions, An Introduction to Particle Physics, Sylvie Braibant, Giorgio Giacomelli, Springer 2009.

Material Sharing

Documents	
Assignments	2
Exams	1 midterm, 1 final

ASSESSMENT

IN-TERM STUDIES	NUMBER	PERCENTAGE
Assignment	2	30
Midterm	1	30
Total		60
CONTRIBUTION OF FINAL EXAMINATION TO OVERALL GRADE		40
CONTRIBUTION OF IN-TERM STUDIES TO OVERALL GRADE		60
Total		100

COURSE CATEGORY	Expertise/Field Courses
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COURSE'S CONTRIBUTION TO PROGRAM						
No	Program Learning Outcomes	Contribution				
		1	2	3	4	5
1	gains the ability to apply the knowledge in physics and mathematics					X
2	gains the ability to construct an experimental setup, perform the experiment, analyze and interpret the results		X			
3	is supposed to have the education required for the measurements in scientific and technological areas					X
4	is able to work in an interdisciplinary team					X
5	is able to identify, formulate and solve physics problems					X
6	is conscious for the professional and ethical responsibility					X
7	is able to communicate actively and effectively			X		
8	is supposed to have the required education for the industrial applications and the social contributions of physics			X		
9	is conscious about the necessity of lifelong education and can implement it				X	
10	is supposed to be aware of the current investigations and developments in the field				X	
11	can make use of the techniques and the modern equipment required for physical applications		X			

ECTS ALLOCATED BASED ON STUDENT WORKLOAD BY THE COURSE DESCRIPTION			
Activities	Quantity	Duration (Hour)	Total Workload (Hour)
Course Duration (Including the exam week: 14x Total course hours)	14	3	42
Hours for off-the-classroom study (Pre-study, practice)	14	12	168
Midterm	1	2	2
Assignment	2	12	24
Final	1	3	3
Total Work Load			
Total Work Load / 25 (h)			239
ECTS Credit of the Course			<u>9,56</u>
			10