Course Information

COURSE INFORMATION

Course Title	Code	Semester	L+U Hour	Credits	ECTS
Fundamental High Energy Physics	FİZ404	8. Semester	3 + 0	3.0	7.0

Prerequisites	None

Language of Instruction	English
Course Level	Bacheclor's Degree (First Cycle)
Course Type	Elective
Mode of delivery	Face to face
Course Coordinator	Assoc. Prof. Dr. Kıvanç SEL
Instructors	
Assistants	
Course Objectives	this course aims to teach the study of smallest components of matter and how they interact. Seeking to learn what our world is made of, how it is put together, and how it works.
Course Content	Quarks and Leptons, The Standard Model of Particle Physics, Particles and Anti-particles, Interactions and Fields, The Boson Propagator , Feynman Diagrams, Electromagnetic Interactions, Midterm exam Invariance Principles and Conservation Laws, Parity of particles and antiparticles, Charge conjugation invariance, Isospin symmetry, Weak and Electroweak interactions, Quark spin and color, Quarks in Hadrons, Final
Course Learning Outcomes	1) Describe the theoretical knowledge required for following the literature on high energy physics 2) Define objects that are not only very energetic but also very small 3) Describe the fundamental structures of matter and energy and the interplay between them 4) Define the elementary particles and their interactions 5) Review the new laws of nature with exquisite mathematical beauty

WEEKLY COURSE CONTENT

Week	Topics	Teaching and Learning Methods and Techniques	Study Materials
1. Week	Quarks and Leptons	Lecture and recitation	
2. Week	The Standard Model of Particle Physics	Lecture and recitation	
3. Week	Particles and Anti-particles	Lecture and	

Quick Access

Physics
- Qualification Awarded
- Level of Qualification
- Qualification Requirements and Regulations
- Specific Admission Requirements
- Recognition of Prior Learning
- Profile of the Program
- Program Key Learning Outcomes
- Occupational Profile of Graduates
- Access to Further Studies
- Course Structure & Credits
- Exam Regulations & Assessment & Grading
- Graduation Requirements
- Mode of Study
- Programme Director(or Equivalent)
- Evaluation Questionnaire
- TYYÇ

Course Information
- Course Information
- Weekly Course Content
- Resources
- Course Category
- CONTRIBUTION OF COURSE LEARNING OUTCOMES TO PROGRAMME OUTCOMES
- ECTS credits and course workload

		recitation	
4. Week	Interactions and Fields	Lecture and recitation	
5. Week	The Boson Propagator	Lecture, recitation and homework	
6. Week	Feynman Diagrams	Lecture and recitation	
7. Week	Electromagnetic Interactions	Lecture and recitation	
8. Week	Midterm exam	Written exam	
9. Week	Invariance Principles and Conservation Laws	Lecture and recitation	
10. Week	Parity of particles and antiparticles	Lecture and recitation	
11. Week	Charge conjugation invariance	Lecture and recitation	
12. Week	Isospin symmetry	Lecture, recitation and homework	
13. Week	Weak and Electroweak interactions	Lecture and recitation	
14. Week	Quark spin and color	Lecture and recitation	
15. Week	Quarks in Hadrons	Lecture and recitation	
16. Week	Final	Written exam	

RESOURCES

Recommended Sources
D.Perkins, Introduction to High Energy Physics, Cambridge University Pres, 0521621968 (ISBN-13: 978-0521621960), 2000
P.C.W.Davies, The Forces of Nature, Cambridge University Pres, 0521313929 (ISBN-13: 978-0521313926), 1986
F.Close, The Cosmic Onion, Heinemann Educational Publishers, 0435691708 (ISBN-13: 978-0435691707), 1983

ASSESSMENT

Measurement and Evaluation Methods and Techniques
Written exam, homework and presentations. (60% Final, 30% midterm, 10% homework and presentation)

COURSE CATEGORY

Course Category	Percentage
Support Courses	% 100

CONTRIBUTION OF COURSE LEARNING OUTCOMES TO PROGRAMME OUTCOMES

Programme Outcomes	Contribution Level	DK1	DK2	DK3	DK4	DK5
PY1	4	4	4	4	4	4
PY2	4	4	4	4	4	4
PY3	3	3	3	3	3	3
PY4	3	3	3	3	3	3
PY5	3	3	3	3	3	3

PY6	4	4	4	4	4	4
PY7	3	3	3	3	3	3
PY8	2	2	2	2	2	2
PY9	4	4	4	4	4	4
PY10	3	3	3	3	3	3
PY11	3	3	3	3	3	3
PY12	3	3	3	3	3	3
PY13	3	3	3	3	3	3
PY14	3	3	3	3	3	3
PY15	3	3	3	3	3	3

*DK = Course's Contrubution.

	0	1	2	3	4	5
Level of contribution	None	Very Low	Low	Fair	High	Very High

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ECTS CREDITS AND COURSE WORKLOAD

Event	Quantity	Duration (Hour)	Total Workload (Hour)
Class Hours (14 weeks)	14	3	42
Final Exam Preparation	1	28	28
Mid Term Exam Preparation	1	27	27
Further Study	14	3	42
Assignment 1	1	18	18
Final Exam	1	2	2
Mid Term Exam 1	1	2	2
Assignment 2	1	18	18
		Total Workload	179
		Total Workload / 25.5 (s)	7.02
		ECTS Credit of the Course	7