AĞRI İBRAHİM ÇEÇEN ÜNİVERSİTESİ
MESLEK YÜKSEKOKULU

Elektrik ve Enerji Bölümü
Nükleer Teknoloji ve Radyasyon Güvenliği Programı Müfredat ve Ders İçerikleri

I.YARIYIL							
DERSİN KODU	DERSİN ADI	Z/S/M	T	U	TS	TK	ECTS
NTR-101	Temel Nükleer Yapı	M	3	0	3	3	5
NTR-103	Ölçme Tekniği	M	2	2	4	3	5
NTR-105	Temel Fizik	M	3	0	3	3	5
BİL-101	Bilgisayar-I	Z	2	0	2	2	3
MAT-101	Matematik-I	Z	2	0	2	2	3
UZTDE-101	Türk Dili-I	Z	2	0	2	2	2
UZİNG-101	Yabancı Dil-I	Z	2	0	2	2	2
UZATA-101	Atatürk İlkeleri ve İnkılap Tarihi-I	Z	2	0	2	2	2
	TOPLAM		18	2	20	19	27
SEÇMELİ DERSLER (*)							
SS-101	İletişim	S	2	0	2	2	3
SS-103	İş Sağlığı ve Güvenliği	S	2	0	2	2	3
SS-105	Yaşam Becerisi ve Sosyal Etkinlik	S	2	0	2	2	3
SS-107	Üniversite ve Kariyer Başarısı	S	2	0	2	2	3
	GENEL TOPLAM		20	2	22	21	30

II.YARIYIL							
DERSİN KODU	DERSİN ADI	Z/S/M	T	U	TS	TK	ECTS
NTR-102	Nükleer Fiziğe Giriş	M	3	0	3	3	5
NTR-104	Radyasyon Korunma	M	3	0	3	3	5
NTR-106	Radyasyon Kaynakları ve Uygulama	M	3	0	3	3	5
DOY-102	Dijital Okuryazarlık	Z	0	0	0	0	3
BİL-102	Bilgisayar-II	Z	2	0	2	2	3
MAT-102	Matematik-II	Z	2	0	2	2	3
UZTDE-102	Türk Dili-II	Z	2	0	2	2	2
UZİNG- 102	Yabancı Dil-II	Z	2	0	2	2	2
UZATA-102	Atatürk İlkeleri ve İnkılap Tarihi-II	Z	2	0	2	2	2
	TOPLAM		19	0	19	19	30
SEÇMELİ DERSLER (*)							
SS-102	Girişimcilik	S	2	0	2	2	3
SS-104	İlk Yardım	S	2	0	2	2	3
SS-106	Çevre Koruma	S	2	0	2	2	3
SS-108	Meslek Etiği	S	2	0	2	2	3
	GENEL TOPLAM		21	0	21	21	33

III.YARIYIL							
DERSİN KODU	DERSİN ADI	Z/S/M	T	U	TS	TK	ECTS
NTR-201	Radyokimya	M	3	0	3	3	5
NTR-203	Radyasyon Zırhlama İlkeleri	M	3	0	3	3	5
NTR-205	Radyasyon Fiziği-I	M	3	0	3	3	3
NTR-207	Radyasyonun Biyolojik Etkileri	M	3	0	3	3	4
NTR-209	Radyasyon Dedektörleri	M	2	0	2	2	3
NTR-211	Nükleer Tıp Uygulamaları	M	2	2	4	3	5
	TOPLAM		16	2	18	17	25
SEÇMELİ DERSLER (*)							
NTR-213	Enerji Dönüşüm Sistemleri	MS	3	0	3	3	5
NTR-215	Nükleer Enerjiye Toplumsal Bakış	MS	3	0	3	3	5
NTR-217	Hibrit Enerji Sistemleri	MS	3	0	3	3	5
NTR-219	Nükleer Enerji Çevre ve Ekonomi	MS	3	0	3	3	5
NTR-221	Bor Teknolojisi	MS	3	0	3	3	5
OSD	Ortak Seçmeli Ders	S	3	0	3	3	5
	GENEL TOPLAM		19	2	21	20	30

IV.YARIYIL							
DERSİN KODU	DERSİN ADI	Z/S/M	T	U	TS	TK	ECTS
NTR-202	Reaktör Teorisi ve İşletme	M	3	0	3	3	4
NTR-204	Radyoaktif Malzemeler ve Atık Yönetimi	M	3	0	3	3	4
NTR-206	Radyasyon Fiziği-II	M	3	0	3	3	4
NTR-208	Sağlık Fiziği	M	3	0	3	3	5
NTR-210	Radyolojik Acil Durum Planlama ve Esasları	M	2	0	2	2	3
NTR-212	Radyasyon Ölçüm Yöntemleri	M	2	2	4	3	5
	TOPLAM		16	2	18	17	25
SEÇMELİ DERSLER(*)							
NTR-214	Geri Kazanım Yöntemleri	MS	3	0	3	3	5
NTR-216	Medikal Görüntüleme Yöntemleri	MS	3	0	3	3	5
NTR-218	Ulusal ve Uluslararası Nükleer Mevzuat	MS	3	0	3	3	5
NTR-220	Lazer Uygulama Teknikleri	MS	3	0	3	3	5
NTR-222	Enerji ve Çevre	MS	3	0	3	3	5
OSD	Ortak Seçmeli Ders	S	3	0	3	3	5
	GENEL TOPLAM		19	2	21	20	30

* Seçmeli derslerden sadece birisi seçilecektir

Mezuniyet için 40 iş günü staj yapmak zorunludur.

Ağrı İbrahim Çeçen Üniversitesi Meslek Yüksekokulu

Electric and Energy Department
Nuclear Technology and Radiation Safety Program Course Contents

1st Semester Course Contents

Fundamentals of Nuclear Structure	Introduction to atomic and nucleus structure, radioactivity, half-life, half-life, radioactivity regulation laws and radiation types
Physics	Physical quantities and calculations, static, dynamic, work energy, power, energy converters and efficiency calculations
Principles of Measuring	What is Measurement, How to do, The importance and definition of measurement, Measurement Tools and Measurement Errors. Furthermire, Length, Area, Volume and Weight, Fluidity and Temperature Measurements, Slope, Cross Section and Diameter, Speed and Rotation, Sound, Pressure, Units of Measurement and Conversions, Tension Measuring Current, Power and Energy
Calculus-I	Numbers, Algebra, Equations and Inequalities, Functions, Trigonometry, linear and exponential equations, Complex Numbers, Logarithm, statistics and reliability.
Computers I	Computer hardware knowledge, operating system, use of Microsoft Office package programs
Foreign Languages-I	Speaking, Listening-Understanding, Writing, Reading-Understanding
Turkish -I	Language, Languages and Turkish Language, Grammar, Word and Sentence, Types of Words, Elements of Expression and Types of Expression, Basic Principles of Proper and Effective Speaking
Ataturk's Principles and History of Turkish Revolution -I	Republic History, Fundamental Properties of the Republic, Ataturk's Principles and Revolutions
Elective Courses	
Communications	Communication and Interpersonal Communication, Perception of Person, Verbal Messages, Nonverbal Messages, Listening, Interpersonal Communication and Ethical Principles, Relationship / Interaction Process, Interaction Contexts, Changing Relationships, Communication with Family and Friends, Communication in Close Relationships, Barriers to Communication, Conflict and Reconciliation, Cultural Differences and Communication
Occupational health and Safety	Occupational Health and Safety Historical Development of Occupational Health and Business Purpose and Importance of Safety Health and Concepts of Health in Turkey in the Safety Area and Safety of Overview of Job Accidents Occupational Diseases Occupational Accidents and Occupational Be Taken Against Disease Precautions Work Accidents and Occupational Diseases of nature costs
Life Skills and Social Activity	Self-realization, self-knowledge, communication, factors that hinder communication, social skills, saying no, problem solving, self-manifestation, anger, stress, excitement, anxiety and fear, etc. coping with challenging emotions, healthy decision making, public speaking, self-concept, career and career planning, cv preparation, efficient studying, aggressive and entrepreneurial behavior development, emotional intelligence.
Success in University and Career	Career management and conceptual framework, career management process, tools and practices that form the organizational dimension of career development, career cycles of employees, career problems and solutions will be discussed.

2nd Semester Course Contents

Radiation Detectors	General properties of radiation measuring devices (Efficiency, response time,

	energy efficiency, dead time) Detector types Gas detectors, Scintillation detectors, Semiconductor detectors, Nctron detectors
Introduction to Nuclear Physics	Atomic Nucleus, Radioactivity, Nuclear Properties, Nuclear Forces, Nuclear Structure, Alpha Decay, Beta Decay, Gamma Decay
Radiation Sources and Application	The introduction of radiation sources and associated potential hazards, accelerators, isotope generators, nuclear measuring devices, x-ray tubes, natural radiation, reactors, radiography techniques.
Computers II	Basic concepts, elements, theoretical foundations, benefits and limitations, application methods, common formats used in computer-aided education. Evaluation and selection of course software, distance education applications, database applications, negative effects of computer and internet on children / youth and prevention.
Digital Literacy	It is to be aware that the learning-teaching process is also now realized using technology.
Calculus-II	Linear Equation Systems and Matrices, Limits and Continuity, Derivatives and Applications, Integrals and Applications, Differential Equations, Statistics
Turkish-II	Types of Written and Oral Expressions, Punctuation and Spelling Rules, Expression Disorders
Ataturk's Principles and History of Turkish Revolution -II	Republic History, Fundamental Properties of the Republic, Ataturk's Principles and Revolutions
Foreign Languages -II	Speaking, Listening Comprehension, Writing, Reading Comprehension
Elective Courses	
Entrepreneurship	Entrepreneurship Concept and Its Emergence, Small Business Types, Small Business Establishment Processes, Small Business Problems and Solutions, Business idea development Methods of creating business ideas, mind maps, organizing and ordering ideas Decision in a business idea, market research, surveys and analysis, competitor analysis SWOT analysis Cost analysis and marketing for entrepreneurs Preparing business plan Business organization and grant-making organizations Application form and application guide reading techniques, Entrepreneurship Approaches, Entrepreneurship Culture, Entrepreneurship Types, Entrepreneurship Functions, Entrepreneurship Areas, Entrepreneurship Process, Business Ideas and Resources, Business Idea Development, Business Plan and Elements, Business Plan Preparation, Local, National and International Context of Entrepreneurship,
First aid	Concept of Quality, Standard and Standardization, The Importance of Standard in Production and Service Sector, Management Quality and Standards, Environmental Standards, Quality Management System Models, Strategic Management, Participation in Management, Process Management System, Resource Management System, Quality Control in Production, Inspection and Sampling, Total Quality Control, Control Diagrams, Statistical Distributions
Environmental Protection	Environmental Definitions, Environmental Problems, Environmental Protection Measures, Nature Pollution, Noise, Environmental Regulation Information Risk Analysis, Waste Storage, Personal Protection Measures International Health and Safety Alerts
Professional Ethics	Ethical and moral concepts, Factors that play a role in the formation of morality, Ethical systems, Professional ethics, Professional corruption and consequences of unethical behavior in professional life, Social responsibility

3rd Semester Course Contents

Radiation Physics-I	The interaction of radiation with matter, radiation detectors and measurement methods, principles of radiation protection, ionization, Electromagnetic spectrum
Principles of Radiation Screening	Armouring of radiation according to radiation types, damping in matter, armouring materials according to radiation types.
Biological Effects of Radiation	Interaction of radiation with biological matter, effects on living cells, dose calculations for human organs, evaluation of radiation risk for living cells and human organs, internal dose calculation methods.
Radiochemistry	Atomic spectum, quantum numbers, periodic table, chemical bonding, chemical bond types, molecular shapes, gases, gas laws, kinetic theory of gases, intermolecular forces, liquids, solids, physical properties of solutions, concentration units, colligative properties, chemical kinetics, reaction rate and expression, reaction mechanism, chemical equilibrium, chemical equilibrium constant and applications, Le Chatalier rule, oxidation-reduction and electrochemistry, reduction-oxidation reactions, galvatic cell, reduction potentials, derivation of new components.
Radiation Detectors	General properties of radiation measuring devices (Efficiency, response time, energy efficiency, dead time) Detector types Gas detectors, Scintillation detectors, Semiconductor detectors, Nctron detectors
Nuclear Medicine Applications	To define the examinations and medical indications made in nuclear medicine. Defining patient preparation and imaging protocols based on reviews. To count the diseases that are the subject of the most frequent investigations in Nuclear Medicine. To apply the examinations of the patients correctly. Recognizes the problems that may occur in the examinations and offers solutions.
Elective Courses	
Energy Conversion Systems	Energy Conversion and Efficiency Concept, Combustion Based Technologies (Internal Combustion Engines, Gas Tribunes, Steam Tribunes, Catalytic Reactors), Non-Combustion Based Technologies (Fuel Cells, Biological Reactor, Solar Eyes, Water Tribunes, Wind Tribunes)
Boron Technology	General information about inorganic boron compounds, sodium borates, dehydration and drying of Borax, Borax Production, Tincal from Borax Production in Turkey, anhydrous borax production, Boric Use and Features of Acid Production Methods, colemanite from Sulfate Acid With Boric Acid Production of Boron Compounds and Pipe Biological Properties, Environmental Pollution of Boron, Usage of Boron in Energy Field (Boron Solid Fuels, Sodium Borohydride Applications, Storage of Solar Energy, Solar Cell Protector
Hybrid Energy Systems	Hydrogen energy, Fuel cell systems, Wind energy systems, Solar energy systems, Energy storage systems, Ultra-capacitor systems, Accumulator systems, Hydrogen storage systems, Applications of hybrid electric energy systems, Fuel cell / ultra-capacitor hybrid system for residential use, Vehicle fuel cell / ultra-capacitor hybrid system, Wind / fuel cell / ultra-capacitor hybrid system, Solar cell / fuel cell / ultra-capacitor hybrid system
Social Perspective on Nuclear Energy	All energy technologies tend to create social concerns or even disagreements. When it comes to nuclear power, these concerns focus on security, nuclear armament and waste storage.
Nuclear Energy Environment and Economy	Considering the energy production efficiency of fossil fuel energy systems, renewable energy sources and nuclear power plants; Comparative study of the effects on human, nature and economy.

4th Semester Course Contents

Radiation Physics-II	Radiation detectors, measurement and evaluation of the radiation absorbed by the radioactive source, determination of the effect of neutron radiation on the substances and the rate of propagation from sources, calculation and evaluation of different radiation analyzes by taking samples
Reactor Theory and Operation	Basic thermodynamic introduction, reactor types, reactivity / criticality in the fission process, reactor kinetics, heat removal, residual heat / decomposition heat, water chemistry in nuclear power plant.
Radioactive Materials and Waste Management	Classification, labeling of solid, liquid, gaseous radioactive materials, transportation of them, preparation of transportation documents, safe storage or disposal methods, selection of suitable routes for shipment (such as rail, sea or road), waste management: (low level and assessment methods for high level waste operations.
Applied Physics in Health Science	Dosimetry usage, calculation of neutron dose, calculations of radioactive concentration in the air, determination of pollution levels, investigation of respiratory problems, prevention of the spread of pollution, methods of eliminating pollution, techniques of determining the protective clothing to be worn, reducing the total radiation pressure and keeping the records, use of radiation measurement devices, measurement taken graphical display of values, health assessment, methods of reducing the effect of the energy released
Radiological Emergency Planning Principles	Information about nuclear accidents, fallout from a possible nuclear accident, collecting environmental samples, emergency plans, risk calculations
Radiation Measurement Methods	To recognize the particles used in the field of Medical Physics and detectors used in gamma-x ray spectroscopy.
Elective Courses	
National and International Nuclear Regulations and Legislation	UAEA (International Atomic Energy Agency) requirements and guidelines in the field of nuclear and radiation applications, TAEK legislation, other national regulations.
Recovery Methods in Industry	Waste Types, Industrial Waste Management, Industrial Waste Management Plan, Codes and Properties of Hazardous Waste, Recycling, Recovery of Plastic Materials, Environmental Risk Assessment and Management, Waste Reduction and Waste Rehabilitation Concepts, Waste Classification (Organic and Inorganic Waste Evaluation Methods), Waste Management Systems, European Union Recycling Guidelines
Medical Imaging Methods	To learn the conventional radiological imaging methods and film bath processes used in radiology, to prepare the patient for examination and to learn the issues to be considered in the radiological positions to be given to the patient.
Laser Application Techniques	Laser production, quantum foundations and theory of laser, coherent laser types, use of laser in industry, medicine and communication systems, laser spectroscopy, double photon spectroscopy, laser measurement methods, laser fusion, laser guided weapon systems, LIDAR, laser as heat and energy source , holography and applications, data storage with holography.
Energy and Environment	Basic information about energy, energy in the formation of the universe, the study of galaxies in terms of energy of the stars and the formation of the universe, the sun as the source of energy, solar * world geometry, solar energy and its annual change, the effects of the solar energy and the weather on earth, the energy balance of the world.