Course Information

COURSE INFORMATION

Course Title	Code	Semester	L+U Hour	Credits	ECTS
High Energy Physics	FZ5014		3 + 0	3.0	7.5

Prerequisites	None
Language of Instruction	Turkish
Course Level	Second Cycle
Course Type	Elective
Mode of delivery	Face to face
Course Coordinator	Assist. Prof. Dr. Ayşe KÜÇÜKARSLAN
Instructors	Prof. Dr. İhsan YILMAZ Assist. Prof. Dr. Oktay YILMAZ
Assistants	
Course Objectives	Historical Developments, Accelerators, Detectors, Measurement Techniques, Relativistic Kinematics, Mass Determination and Conservation of Half Life, Symmetry Principles, Spin Parity, Determination of isospin and other Quantum Numbers, Electromagnetic Interactions and Form Factor, Weak Interactions, Neutrinos, Neutral Caons.
Course Content	Introduction to High Energy Physics, History of Elementary Particles, Production of Elementary Particles and Their Detection, Standard Model, Elementary Particles and Forces, Experimental Apparatus, Accelerators, Colliders, Detectors, Relativistic Kinematics, Lorentz Transformations, Scattering and Decay Problems, Feynman Diagrams, Symmetries in Particle Physics, Four Vectors, Mandelstam Variables, Conservation Laws Symmetries and Groups.
Course Learning Outcomes	1) Explain the elementary particles and their interactions 2) Define the experimental apparatus used in particle physics 3) Solve the problems in elementary particle physics 4) Define basic conservation laws in high energy physics 5) Define gauge theories

WEEKLY COURSE CONTENT

Week	Topics	Teaching and Learning Methods and Techniques	Study Materials
1. Week	Introduction to High Energy Physics	Lecture, Problem solving, Homework	
2. Week	History of Elementary Particles	Lecture, Problem solving, Homework	
3. Week	Production of Elementary Particles and Their Detection	Lecture, Problem	

Quick Access

Physics (Master)
- 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

		solving, Homework	
4. Week	Standard Model, Elementary Particles and Forces	Lecture, Problem solving, Homework	
5. Week	Experimental Apparatus, Accelerators, Colliders, Detectors	Lecture, Problem solving, Homework	
6. Week	Experimental Apparatus, Accelerators, Colliders, Detectors	Lecture, Problem solving, Homework	
7. Week	Relativistic Kinematics	Lecture, Problem solving, Homework	
8. Week	Midterm exam	Exam	
9. Week	Lorentz Transformations	Lecture, Problem solving, Homework	
10. Week	Scattering and Decay Problems	Lecture, Problem solving, Homework	
11. Week	Feynman Diagrams	Lecture, Problem solving, Homework	
12. Week	Symmetries in Particle Physics	Lecture, Problem solving, Homework	
13. Week	Four Vectors, Mandelstam Variables	Lecture, Problem solving, Homework	
14. Week	Conservation Laws	Lecture, Problem solving, Homework	
15. Week	Symmetries and Groups	Lecture, Problem solving, Homework	
16. Week	Final Exam	Exam	

RESOURCES

Recommended Sources
Introduction to Elementary Particles, David Griffiths, 1987, John Wiley & Sons, Inc., America
Quarks and Leptons: An Introductory Course in Modern Particle Physics, F. Halzen and A. D. Martin, 1984, John Wiley & Sons, Inc., America
"Introduction to High Energy Physics", D.H.Perkins, 2000, Cambridge University Press, United Kingdom

ASSESSMENT

Measurement and Evaluation Methods and Techniques
Midterm exam, Homework, Final

COURSE CATEGORY

Course Category	Percentage
Core Courses	% 100

CONTRIBUTION OF COURSE LEARNING OUTCOMES TO PROGRAMME OUTCOMES

Programme Outcomes	Contribution Level	DK1	DK2	DK3	DK4	DK5
PY1	3	3	2	4	0	0
PY2	4	4	4	4	0	0
PY3	3	4	3	2	0	0
PY4	3	4	4	1	0	0
PY5	3	3	3	3	0	0

PY6	4	3	5	4	0	0
PY7	0	0	0	0	0	0
PY8	3	3	2	4	0	0
PY9	4	4	3	5	0	0
PY10	0	0	0	0	0	0
PY11	3	4	2	3	0	0
PY12	3	3	3	3	0	0
PY13	0	0	0	0	0	0
PY14	2	2	2	2	0	0
PY15	0	0	0	0	0	0

*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
Mid Term Exam Preparation	1	25	25
Further Study	14	3	42
Assignment 1	3	15	45
Final Exam Preparation	1	30	30
Final Exam	1	4	4
Mid Term Exam 1	1	3	3
Total Workload			191
Total Workload / 25.5 (s)			7.49
ECTS Credit of the Course			7