COURSE LIST Faculty of Arts & Sciences Department of Physics

Please note that Erasmus students are allowed to take courses from lists of all faculties/schools according to their needs or interests.

Courses offered in Turkish are listed at the website of the faculty http://fef.comu.edu.tr/ or you can contact Departmental Coordinator to get the necessary information

Courses offered in English

Course Title	Code	ECTS Credit	COMU Credit	Lecturer
Fluid Physics	ULP-02-121	7	3	Assoc. Prof. Dr. Huseyin Cavus
Experimental Techniques in Physics	ULP-02-122	7	3	Prof. Dr. Serhat Ozder
Fundamental High Energy Astrophysics	ULP-02-123	7	3	Assoc. Prof. Dr. Gülnur İkis Gün
Prevention from radiation	ULP-02-125	7	3	Assoc. Prof. Dr. Emine Dilara Aydin
Biophysics	ULP-02-126	7	3	Assoc. Prof. Dr. Hilal Goktas
Digital Electronics	ULP-02-127	7	3	Assoc. Prof. Dr. Huseyin Cavus
Analog Electronics	ULP-02-128	7	3	Assoc. Prof. Dr. Huseyin Cavus
Nuclear Reactors	ULP-02-129	7	3	Assoc. Prof. Dr. Emine Dilara Aydin
Radiation Physics	ULP-02-130	7	3	Assoc. Prof. Dr. Emine Dilara Aydin
General Astronomy I	ULP-02-131	7	3	Prof. Dr. Osman Demircan Assoc. Prof. Dr. Gülnur İkis Gün

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General Astronomy II	ULP-02-132	7	3	Prof. Dr. Osman Demircan Assoc. Prof. Dr. Gülnur İkis Gün
Astronomy of Solar System	ULP-02-133	7	3	Prof. Dr. Osman Demircan
Pratic Astronomy I	ULP-02-135	7	3	Prof. Dr. Osman Demircan
Pratic Astronomy II	ULP-02-136	7	3	Prof. Dr. Osman Demircan
Introduction to Solid State Physics	ULP-02-137	7	3	Assoc. Prof. Dr. Kivanc Sel
History of Physics	ULP-02-138	7	3	Assoc. Prof. Dr. Huseyin Cavus
Semiconductor Physics	ULP-02-139	7	3	Assoc. Prof. Dr. Kivanc Sel
Introduction to Atom and Molecular Physics	ULP-02-140	7	3	Assoc. Prof. Dr. Mustafa Kurt
Neutron Physics	ULP-02-141	7	3	Assoc. Prof. Dr. Emine Dilara Aydin
Particle Physics I	ULP-02-142	7	3	Assist. Prof. Dr. Ayse Küçükarslan
Particle Physics II	ULP-02-143	7	3	Assist. Prof. Dr. Ayse Küçükarslan
Introduction to Laser Physics	ULP-02-144	7	3	Assoc. Prof. Dr. Hilal Göktaş Assoc. Prof. Dr. Mustafa Kurt
Laser and	ULP-02-145	7	3	Assoc. Prof. Dr. Mustafa

Applications				Kurt
Introduction to Plasma Physics	ULP-02-146	7	3	Assoc. Prof. Dr. Hilal Göktaş
Basis of Nuclear Engineering	ULP-02-147	7	3	Assoc. Prof. Dr. Emine Dilara Aydin
Application of Radiation in Medical and Industry	ULP-02-148	7	3	Assoc. Prof. Dr. Emine Dilara Aydin
Radiation Measurement and Imaging	ULP-02-150	7	3	Assoc. Prof. Dr. Emine Dilara Aydin
Quantum Mechanics II	ULP-02-151	7	3	Assoc. Prof. Dr. Kivanc Sel

Course Code	ULP - 02 - 121
Name of the course in English	Fluid Physics
Name of the course in Turkish	Akışkanlar Fiziği
Language of the course	English
Level of Course	Bachelor's / Undergraduate
Lecturer	-
ECTS Credits	7
COMU Credits	3
Description	In this course, basic physical properties of fluids, static, dynamic, viscid, inviscid, laminar and turbulent flows are analysed.

Course Code	ULP - 02 - 122
Name of the course in English	Experimental Techniques in Physics
Name of the course in Turkish	Fizikte deneysel Teknikler
Language of the course	English
Level of Course	Bachelor's / Undergraduate
Lecturer	-
ECTS Credits	7
COMU Credits	3
Description	In this course electron spin resonance, x-ray, electron diffraction, hall effect, birefringence and radioactivity events be able to worked as theoretically and experimentally.

Course Code	ULP - 02 - 123
Name of the course in English	Fundamental High Energy Astrophysics
Name of the course in Turkish	Temel Yüksek Enerji Astrofiziği
Language of the course	English
Level of Course	Bachelor's / Undergraduate
Lecturer	Assoc. Prof. Dr. Gülnur İkis Gün
ECTS Credits	7
COMU Credits	3
Description	This course is an introduction to high energy astrophysics. The aim of the course is to give the knowledge about cosmic particles, gamma rays, neutrinos, the radio waves etc and the celestial objects which radiates in these types of spectrum.

Course Code	ULP - 02 - 125
Name of the course in English	Prevention from radiation
Name of the course in Turkish	Radyasyondan Korunma
Language of the course	English
Level of Course	Bachelor's / Undergraduate
Lecturer	-
ECTS Credits	7
COMU Credits	3
Description	Aim of the course is to teach the basic principles of radiation protection, indoor and outdoor radiation sources and radioactive waste management. ENERGY- THE UNIFYING CONCEPT IN RADIATION PROTECTION. ENERGY- THE UNIFYING CONCEPT IN RADIATION PROTECTION. PRINCIPLES OF PROTECTION AGAINST IONIZING RADIATION. PRINCIPLES OF PROTECTION AGAINST IONIZING RADIATION. RADIATION DOSE CALCULATIONS. RADIATION DOSE CALCULATIONS. RADIATION MEASUREMENTS. RADIATION MEASUREMENTS. RADIATION MEASUREMENTS. PRACTICAL ASPECTS OF THE USE OF RADIONUCLIDES. PRACTICAL ASPECTS OF THE USE OF RADIONUCLIDES. IONIZING RADIATION AND PUBLIC HEALTH. EXPOSURE TO NONIONIZING ELECTROMAGNETIC RADIATION. CURRENT ISSUES IN RADIATION PROTECTION: WHERE THE EXPERTS STAND.

Course Code	ULP - 02 - 126
Name of the course in English	Biophysics
Name of the course in Turkish	Biofizik
Language of the course	English

Level of Course	Bachelor's / Undergraduate
Lecturer	-
ECTS Credits	7
COMU Credits	3
Description	The applications of Newton Mechanics and Modern Physicsto biophysics; bioenergetics properties, bioelectric application tools, biological effects of electromagnetic waves and their applications, electromagnetic spectrum and their biological effects and applications

Course Code	ULP - 02 - 127
Name of the course in English	Digital Electronics
Name of the course in Turkish	Dijital Elektronik
Language of the course	English
Level of Course	Bachelor's / Undergraduate
Lecturer	-
ECTS Credits	7
COMU Credits	3
Description	Analysing the digital logic and some composite circuits in digital electronics.

Course Code	ULP - 02 - 128
Name of the course in English	Analog Electronics
Name of the course in Turkish	Analog Elektronik
Language of the course	English
Level of Course	Bachelor's / Undergraduate

Lecturer	-
ECTS Credits	7
COMU Credits	3
Description	Learning of active circuit devices, semiconductor circuit devices and their applications.

Course Code	ULP - 02 - 129
Name of the course in English	Nuclear Reactors
Name of the course in Turkish	Nükleer Reaktörler
Language of the course	English
Level of Course	Bachelor's / Undergraduate
Lecturer	Assoc. Prof. Dr. Emine Dilara Aydin
ECTS Credits	7
COMU Credits	3
Description	Fission, components of nuclear reactors, pressured water reactors, boiling water reactors, CANDU.

Course Code	ULP - 02 - 130
Name of the course in English	Radiation Physics
Name of the course in Turkish	Radyasyon Fiziği
Language of the course	English
Level of Course	Bachelor's / Undergraduate
Lecturer	-
ECTS Credits	7
COMU Credits	3

Description	Review of physical principles, atomic and nuclear structure and radioactivity and transformation mechanism, radioactive transformation kinetics, activity units; Interaction of photons, neutrons, and charged particles with matter and mechanisms of energy loss; Radiation dosimetry, concepts, quantities and units, external and internal dose evaluations; Biological effect of radiation, dose-response characteristics, biological basis for internal dosimetry, radiation effects, radiation-weighted dose units; Design and application of radiation dosimetry systems for personnel monitoring, area radiation monitoring and accidents situation, health physics instrumentation, radiation detectors, particle counting instruments, dose measuring instruments, neutron measurement, instrument calibration, counting statistics, Theory and practice of radiation dosimetry as applied to radiation protection, Radiation-protection criteria and exposure Limits, External radiation protection, basic concepts, shielding calculations and optimisation; Internal radiation protection, determination of maximum permissible body burdens and concentrations in air and water; internal radiation hazard, principles of source, worker and environmental control, surface contamination limits, waste management, assessment of hazard, optimisation; Evaluation of protective measures, medical surveillance, estimation of internally deposited radioactivity, individual monitoring, radiation and contamination surveys, air sampling, continues environmental monitoring. Special emphasises on power reactor, fuel cycle, university, accelerator, medical, environmental health physics.

Course Code	ULP - 02 - 131
Name of the course in English	General Astronomy I
Name of the course in Turkish	Genel Astronomi I
Language of the course	English

Level of Course	Bachelor's / Undergraduate
Lecturer	Prof. Dr. Osman Demircan Assoc. Prof. Dr. Gülnur İkis Gün
ECTS Credits	7
COMU Credits	3
Description	Basic concepts in astronomy, visible motions of heavinly bodies, daily motion, description of horison circle, meridian plane and celestial sphere, visible motion of the Sun, the moon and planets. Kepler laws, Coordinate systems, time, events happened on celestial sphere, motion of Earth, paralactic motion of stars, annual regular motion in stars radial velocity, the Moon and its distance, size and mass. The Moon's rotational motion and orbital motion.

Course Code	ULP - 02 - 132
Name of the course in English	General Astronomy II
Name of the course in Turkish	Genel Astronomi II
Language of the course	English
Level of Course	Bachelor's / Undergraduate
Lecturer	Prof. Dr. Osman Demircan Assoc. Prof. Dr. Gülnur İkis Gün
ECTS Credits	7
COMU Credits	3
Description	Planck, Stefan-Boltzmann and Wien’s laws, Stars and basic parameters of the stars, Energy distribution of stars, the distance of stars, the brightness of stars, the spectra of stars and spectral classification. Boltzmann and Field’s laws, H-R diagram, motions of the stars, cluster of the stars, binary stars, variable stars, evolution of the stars.

Course Code	ULP - 02 - 133
Name of the course in English	Astronomy of Solar System
Name of the course in Turkish	Güneş Sistemi Astronomisi
Language of the course	English
Level of Course	Bachelor's / Undergraduate
Lecturer	Prof. Dr. Osman Demircan Assoc. Prof. Dr. Gülnur İkis Gün
ECTS Credits	7
COMU Credits	3
Description	Formation theories of the solar system. İnternal structures, surface properties, orbit planes, atmospheres of planets in the solar systems. The comets, meteors, kuiper blet, Oort nebula.

Course Code	ULP - 02 - 135
Name of the course in English	Pratic Astronomy I
Name of the course in Turkish	Pratik Astronomi I
Language of the course	English
Level of Course	Bachelor's / Undergraduate
Lecturer	-
ECTS Credits	7
COMU Credits	3
Description	This course includes of transit of Venüs and Uranus, movement in space of Bardard star, colour-brightness diagram of Hyades, absolute brightness, properties of Milky Way and Andromeda galaxies, determination of Hubble space constant,, observation of puslar and quasar .

Course Code	ULP - 02 - 136
Name of the course in English	Pratic Astronomy II
Name of the course in Turkish	Pratik Astronomi II
Language of the course	English
Level of Course	Bachelor's / Undergraduate
Lecturer	-
ECTS Credits	7
COMU Credits	3
Description	Astrometric Times, Time Transformations, Astrometric Coordinates, Coordinate Transformations, Photometric Astronomy, Astrometric Measurments.

Course Code	ULP - 02 - 137
Name of the course in English	Introduction to Solid State Physics
Name of the course in Turkish	Katı Hal Fiziğine Giriş
Language of the course	English
Level of Course	Bachelor's / Undergraduate
Lecturer	-
ECTS Credits	7
COMU Credits	3
Description	Crystal Structure, Reciprocal Lattice, X-Ray crystallography, Determination of Crystal Structures by X-Ray Diffraction, Crystal Binding and Elastic Constants, Phonons I; Crystal Vibrations, Phonons II; Thermal Properties.

Course Code	ULP - 02 - 138

Name of the course in English	History of Physics
Name of the course in Turkish	Fiziğin Tarihi
Language of the course	English
Level of Course	Bachelor's / Undergraduate
Lecturer	-
ECTS Credits	7
COMU Credits	3
Description	This course is an introduction to the history of science. We will explore evolution/development of science, physics and astronomy from earliest times to the present day

Course Code	ULP - 02 - 139
Name of the course in English	Semiconductor Physics
Name of the course in Turkish	Yarı iletken Fiziği
Language of the course	English
Level of Course	Bachelor's / Undergraduate
Lecturer	-
ECTS Credits	7
COMU Credits	3
Description	Crystal structures, classification of solids, fundamentals of semiconductors, intrinsic and doped semiconductors, conduction mechanisims in semiconductors, energy band structures of metals, semiconductors and insulators, electron transitions between bands and energy levels, recombination of charge carriers, statistics of charge carriers in semiconductors, Fermi distribution function, fermi enrgy of intrinsic and doped semiconductors, diffusion of charge carriers.

Course Code	ULP - 02 - 140
Name of the course in English	Introduction to Atom and Molecular Physics
Name of the course in Turkish	Atom ve Molekül Fiziğine Giriş
Language of the course	English
Level of Course	Bachelor's / Undergraduate
Lecturer	Assoc. Prof. Dr. Mustafa Kurt
ECTS Credits	7
COMU Credits	3
Description	Investigation the anatomy of the formation of atomic nuclei and atomic properties. Determine the characteristics of different atomic models to analyze the structure of electrons surrounding the atomic nucleus. Structure of atoms and molecules, energy levels, wave functions and electromagnetic transitions to analyze conceptually.

Course Code	ULP - 02 - 141
Name of the course in English	Neutron Physics
Name of the course in Turkish	Nötron Fiziği
Language of the course	English
Level of Course	Bachelor's / Undergraduate
Lecturer	-
ECTS Credits	7
COMU Credits	3
Description	Physical properties of neutron, Cross section and Mean Free Path, Elastic Collision, (n,p) Collision, Inelastic Collision, Absorption of the neutron, Fission, Emergence

	of Charged Particles, Neutron Sources, Detection of Neutrons,Neutron Activation Method, Neutron Transport Theory, Neutron Transport Theory, Solution Methods of Neutron Transport Theory, Solution Methods of Neutron Transport Theory, One-Speed Diffusion Equation, Solution of the Diffusion Equation, Solution of the Diffusion Equation.

Course Code	ULP - 02 - 142
Name of the course in English	Particle Physics I
Name of the course in Turkish	Parçacık Fiziği I
Language of the course	English
Level of Course	Bachelor's / Undergraduate
Lecturer	-
ECTS Credits	7
COMU Credits	3
Description	Definition of particles; discoveries of particles; classification of particles and their interactions; relativistic kinematics; measurement techniques, accelerators, detectors; definition of Feynman calculus.

Course Code	ULP - 02 - 143
Name of the course in English	Particle Physics II
Name of the course in Turkish	Parçacık Fiziği II
Language of the course	English
Level of Course	Bachelor's / Undergraduate
Lecturer	-
ECTS Credits	7

COMU Credits	3
Description	Identification of particles, discoveries of particles, classification of particles and their interactions, relativistic kinematics, measurement techniques, accelerators, detectors, introduction to Feynman calculus.

Course Code	ULP - 02 - 144
Name of the course in English	Introduction to Laser Physics
Name of the course in Turkish	Lazer Fiziğine Giriş
Language of the course	English
Level of Course	Bachelor's / Undergraduate
Lecturer	Assoc. Prof. Dr. Hilal Göktaş Assoc. Prof. Dr. Mustafa Kurt
ECTS Credits	7
COMU Credits	3
Description	The fundamentals of laser light, laser resonators, pumping processes, radiation absorption and emission, gain, classification of laser types; solid state, gas, semi-conductor, X-ray lasers.

Course Code	ULP - 02 - 145
Name of the course in English	Laser and Applications
Name of the course in Turkish	Lazer ve Uygulamaları
Language of the course	English
Level of Course	Bachelor's / Undergraduate
Lecturer	Assoc. Prof. Dr. Mustafa Kurt
ECTS Credits	7

COMU Credits	3
Description	Properties and principles of the lasers, Types of lasers, photodetectors, coupling of light and laser light, laser safety, Application of lasers: Metrological, Industrial, Military, Health etc.

Course Code	ULP - 02 - 146
Name of the course in English	Introduction to Plasma Physics
Name of the course in Turkish	Lazer Fiziğine Giriş
Language of the course	English
Level of Course	Bachelor's / Undergraduate
Lecturer	-
ECTS Credits	7
COMU Credits	3
Description	To introduce Basic Parameters and Basic Equations of Plasma Physics, and also to provide a knownledge about their usages and applications.

Course Code	ULP - 02 - 147
Name of the course in English	Basis of Nuclear Engineering
Name of the course in Turkish	Nükleer Mühendisliğin Temelleri
Language of the course	English
Level of Course	Bachelor's / Undergraduate
Lecturer	-
ECTS Credits	7
COMU Credits	3

Description	Basic radiation physics, radiation technology. Nuclear reactor systems and types; basic reactor physics, criticality calculations; fuel cycles; radioactivity changes; reactor kinetics. Instrumentation and control; radiation protection. Reactor materials; shielding; energy removal. Reactor safety; economics. Waste management. Reactor design.

Course Code	ULP - 02 - 148
Name of the course in English	Application of Radiation in Medical and Industry
Name of the course in Turkish	Radyasyonun Tıbbi ve Endüstriyel Uygulamaları
Language of the course	English
Level of Course	Bachelor's / Undergraduate
Lecturer	-
ECTS Credits	7
COMU Credits	3
Description	Introduction to medical imaging techniques, radiography, imaging with positron and x-rays and principles of magnetic resonance imaging, industrial applications.

Course Code	ULP - 02 - 150
Name of the course in English	Radiation Measurement and Imaging
Name of the course in Turkish	Radyasyon Ölçümü ve Görüntüleme
Language of the course	English
Level of Course	Bachelor's / Undergraduate
Lecturer	-
ECTS Credits	7

COMU Credits	3
Description	Radiation Sources, Units and Definitions, Interaction of Charged Particles, Gamma Rays and Neutrons with Matter. Counting Statistics and Error Prediction: Characterization of Data, Statistical Models, Application of Statistical Models, Error Propagation, Optimization of Counting Experiments, Limits of Detectability, Distribution of Time Intervals. General Properties of Radiation Detectors: Simplified Detector Model, Modes of Detector Operation, Pulse Height Spectra, Counting Curves and Plateaus, Energy Resolution, Detection Efficiency, Dead Time. Operation Principles and Properties of Ionization Chambers, Proportional Counters, Geiger-Mueller Counters, Scintillation Detectors, Slow Neutron Detection Methods, Fast Neutron Detection and Spectroscopy. Analaog and Digital Pulse Processing and Shaping.Theory and Use of Detectors For Imaging: Fundamental Physics and Mathematics Involved in Image Formation, Introduction to Digital Image Processing: Definitions,. Linear System Theory, Image Operations. Image Quality, Modulation Transfer Function, Noise Properties, Instrumentation for Nuclear Imaging, Scintillation Cameras, Radionuclide Tomographic Reconstruction, Data Acquisition and Reconstruction, Planer Radiographic Imaging, Multi-dimensional Tomography (X-ray CAT, PET,SPECT).

Course Code	ULP - 02 - 151
Name of the course in English	Quantum Mechanics II
Name of the course in Turkish	Kuantum Mekaniği II
Language of the course	English
Level of Course	Bachelor's / Undergraduate
Lecturer	-
ECTS Credits	7

COMU Credits	3
Description	Angular Momentum, The Schrodinger Equation in Three Dimension, Hydrogen Atom, The Interaction of Charged Particle with the Electromagnetic Field, Matrix Representation of Operators, Spin, The Interaction of Charged Particles with the Electromagnetic Field, Time-Independent Perturbation Theory, Identical Particles.