NUCLEAR TECHNOLOGY AND RADIATION SAFETY PROGRAM

I. Semester

GKM 101-General Chemistry (2+0), ECTS:3

Substances, Elements, Compounds, Mixtures, Measurements and Mol Concept, Discovery of Chemical Formulas, Redox Reactions, Calculations Based on Chemical Reactions, Atom: Atomic models, Proton, Neutron, Electron, Electromagnetic Glow, Bohr Atomic Theory, Periodic Ruler, Quantum Numbers, Atomic Radius, Ionization Energy, Electron Interest, Electronegativity, Atomic Core Structure, Chemical Bonds: Ionic and Cosolent Bonds, Exceptions of Oxetirule, Chemical attachment theories, Rebel-Base Concept, Solutions, Buffers, Caloric solutions.

MAT 101-Basic Mathematics (Selective) (2+0), ECTS:3

Numbers, Exponential Numbers, Deep-Rooted Numbers, Absolute Value, Multiplicity, Rate Ratio, Equations, 1. 1 Unknown Equations, 1. 2 Unknown Equations, Inequalities, Functions, Clusters

NTR 103-Radiation Physics I (3+0), ECTS:4

Matter, Structure of Atom and Atomic Nucleus, Some Properties of Nuclei, Fission, Fission, Nuclear Reactions, Mass, Energy and Bonding Energy, Radioactivity Laws, Radioactive Decays, Half-Life, Natural Radioactivity, Radioactivity units, Uranium, Thorium, Radium, Radon and Harmful Effects, Radiation Types, Ionization, Radiation units, Interaction of radiation with matter, Photoelectricity, Event Compton Event, Double Formation, Interaction of particle radiation with matter, Radiation dosimeter

NTR 109-Basic Biomechanics (3+0), ECTS:3

Introduction, Measurement, Estimation, Units and Dimensions. Motion in one dimension, Kinematics: Displacement, Speed, Acceleration, Free Fall. Scales and Vectors, Motion in Two and Three Dimensions, Dynamic: Newton's Laws, Applications of Newtonian Laws,Applications of Newtonian Laws: Gravity, Friction, Pendulum Force, Circular Motion Force, Work, Kinetic Energy, Work-Energy Principle, Conservative and Non-Conservative Forces, Potential Energy, Energy Conservation, Linear Momentum and Conservation, Elastic and Inelastic Collisions, Mass Center,Vibrations and Waves: Simple Harmonic Motion and Simple Pendulum,Rotational Motion, Torque, Rotation Moment, Rotational Kinetic Energy,Angular Momentum and Conservation, Rotational Dynamics, Work and Energy in Angular Motion.

NTR 107-Basic Information Technologies (0+2), ECTS:2

Basic computer information, Windows XP, Microsoft Word, Microsoft Excel, Microsoft Powerpoint, Internet usage.

First 101-First Aid (Selective) (2+0), ECTS:3

Basic applications of first aid, first and second assessment, basic life support in adults, basic life support in children and infants, respiratory assistance, first aid in congestion, external and internal bleeding, types of wounds and wounds, regional injuries, first aid in head and spine fractures, first aid in upper

extremities fractures, fractures in the hip and lower extremities, first aid in diseases requiring emergency care, first aid in emergency care first aid in alien body escapes, poisonings, hot shock, burns and freezes.

RKUL 101-University Culture-I (Uni Selective) (0+2), ECTS:1

Each semester includes seminars, conferences, panels, workshops and lectures that will be held for 14 weeks within the framework of a program of recommendations from academic units, student council sands and student clubs at the university.

INGU 101-English I (3+0), ECTS: 3

Tokens; Pre-state Edits: Location, Time, Movement; Singulate and Plural Names: Counted and Uncountable names; Times: Large time, present time, past time structures; Kipler: Will, Should, Should Note Must, Must note, Can; Comparative structures; Adhisls: Contact names, name of the bees; Adjectives; Positive sentences, Negative sentences and Q&a; Bonds: And, But, Because.

TURK 101-Turkish Language I (2+0), ECTS:3

Language and characteristics; The relationship of language, which is a social institution, with the nation, culture, thought; Classification of world languages and the location and importance of Turkish among these languages; Periods of historical development of speech language, writing language and Turkish writing language; The current state of Turkish and its sprawling areas, sounds and sound incidents in Turkish; Syllable syllables, famous and unconsonant voices in Turkish words; Spelling rules and punctuation.

ATA 101-Ataturk Principles and History of Revolution I (2+0), ECTS:3

The fall of the Ottoman order of society and the state and the reform movements; The disintegration of the Ottoman state and the start of the national struggle; Mustafa Kemal Pasha's organization of the national struggle in Anatolia; opening the first T.B.M.M.; Military and political developments from 1920 to 1922; revolutions and counterreactions; establishment of the constitutional system; domestic and foreign policy during the republic period; The basic characteristics of the Turkish revolution and the flows of thought that were affected; innovations in law, education, economy and social life; Ataturk principles and general qualities of these principles; evaluation of Ataturkism from an ideological point of view.

II. Semester

NTR 110-Mathematics in Nuclear Technology (Selective) (2+0), ECTS:2

Polynomials, Matrix, Determinants, Functions, Limit and Continuity, Derivatives and Applications, Integral and Practices, Differential Equations.

NTR 104-Radiation Physics II (2+0), ECTS:2

Atomic Spectra. Spectra of X-rays and multi-electron atoms, Obtaining the X-Ray Scattering and Absorption Mechanism., Properties of X-rays, Interaction with matter, Parameters of X-ray devices, Uses of Radiation and Radioactivity, Sterilization with Radiation, Determination of age by nuclear methods, C-14 method, determination of the age of the World, X-ray fluorescence spectroscopy (XRF), Neutron activation analysis (NAA), Mass spectrometry, Medical use of radiation, X-ray Imaging

Techniques, Computerized Tomography (CT), Magnetic Resonance Imaging, Nuclear Medicine Imaging Techniques, Positron Emission Tomography (PET), Ultrasonic Imaging Techniques, Radiotherapy Applications, Harmful Effects of Radiation, Radiation Safety, ALARA.

NTR 106-Basic Electricity (Selective) (3+0), ECTS:3

Electric Charge,Electric Field,Gauss' Law, Electric Potential,Capacity, Dielectrics,Storage of Electric Energy, Electric Current and Resistance, Direct Current Circuits, Magnetism, Magnetic Field Sources, Electromagnetic Induction and Faraday Law,Electromagnetic Induction,Inductance and Electromagnetic Oscillations,Maxwell Equations,Electromagnetic Waves,Light

RPSI 209-Positive Psychology and Communication Skills (Uni Selective) (2+0), ECTS:3

Definition of positive psychology, basic concepts, theoretical foundations and practices, studying brain behavioral systems of emotional experience and behavior, recognizing yourself and others, psychosocial life skills and problem solving skills, motivation and planning, anger, aggression, anger, aggression, violence, relationship management, healthy decision-making, perceence and reconciliation.

NTR 108-Biological Effects of Radiation (2+0), ECTS:2

Learning radiation physics, radiation doses and units to be used in their specialty.

RKUL 102-University Culture-II (Uni Selective) (0+2), ECTS:1

Each semester includes seminars, conferences, panels, workshops and lectures that will be held for 14 weeks within the framework of a program of recommendations from academic units, student council sands and student clubs at the university.

INGU 102-English II (3+0), ECTS:3

Times: Current time, Broad time, Past time, Future time structures; Kipler: Might, Could, Can, Must, May; Envelopes: Location, Direction, Purpose, State envelopes; Adjectives: The order of adjectives, comparison, superiority structures; Passive Structure: Current, Wide, Past, Passive structure in the future; Terms of Condition; Adjective Sentences; Transfer Sentences; Verb Structures: TO, -ING; Name Phrases; Envelope Sentences; Comparative Structures.

TURK 102-Turkish Language II (2+0), ECTS:3

To gain the ability to use the mother tongue correctly; In the course, which is essential to producing and writing thoughts in order to improve the abilities of students who have come to university by gaining this skill, punctuation and spelling rules, composition rules, writing types are discussed and writing studies are carried out on them. In addition, various novels, poetry books and theatre works are read and studied. By performing a reading theatre in the classroom, applied emphasis and toning courses are performed with various diction techniques.

ATA 102-Ataturk Principles and History of Revolution II (2+0), ECTS:3

The Regression of the Ottoman Society and State Order and the Reform Movements; The Disintegration of the Ottoman Empire and the Beginning of the National Struggle; Mustafa Kemal Pasha's Organization of the National Struggle in Anatolia; Opening of the First T.B.M.M.M.; Military and Political Developments between 1920 and 1922; Revolutions and Counterreactions; Establishment of the Constitutional System; Internal and Foreign Policy during the Republic Period; The Basic

Characteristics of the Turkish Revolution and the Thought Currents affected; Innovations in Law, Education, Economy and Social Life; Ataturk Principles and General Qualifications of These Principles; Evaluation of Ataturkism ideologically.

NTR999-Summer Internship (20 Working days) ECTS:9

III. Semester

NTR 201-Radiation Measurement Methods (2+0) ECTS:3

Radiation, Radiation Sources and Units, Radiation Measurement Principle, General Characteristics of Radiation Detectors, Ionization Detectors, Proportional Counters, Geiger - Mueller Detectors, Scintillation Detectors, Semiconductor Detectors, Neutron Detectors, Radiation Spectrometer in Scintillators

NTR 203-Radiation Sources and Application (2+0) ECTS:3

Introduction, Radioactivity and Radiation, Radioactivity and radiation units, Radioactive Decay Series, Environmental Radioactivity, Cosmic Radiation, Natural Radioactivity in Soil, Water and Atmosphere, Natural Radioactivity in Food and the Building Materials, Artificial Radiation Sources, Nuclear power plants, accelerators, Nuclear power plant accidents, Radioactive fallout, Industrial Applications, Medical Applications, Research, Educational Applications, Security Applications, Consumer Products, Radiation Doses and Standards

NTR 205-Basic Electronics (2+0) ECTS:2

Direct Current, Alternating Current, Series Circuits, Parallel Circuits, Series-Parallel Circuit,Resistors, Capacitors, Coils, Diodes, Transistors, Number Systems, Basic Gates

NTR 207-Nuclear Energy Technologies (2+0) ECTS:2

To learn about reactor technology, radiation safety, fuel and waste management, the prevalence and number of use of Atomic Energy and Nuclear Energy today.

MET 101-Professional Ethics (Selective) (2+0) ECTS:2

Professional ethics course on the basic concepts of ethics describes the moral rules and values system. Health care workers should have the virtues, values and defines ethical codes.

NTR 209-Radiation Safety Applications I (2+8) ECTS:12

The content of this course will coincide with the implementation principles of the Nuclear Technology and Radiation Safety program and will carry out activities in the fields of employment of graduates.

NTR 211-Radiation Shielding Principles (2+0) ECTS:3

Basic definitions concepts and units, Interaction of heavy charged particles with matter, Interaction of photons with matter, Cross sections, Interaction of neutron with matter, Radiation detection methods,

Radiation dosimetry, Dose calculations, Radiation protection criteria and standards, Basic principles of armor, , Empirical Methods, External Radiation Protection.

NTR 213-Accelerator Physics (2+0) ECTS:3

Particle Sources, Thermionic Guns and RF Guns, Accelerator Units, Electrostatic and RF Field Excitation, RF Cavity Technology, Klystroscopes, Wave Guides, Bundle Lines, Energy for Bundles, Current, Emittance, Position Measurements, Beam Diagnostic Tools, Position and Energy Monitors , Vacuum Technology in Accelerators, Power and Cooling Technologies for Accelerators, Bunch Stop Techniques, Medical Accelerators, Industrial applications of Accelerators.

Iv. Semester

NTR 202-Radiological Emergency Planning Principles (3+0), ECTS:4

Nuclear and Radiological Hazard Situation National Implementation Regulation, Danger Situation Detection, Duties and Responsibilities of Related Ministries, Institutions and Affiliates and Governorships, Preliminary Information to Be Supplied to the Public for Possible Nuclear and Radiological Accident or Hazard Situation, Information to be Publicized during a Nuclear and Radiological Accident or Hazard Situation, TAEK Disaster and Emergency Management Center Directive, Establishment, Duties and Responsibilities of Disaster and Emergency Management Center, Working Principles of the Disaster and Emergency Management Center, Services Execution, Records and Documents, National Radiation Emergency Plan (URAP), National Level Institutions and Organizations and Service Groups that will be in the Emergency of Radiation Emergency, Planning Principles; National Disaster Response Organization, Plans to Maintain in Case of Radiation Emergency, Emergency Response Process, International Organizations and Agreements, National Guidelines.

NTR 204-Radiation Safety Applications II (2+8), ECTS:12

The content of this course will coincide with the implementation principles of the Nuclear Technology and Radiation Safety program and will carry out activities in the fields of employment of graduates.

NTR 206-Health Physics (Selective) (2+0), ECTS:4

Definition of health physics and basic concepts,Radioactivity,Radiation dosimetry,Problems related to radiation dosimetry,Natural, artificial radiations and radioactive fallout,Biological effects of radiation, Radioisotopes important for human health and environment, Problem solving,Radiation protection,Accumulation of radioactive material wastes, return to harmless state and methods of relocation,The planning of the places worked with radiation, radiation accidents and radiation related legal situation, Radiation and radionuclides use of medicine, biology and industry.

NTR 208-National and International Nuclear Legislation (Selective) (2+0), ETS:4

Nuclear Safety and Nuclear Regulatory System, Construction Control Regulation of Nuclear Power Plants, Authorization of Nuclear Structure Inspection Institutions, Nuclear Substance Counter and

Control Regulation, Regulation on the Physical Preservation of Nuclear Plants and Nuclear Materials, Physical Protection Measures Against Defiance During Use, Storage and Storage of Nuclear Material, Physical Protection Measures Against Sabotage Towards Nuclear Material and Nuclear Facilities, Regulation on Nuclear Safety Audits and Sanctions, Radiation Safety Regulation, Basic Safety Standards in Radiation Protection, Radiation Fields and Irradiation, License, Permit, Control, Records, International Organizations, International Nuclear Regulations and the Prevention of Nuclear Weapons.

NTR 210-Industrial Control and Motors (2+0), ECTS:2

Relay, Contactor, Thyristor, Triac, Thyristor and Triac Trigger Elements, Semi-Conductor Elements, Semiconductor Sensors and Transducers, Thermal Sensors and Transducers, Mechanical Sensors and Transducers, Digital-Analog Converters, Analog-Digital Converters, Motors, Motors, Rotary Motion Change Motors with Digital Pulse

NTR 212-Radioactive Materials and Waste Management (2+0), ECTS:3

Radiation and Radioactivity, Radioactive materials, Foundations and Institutions Providing Service by Using Radioactive Resources, Processing of Radioactive Materials, Safe Transport of Radioactive Matter and Related Regulation, Radioactive Waste Management, Radioactive Waste Management Steps, Determination and classification of radioactive waste characteristics, Low-Level Wastes, Medium-Level Wastes, High-Level Wastes, Radioactive Waste Storage, Radioactive waste disposal, Release of Gas and Liquid Radioactive Wastes to the Environment, General Principles in Radioactive Waste Facilities, General Safety Principles in Radioactive Waste Facilities, Radioactive Waste Management, Inspection and Sanctions in Nuclear Facilities and Radiation Facilities.

NTR 214-Reactor Theory and Operation (2+0),ECTS:2

Energy sources and Nuclear energy, Fusion and Fission Energies, Radioactivity, Nuclear Reactor Physics, Chain Reaction and Replication Coefficient, Neutron loss and Critical conditions, Critical dimension account, Classification and technical properties of power reactors, Basic elements of power reactors, Reactor kinetics: volume-flow-time relationships, mass balance, accumulation, reaction rate, Reactor hydration: concepts of advective and convective diffusion, dispersion, flux, retention time, distribution of retention time in ideal and non-ideal flow reactors, interface field, motions and velocities of liquid and solid phases, Operating characteristics of reactors, Nuclear fuel cycles, Nuclear reactor accident situation analysis, Economic and environmental nuclear energy.