RELATIVISTIC QUANTUM MECHANICS I

1	Course Title:	RELATIVISTIC QUANTUM MECHANICS I	
2	Course Code:	FZK5209	
3	Type of Course:	Optional	
4	Level of Course:	Second Cycle	
5	Year of Study:	1	
6	Semester:	1	
7	ECTS Credits Allocated:	6.00	
8	Theoretical (hour/week):	3.00	
9	Practice (hour/week):	0.00	
10	Laboratory (hour/week):	0	
11	Prerequisites:		
12	Language:	Turkish	
13	Mode of Delivery:	Face to face	
14	Course Coordinator:	Doç. Dr. Cem Salih ÜN	
15	Course Lecturers:	Doç. Dr. Cem Salih ÜN, Dr. Öğr. Gör. Zerrin KIRCA	
16	Contact information of the Course Coordinator:	Doç. Dr. Cem Salih ÜN E-mail: cemsalihun@uludag.edu.tr İş Tel:(0224)2955075 Adres: UÜ Fen Edebiyat Fakültesi, Fizik Bölümü, 16059 Görükle Kampusü, Bursa	
17	Website:		
18	Objective of the Course:	The aim of this course is to provide information about quantization of fields and mathematical structure of relativistic quantum mechanics. Also relativistic quantum mechanics is provide basic concepts of the quantum field theory	
19	Contribution of the Course to Professional Development:	The student learns the fundamental laws in High Energy and Particle Physics such as quantum mechanics and its relativistic applications. They also learn how to formulate the current problems and their solutions on the fundamental laws.	
20	Learning Outcomes:		
		1	To learn the basic conceptual foundations of the relativistic quantum mechanics.
		2	To learn mathematical structure of the relativistic quantum mechanics.
		3	To learn quantized field equations according to spin states
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21	Course Content:		

Course Content:

Week	Theoretical	Practice
1	Special relativity (review), description of four vector, metric	

2	Special relativity; Proper time, Physics in flat spacetime	
3	Relativistic wave equation for spin-0 particles	
4	Schrodinger equation (relativistic corrections) and Klein-Gordon equation	
5	Klein-ordon equation and problems	
6	Klein-Gordon equation and practices	
7	Concepts of spinor and bilinear covariant forms	
8	Concepts of spinor and bilinear covariant forms and practices	
9	Relativistic wave equation for spin-1/2 particles: Dirac equation	
10	Relativistic wave equation for spin-1/2 particles: Dirac equation, definition of particle- anti particle	
11	Lorentz covariance form of Dirac equation	
12	Another way to construct of free Dirac equation-Lorentz covariance	
13	energy and spin projection operators	
14	energy ve spin projection operators – practise	

22	Textbooks, References and/or Other Materials:	1- Relativistic Quantum Mechanics, Wave Equations by Walter Greiner. 2- Relativistic Quantum Mechanics and Field theory by Bjorken.

Activites	Number	Duration (hour)	Total Work Load (hour)
Theoretical	14	3.00	42.00
Practicals/Labs	0	0.00	0.00
Self Study and Preperation	14	4.00	56.00
Homeworks	4	5.00	20.00
Projects	0	0.00	0.00
Field Studies	0	0.00	0.00
Midterm exams	1	6.00	6.00
Others	0	0.00	0.00
Final Exams	1	52.00	52.00
Total Work Load			176.00
Total work load/ 30 hr			5.87
ECTS Credit of the Course			6.00

TERM LEARNING ACTIVITIES	NUMBER	WEIGHT
Quiz	0	0.00
Midterm exams	1	50.00
Final Exam	1	50.00
Contribution of Term (Year) Learning Activities to Success Grade		50.00
Contribution of Final Exam to Success Grade		50.00

Measurement and Evaluation Techniques Used in the Course	Bağıl değerlendirme sistemi uygulanmaktadır.

24 ECTS / WORK LOAD TABLE

25 CONTRIBUTION OF LEARNING OUTCOMES TO PROGRAMME QUALIFICATIONS

	PQ1	PQ2	PQ3	PQ4	PQ5	PQ6	PQ7	PQ8	PQ9	PQ10	PQ11	PQ12	PQ13	PQ14	PQ15	PQ16
ÖK1	0	0	0	4	4	0	0	0	3	0	4	0	0	0	0	0
ÖK2	0	4	3	0	0	0	0	0	0	0	4	0	0	0	0	0
ÖK3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

LO: Learning Objectives PQ: Program Qualifications					
Contribution Level:	**1 very low**	**2 low**	**3 Medium**	**4 High**	**5 Very High**