Ankara Üniversitesi
Kütüphane ve Dokümantasyon Daire Başkanlığı

Açık Ders Malzemeleri

PHYS 437 Int. to High Energy Physics I - Çalışma Planı (Çalışma Takvimi) Prof.Dr.A.Ulvi Yılmazer

Haftalar	Haftalık Konu Başlıkları
1.Hafta	**Overview**
	○ Overview of particle physics, its concepts and theoretical sturucture, latest experimental discoveries. Latest physics news from the leading accelerators and detectors.
	○ A brief review of quantum mechanical basics and electrodynamics.
2.Hafta	**Historical introduction to the world of elementary particles**
	○ Photon, electron, proton, mesons, antiparticles, neutrinos, strange particles, symmetries.
	○ Quark model and the eightfold way, intermediate vector mesons, Standard Model and the future
3.Hafta	**Elementary particle Dynamics - 1**
	○ Four fundamental forces of nature.
	○ Basic notions of classical and quantum electrodynamics.
	○ Weak interactions
	○ Quantum chromodynamics as the theory of strong nuclear interactions
4.Hafta	**Elementary particle Dynamics - 2**
	○ Particle decays
	○ Conservation laws and their uses
	○ Unification schemes fort he fundamentalinteractions
	○ Today's present situation.
5.Hafta	**Relativistic kinematics -1**
	○ Lorentz transformations
	○ Four vectors of position and energy-momentum.
	○ Collisions
6.Hafta	**Relativistic kinematics -2**
	○ Examples and applications for the use of four vectors in the kinematic analysis of decays and collisons.
	○ Laboratory and center of mass frames and their proper uses in collision processes.
7.Hafta	**Symmetries - 1**
	○ Symmetries, groups, and conservation laws
	○ Spin and angular momentum
	○ Addition of angular momenta
	○ Spin 1/2
8.hafta	**Symmetries - 2**
	○ Flavour symmetries
	○ Parity and charge conjugation, CP violation
	○ Time reversal and CPT theorem
9.Hafta	**Bound states**
	○ Schrödinger equation for central potential
	○ Hydrogen atom and its fine and hyperfine structures, Lamb shift and its origin
	Positronium, quarkonium, baryon masses and baryon moments

Haftalar	Haftalık Konu Başlıkları
	The Feynman Calculus -1
10.Hafta	○ Lifetime and cross sections
	○ Golden rule
	○ Feynman rule for a quantum field theoretic toy model
11.Hafta	**The Feynman Calculus -2**
	○ Lifetime calculation for a decaying particle
	○ Scattering calculations for basic processes in this model
	○ Higher order diagrams and renormalization concept
12.Hafta	**Dirac Equation -1**
	○ Klein-Gordon equation
	○ Dirac equation
	○ Bilinear covariants
13.Hafta	**Dirac Equation -2**
	○ The photon
	○ The Feynman rules for quantum electrodynamics
	○ Examples for sample calculations
14.Hafta	**Dirac Equation -3**
	○ Casimir's trick and trace theorems
	○ Cross sections and lifetimes
	○ Renormalization