NEAR EAST UNIVERSITY

DEPARTMENT OF FOOD ENGINEERING

Course Catalogue

This course catalogue is developed to give information about food engineering programme to all who are interested in the Near East University, Department of Food Engineering eg. future students, parents, academics, universities and institutions, bodies abroad.

The catalogue includes key information about the duration of the programme, mode of study, course description, credit and grading system etc. of the programme.

We hope you can find the necessary information to your questions about the Department of Food Engineering and the course programme.

Sincerely

Msc. Buğra Demircioğlu

Coordinator

Food Engineering (FE) Programme

General Information about the Department of Food Engineering

The Department of Food Engineering offers a multidisciplinary program which describes engineering methods for food production, distribution, packaging, marketing, purchasing and quality control.

With the decision of TRNC Higher Education Planning, Evaluation, Accreditation and Coordination Council (YÖDAK), the Department of Food Engineering has been founded within the Faculty of Engineering of the Near East University, in 2009. It is the one and only Department of Food Engineering which offers higher education training in this field within the TRNC.

Aims and Objectives

The Department aims to train people who will specialize on the field of food engineering in conformity with the requirements of this very fast developing sector of our modern age. As food engineering shares many common features with other engineering branches, students of this department are trained on the basic principles of engineering in general and expected to be subject specialists on food engineering at the end of their training period.

The department also aims to give the best possible training facilities and create research opportunities in this field, lead students in carrying out advanced research facilities and come out with publications, be recognized as an internationally well known institution and represent Cyprus throughout the international area.

Mission

The mission of the department is nurturing successful engineers who are able to adapt to the technological innovations of the 21st century, productive, able to facilitate basic engineering principles into food engineering, have a scientific consciousness and hold ethic values in high regards. Graduates of the department will be equipped with the qualitative knowledge for; food production, distribution, marketing, quality control, design, improvement and utilization of tools and machines used throughout the food industry.

Vision

By offering comprehensive, high quality graduate and postgraduate programs at an international level, the vision of the department is to be a leading establishment which brings up individuals who successfully carry out research and contribute to areas of relevant science, implement qualitative scientific research, perform as reformists and models, are able to bring in solutions to productive and industrial institutions and use his/her accretion in the benefit of the society.

Employment Opportunities

Graduates of this department have the opportunity to be employed in the following sectors and institutions:

- Departments of factories which facilitate quality control, production, distribution, marketing and purchasing
- Various sectors and branches of food industry
- Food production and food quality control departments of supermarkets
- Various firms and companies facilitating food safety and quality
- Restaurants, pastry shops and alike which employ a quality control staff
- Companies dealing with food packing as packing control officers
- Ministries of Agriculture and Ministries of Health
- Schools, colleges, universities, and institutions offering food facilities
- Educational institutions giving training on food engineering.

Departmental Facilities

Students are provided with opportunities through which they can gain both theoretical and practical insights about food engineering, and use all information systems of university to gain access to all sort of data that they need to improve their knowledge, experience, abilities and skills in this field. Students also have opportunities to get in touch with companies specializing on this field and enhance their training facilities.

Courses & Descriptions

First Semester

Code	Course Title	Credit	Prer.
ECC107	Biology	2	
CHM104	General Chem. For Biolog. Sci.&Eng.	4	
ENG101	English I	3	
FDE101	Int. To Food Eng.	1	
MTH101	Calculus I	4	
PHY101	General Physics I	4	
YIT100	Turkish for Foreigner St.	2	

Second Semester

Code	Course Title	Credit	Prer.
CHM122	Organic Chemistry	4	CHM104
ECC016	Int. to Comp. & Prog.	3	
ENG102	English II	3	ENG101
MTH102	Calculus II	4	MTH101
PHY102	General Physics II	4	PHY101
TD102	Technical Drawing	3	

Third Semester

Code	Course Title	Credit	Prer.
FDE201	Mass & Energy Balances	3	CHM104
ECC217	Microbiology	3	BIO101
FDE205	Biochemistry	3	CHM104
ENG201	Writting Techniques in Academic English	3	ENG102
MTH201	Differential Equations	4	MTH102
RNTE	Rest.Non Tech. Elec.	3	

Fourth Semester

Code	Course Title	Credit	Prer.
FDE202	Thermodynamics	4	FDE201
FDE206	Food Microbiology	4	ECC217
FDE212	Food Eng. Unit Op. I	4	MTH201
CHM212	Analytical Chemistry	3	CHM104
FDE214	Engineering Materials	3	CHM104
NTE	Non Tech. Elective	3	

Fifth Semester

Code	Course Title	Credit	Prer.
FDE300	Summer Practice I	NC	
FDE301	Instrumental Analysis	3	CHM212
FDE303	Food Chemistry I	3	CHM122
FDE311	Food Eng. Unit Op. II	4	FDE212
MTH251	Probability & Statistics	3	MTH101
TE	Technical Elective	2	

Sixth Semester

Code	Course Title	Credit	Prer.
FDE302	Food Analysis	3	FDE301
FDE304	Food Chemistry II	3	FDE303
FDE306	FE. Applied Kinetics	3	FDE303
FDE312	Food Eng. Unit Op. III	4	FDE311
RNTE	Rest. Non Tech. Elec.	3	
TE	Technical Elective	2	

Seventh Semester

Code	Course Title	Credit	Prer.
FDE400	Summer Practice II	NC	
FDE401	Food Eng. Design I	3	FDE312
FDE403	Process Control	3	FDE312
FDE407	Food Packaging Tech.	2	
FDE411	Food Technology	3	
TE	Technical Elective	3	
TE	Technical Elective	3	

Eighth Semester

Code	Course Title	Credit	Prer.
FDE402	Food Eng. Design II	3	FDE401
FDE404	Quality Control in F.E.	3	FDE302
FDE412	FE. Unit Op. Lab.	3	FDE312
TE	Technical Elective	3	
TE	Technical Elective	3	

TE Technical Elective

Code	Course Title	Credit
FDE320	Industrial Microbiology	2
FDE321	Food Biotechnology	2
FDE322	Principles of Nutrition	2
FDE323	Physical Properties of Food	2
FDE421	Cereal Technology	3
FDE422	Fermentation Technology	3
FDE423	Fruit & Vegetable Tech.	3
FDE424	Sea Food Products Tech.	3
FDE425	Fats & Oil Technology	3
FDE426	Diary Technology	3
FDE427	Meat Technology	3
FDE430	Plant Sanitation	3
FDE431	Food Economy & Management	3
FDE432	Food Legislation	3

RE	Restricted Non-Technical Elective	
Code	**Course Title**	**Credit**
ECC426	Economics for Engineers	3
ECC427	Managements for Engineers	3

Course Descriptions

ECC107- Biology (2-0)2
An introduction to life earth, characteristics of living things, importance of water in life, inorganic materials, biological molecules, hormones, vitamins, enzymes, features of prokaryotic and eukaryotic cells, physical and chemical properties of cell, cell membrane structure and function, transports across cell membranes, organelles, aerobic, anaerobic respiration and fermentation, photosynthesis and kemosynthesis, ribosomes and protein synthesis, centrioles, DNA replication and repair, cellular reproduction.

CHM104-General Chem. for Biolog. Sci. & Eng. (3-2)4
A basic course with emphasizing the metric system. Introduction to atomic theory, stoichiometry.The structural and physical properties of matter. Periodic relationship among elements and periodic table.Gaseousstate.Thermo-chemistry.Energy and enthalpy.Electronic structure of atoms.Chemical bonding.

ENG101- English I (3-0)3
Within a thematic approach, reading, writing, speaking, and listening skills will be developed. In speaking and writing, students will be encouraged to use language forms that they learn through reading and listening. Under broad themes (or threads), the students will be exposed to extensive reading both in and outside the classroom. They'll be encouraged to read a variety of texts such as short stories, academic articles, research reports, reviews and journalistic texts as well as chapters from textbooks.

FDE101- Introduction to Food Engineering (1-0)1
Definition and importance of food engineering, relationship of food engineering with other disciplines, main characteristics and functions of foods, food processing methods, food preservation techniques.

MTH 101- Calculus 1 (4-0)4
Functions, limits and continuity.Derivatives.Average value theorem. Graph plotting. Integrals.Logarithmic, trigonometric and reverse trigonometric functions and their derivatives.L'hospital's rules.Integral methods, applications of integrals and irregular integrals.

PHY101- General Physics I (3-2)4
Measurement, vectors, kinematics, force, mass.Newton's laws, applications of Newton's laws.Work and kinetic energy.Conservation of linear momentum.Impulse, collisions, rotation, moments of inertia.Torque, angular momentum, conservation of angular momentum, static equilibrium.

FDE205- Biochemistry (4-1)3
Cell structure and material transport from cell membrane, introduction to metabolism, carbohydrate metabolism, biological oxidation, photosynthesis, lipid metabolism, aminoacid metabolism, definition and biosynthesis of nucleic acid, biosynthesis of nucleotides, biosynthesis of proteins, enzymes, co-enzymes.
Prerequisite: CHM104

ECC016- Introduction to Com. & Prog. (3-1)3
Construction and abstraction of computer program.Structure of a Pascal program, data types, constants, input and output of integer numbers, real numbers.Arithmetic expressions. Control structures, Procedures. Enumerated types, array records and subscripted variables. Arrays.Files, pointers, linked-lists, queues.

ENG102- English II (3-0)3
This course will be a continuation of ENG 101, with greater emphasis on student autonomy, research skills and synthesizing ability. In Eng-102, the ability to evaluate, analyze and synthesize information in written discourse will be highlighted. Documentation in writing will be introduced at the beginning of the course, in order to solidly establish the skill by the end. Students will learn the discourse patterns and structures to be used in different essay types
Prerequisite:ENG101

MTH102-Calculus II (4-0)4
Plane and polar co-ordinates, area in polar co-ordinates, arc length of curves. Limit continuity and differentiability of function of several variables, extreme values, and method of Lagrange multipliers. Double integral, triple integral with applications. Line integrals, Green's theorem.Sequences, infinite series, power series, Taylor'sseries.Complex numbers.
Prerequisite: MTH 101

TD102- Technical Drawing (2-2)3
Fundamentals of engineering drawing, introductory materials, use of instruments, lettering, constructional geometry, orthographic drawing, sectioning, dimensioning, pictorial drawing and sketching, isometric projection, assembly drawing, assembly elements.

PHY102- General Physics II (3-2)4
Electrical charges.Coulomb'slaw.Electricalfields.Gauss'slaw.Electricalpotential.Capacitance and dielectrics.Current and resistance.Direct current circuits.Magneticfields.Sources of the magnetic field.Faraday's law of induction.Inductance and inductors.
Prerequisite: PHY 101

ECC217 Microbiology (3-1)3
General properties of microorganisms, prokaryotic and eukaryotic cells, microbial taxonomy and nomenclature, microbial growth ,different mediums for growth, sterilization methods, bacteria, yeasts, moulds, algae, protozoa and viruses, microbial metabolisms, microbial genetics, microbial communications and relations.
Prerequisite: ECC107

CHM122- Organic Chemistry (3-1)3
Structures of organic compounds and nomenclature, hydrocarbons (alkanes, alkenes, alkynes, aromatic hydrocarbons), organic halogen compounds, alcohols, ethers, aldehydes and ketones, carboxylic acids, acyl compounds (acid halides, acid anhydrides, esthers, amides, nitriles), amines, stereochemistry.
Prerequisite: CHM104

ENG201- Writting Techniques in Academic English (3-0)3
The main goal of ENG 210 is to enhance the students' competence and willingness to express themselves in an organized manner in academic and professional contexts, and to interact with others confidently. ENG 210 will be inter-active; students will be encouraged to listen actively, respond to presentations, and participate in discussions. Speaking activities and academic presentations will ensue from reading and listening activities. Each theme will lead to the production of an oral and/or written activity. Students will enable to distinguish between oral and written discourse, and emphasize the requirements of oral discourse.
Prerequisite: ENG102

FDE201- Mass and Energy Balances (3-0)3
Systems of units and dimensions. Dimensional equations and consistency.Concentration, force, weight, pressure and temperature.Definition of types of process, operation and system. Block diagram representation of a process. Material balances for steady-state open systems and for steady-state open systems with recycle, by-pass and purge. Material balances for processes with and without chemical reaction. Gases and vapors, saturation and humidity.General terms of energy balances.Energy balances for both reactional and non-reactional systems. Physical and chemical heat effects, use of steam tables. Simultaneous material and energy balances. Humidification and use of psychometric chart.
Prerequisite: CHM104

MTH201- Differential Equations (4-0)4
Differential equations and their solutions: Classification of Differential equations; their origin and solutions, Initial value and Boundary value problems and existence of solutions. First order equations: separable equations and equations reducible this form. Linear equations and Bernoulli equations.Exact differential equations and integrating factors.Higher order linear differential equations:Basic Theory of Linear Differential Equations, The Homogeneous Linear Equation with constant coefficients.The method of undetermined Coefficients,The Cauchy –Euler equation, Variation of Parameters.Series solutions of linear differential equations. Laplace transform: Definition,existence and basic properties ,the inverse transform and the convolution,Laplace Transform solution of linear differential equations with constant coefficients, Laplace transform solution of linear differential equations with discontinuous nonhomogeneous terms.
Prerequisite: MTH102

CHM212- Analytical Chemistry (4-1)4
Laboratory safety, basic concepts in analytical chemistry, gravimetric and titrimetric analysis methods, aqueous-solution chemistry, chemical equilibria and theory and applications of neutralization titrations, precipitation titrimetry, complex formation, oxidation/reduction titrations.
Prerequisite:CHM104

FDE202- Thermodynamics (4-0)4
Basic principles in thermodynamic, chemical equilibrium concept, temperature and irreversibility, the first law, work and heat concepts, the second law and entropy, state equations and thermodynamic properties of pure substances, design and analysis of open and closed systems, power generators and thermodynamic analysis of cyclic cooling processes, thermodynamic applications in food engineering.
Prerequisite:FDE201

FDE206 –Food Microbiology (3-2)4
Importance of microorganisms in foods (contamination sources, food borne bacteria, yeasts, fungi, viruses and parasites), intrinsic and extrinsic factors in foods affected microbial growth, indicator microorganisms, contamination and spoilage of different kinds of foods, chemical changes in foods caused by microorganisms, microbial counts and its importance, microbial analyses of foods.
Prerequisite:FDE201

FDE212 – Food Engineering Unit Operations I (4-0)4
Dimensional analysis, transport phenomena and fluid mechanics, properties of fluids, viscosity, density, surface tension, Newton's law, fluid statics, static balance, manometers, flow of fluids, mass balances, characteristics of flow, laminar flow boundary layer theory, momentum balance, velocity profiles, overall energy balance and friction, flow around submerged objects, measurement of fluid flow, agitation of liquids.
Prerequisite:MTH201

MTH251- Probability and Statistics (3-0)3
Definition of probability.Sample space and events.Permutations and combinations.Conditional probability and Bayer's theorem.Randomvariables.Discrete and continuous distributions.Moment generating function.Expectation, variance, covariance and correlation.Condition densities and regression and transformation of variables.Descriptive statistics.
Prerequisite: MTH 101

FDE214 –Engineering Materials (3-0)3
Properties of materials,atomic structure, bonding, crystal structure, crystal defects, solid solutions, mechanical properties of materials, elastic and plastic deformation, hardness of materials and its measurement, phase diagrams, metals, production of iron and stainless steel, heat treatment of steels, nonferrous metals, production and their alloys, corrosion, testing of materials, inorganic, organic and composite materials and their properties.
Prerequisite:CHM104

FDE300-Summer Practice I NC
Twenty working days of practical training in a plant designated or approved by the Department. A final report is required at the end of the training period. Material and energy balances will be performed by the students and also information about plant will be provided in practice report.

FDE301 –Instrumental Analysis (2-2)3
Basic principles of spectroscopy, ultra violet and visible region spectroscopy, UV-VIS spectrophotometers, analytical applications, fluorescence and phosphorescence spectroscopy, refractometric and polarimetric methods and measurements, atomic absorption and flame emmission spectroscopy, chromatography: principles and analytical applications, paper chromatography, liquid and gas chromatography, HPLC and GC applications.
Prerequisitel:CHM212

FDE303 –Food Chemistry I (3-0)3
Chemical composition of foods, function of water in foods (properties of water, moisture sorption isotherms and water activity), carbohydrates, proteins, lipids, enzymes (main types of enzymes and enzymatic reactions in foods), phenolic compounds and pigments.
Prerequisite:CHM122

FDE311 –Food Engineering Unit Operations II (4-0)4
Fundamentals of heat transfer, principles of conduction, convection and radiation. Empirical models for the evaluation of heat transfer coefficients. Heat transfer operations in food engineering with emphasis on heat exchange in non-Newtonian flow, boiling and condensation, evaporation and concentration, pasteurization and sterilization, cooking and cooling, freezing.
Prerequisite:FDE212

FDE302 –Food Analysis (2-2)3
Sampling, sample preparation, evaluation of analytical data, moisture and total solid analyses, mineral and ash analyses, pH and titratable acidity, crude fat, crude protein, carbohydrate and fiber analyses, enzyme assay, vitamin analyses, analyses of pesticide and mycotoxin in foods, rheologic analyses, color analyses, sensory evaluation.
Prerequisite:FDE301

FDE304 –Food Chemistry II (3-0)3
Vitamins (classification, water-soluble vitamins, fat-soluble vitamins), minerals (nutritional aspects of minerals, mineral composition of foods, toxic elements), food additives (definition and function of food additives, toxicological concepts, preservatives, colorants, antioxidants, sweeteners, emulsifiers), residue and contaminants (toxicological evaluation, metallic contaminants, radionucleides, pesticides, hormones, antibiotics mycotoxins, polycyclic aromatic hydrocarbons), toxic compounds naturally found in foods.
Prerequisite: FDE303

FDE306 –Reaction Kinetic (3-0)3
Reaction rates, theories about reaction rates, factors affecting reaction rates in foods, calculation of kinetic parameters for reactions in foods (reaction rate constants and half-lives), effects of temperature on reaction rates in foods (activation energies and Q10 values). Kinetics of biological reactions.Kinetics of biomass production, substrate utilization and product formation in cell cultures.Kinetics of microbial death and enzyme inactivation.
Prerequisite:FDE303

FDE312 – Food Engineering Unit Operations III (4-0)4
Fundamentals of mass transfer, principles of diffusion and diffusivity, molecular and convective mass transfer, phase equlibria, equilibrium processes, absorbtion, membrane separation processes, leaching, distillilation, drying and crystallization, extraction, evaporation.
Prerequisite:FDE311

FDE320 –Industrial Microbiology (2-0)2
General characteristics of industrial microorganisms, industrial applications of some microorganisms, stoichiometry of microbial growth and product formation, application principles of free and immobilized cultures, selection, scale up, operation and control of bioreactors, recovery and purification of products, utilization of genetically modified organisms in processing.

FDE321 –Food Biotechnology (2-0)2
Definition of biotechnology, fundamentals of genetic engineering and recombinant DNA technology, mutagenesis, enzyme technology, biosensors, techniques of product recovery, factors affecting the fermentation and their controls, fermenter design and its control, biotechnological applications in food industry.

FDE322 –Principles of Nutrition (2-0)2
Nutrition and health, nutrients and their properties, usage of nutrients in body, composition of foods, their physical and chemical properties, diet-planning for people of different age, sex and work group.

FDE323- Physical Properties of Foods (2-0)2
Principles involved in physical properties of foods, density and specific gravity, textural and rheological properties, surface properties including emulsion, foaming, gelation, adhesion, cohesion, solubility and wettability, thermal properties of foods, thermal conductivity of foods, dielectric properties of foods.

FDE400-Summer Practice II NC
Twenty working days of practical training in a plant designated or approved by the Department. A final report is required at the end of the training period. Process flow chart, properties of each unit, material and energy calculations of each unit, raw materials, products and their properties, distribution, management and quality control in the trained plant should be reported.

FDE401- Food Engineering Design I (3-0)3
During one semester, students choose a design based topic in Food Engineering and conduct research about this topic using sources such as libraries, computer and laboratory facilities and prepare a trial plan. A final report in a scientific manuscript format and an oral presentation is prepared. Design and optimization of equipment used in food industry through case studies. Optimization of operational conditions. The principles of engineering operations are extensively utilized in a design report for each case (pumps and compressors, centrifugation, heat exchangers, pasteurization, distillation, packaging, drying, evaporation, crystallization, fermentors) including a technical specification sheet.
Prerequisite:FDE312

FDE403- Process Control (3-0)3
Importance of process control in the food industry, introduction to process control principles, definition of control objectives, disturbances, manipulated variables, basics of mathematical modeling, process control elements, definition of open and closed loop systems, transfer functions and block diagrams, types and selection of controllers, types and selection of control schemes. Process control of selected food engineering operations (bioreactors, blanching, pasteurization and sterilization, drying, freezing, evaporation and concentration, baking and extrusion).
Prerequisite:FDE312

FDE407- Food Packaging (2-0)2
Functions of packages and importance of food packaging, food packaging material, structures and properties of paper, metal, glass and plastic packaging materials, properties of multi-layer combinations, packaging systems, aseptic packaging, vacuum packaging, modified atmosphere packaging, packaging of fresh and processed foods, shelf life of packaged foods, package-product interactions, package control, safety and legislative aspects of packaging.

FDE411- Food Technology (3-0)3
Raw material handling, processing, packaging, storage and distribution of food products are covered for each food group. Certain topics are assigned to students as term projects.

FDE402 – Food Engineering Design II (3-0)3
It is prerequisite course of FDE401. Design and optimization of equipment used in food industry through case studies. Optimization of operational conditions. The principles of engineering operations are extensively utilized in a design report for each case including a technical specification sheet.
Prerequisite:FDE401

FDE404- Quality Control in Food Engineering (3-0)3
Quality concept and quality criteria in foods, basic concepts of quality assurance and related definitions (ISO, GMP, HACCP, GAP), quality assurance organization and its function, quality control cards and their interpretation, color, textural and rheological properties of foods, sensorial properties of foods and evaluation techniques, national and international standards and legislation concerning food quality, quality changes in foods, defect types and their determination in foods.

FDE412 – Food Engineering Unit Operation Laboratories (1-4)3
Experiments on a variety of food engineering operations (drying, extraction, pasteurization, filtration, size reduction, centrifugation, fluid flow, fermentation). Experimental design, analysis and interpretation of data in the form of written reports.
Prerequisite:FDE312

FDE421 – Cereal Technology (2-2)3
Physical and chemical properties of cereal, cereal quality criteria, storage of cereal, milling of cereal, flour quality criteria, rheology and chemistry of dough, bread making technology, macaroni production technology, biscuit production technology, bulgur production technology, breakfast cereals and snack food technology, quality control analyses in cereals and cereal products.

FDE422 – Fermentation Technology (2-2)3
Definition of fermentation, microorganisms of fermentation, fermentation kinetics, alcoholic fermentation and other fermentations, wine technology, brewing technology, vinegar technology, lactic acid fermentations and technologies, quality control analyses in fermented products.

FDE423 – Fruit and Vegetable Technology (2-2) 3
Physical, chemical and biological properties of fruits and vegetables, pre-treatments used for preservation of fruits and vegetables, freezing of fruits and vegetables, production technology of canned foods, tomato paste production technology, jam-marmalade production technology, drying technology, fruit juice processing technology, high pressure (HP) processing of fruits and vegetables, quality control analyses in fruits, vegetables and their products.

FDE424 – Seafood Products Technology (2-2) 3
Classification, anatomy and physiology of seafoods, composition of seafoods and its importance for nutrition, postmortem alteration in seafoods and its effect on rigor mortis and quality of fish meat, freshness parameters in seafoods, chilling and freezing, canning production technology, technology of curing, smoking, drying and alternative seafoods production and quality control in seafoods.

FDE425 – Fats and Oils Technology (2-2)3
Oil chemistry, fatty acids, glycerides, phosphatides, sterols, color and odor substances, waxes, hydrocarbons, natural antioxidants, deterioration reactions in oils, oil raw materials, storage and cleaning of raw materials, size reduction, roasting, pressing, extraction and pre-pressing-extraction, degumming, removal of free fatty acids, decolorization, deodorization, vinterization, production of modified fats, fractional crystallization, hydrogenation, interesterification, margarine production, quality control analyses in fats and oils.

FDE426 – Diary Technology (2-2)3
Milk composition, dairy chemistry and physics, dairy microbiology, milk grading, dairy processing technology; clarification, separation, standardization, pasteurization, UHT treatment, homogenization, dairy products technology; fluid milk products, concentrated and dried milk products, cultured dairy products technology (cheese, yogurt and fermented beverages), butter, ice cream, quality control analyses in milk and dairy products.

FDE427 – Meat Technology (2-2) 3
Physical, chemical, microbiological and histological characteristics of meat, conversion of muscle to meat, preservation methods; meat refrigeration and freezing technologies, meat processing technologies; curing, smoking, emulsification, fermentation, canning, restructured meat products, meat packaging technology, quality control analyses in meat and meat products.

FDE430 – Plant Sanitation (2-2)3
Hygiene and sanitation concepts and importance in food industry, sources of food contamination and its prevention, sanitation and cleaning practices in food plants, personal hygiene, training and education, cleaning agents, sanitizers, pest control, properties and disinfection of water used in food plants.

FDE431 – Food Economy and Management (3-0)3
Integration models at agriculture and food system, food production and demand, food marketing and actors, food distribution system and organization, food policy components, food security and reliability, sub food sector-actual analysis and evaluation, food enterprises, alternative establishment place, production-cost and capacity analysis, investment strategy, economic and financial analysis.

FDE432 – Food Legislation (3-0)3
The history of food control in Turkey, the law (5179) and its consequences, Turkish food codex announcements, Food control regulations and control systems, ISO 17020 and food auditing, food control labs, EU food legistlation and food control, TSE food standards, ISO and CAC food standards, and the control of HACCP applications.

Sample Copy of Diploma Supplement

Diploma No:	**Diploma Date:**
1.INFORMATION IDENTIFYING THE HOLDER OF THE QUALIFICATION	
Family name(s): ***Given name(s):***	***Place and date of birth:*** ***Student identification number:***
2. INFORMATION IDENTIFYING THE QUALIFICATION	
Name of the qualification and (if applicable) the title conferred BACHELOR OF SCIENCE, B.Sc. ***Main field(s) of study for qualification*** FOOD ENGINEERING ***Name and status of awarding institution*** NEAR EAST UNIVERSITY, PRIVATE UNIVERSITY	***Name and type of institution administering studies*** NEAR EAST UNIVERSITY, PRIVATE UNIVERSITY ***Language(s) of instruction/examinations*** ENGLISH / TURKISH
3. INFORMATION ON THE LEVEL OF THE QUALIFICATION	
3.1. ***Level of qualification*** First Cycle (Bachelor's Degree)	**3.2.** ***Official length of program*** Normally 4 Years (excluding 1 year English Preparatory School, if necessary), 2 semesters per year, 16 weeks per semester
3.3. ***Access requirement(s)*** Admission of Turkish nationalities to higher education is based on a nation-wide Student Selection Examination (ÖSS) administered by the Higher Education Council of Turkey (YÖK). Admission of Turkish Republic of Northern Cyprus nationals is based on the Near East University Entrance and Placement Exam for Turkish Cypriots. Admission of foreign students is based on their high school credentials. Proof of English language proficiency is also required.	
4. INFORMATION ON THE CONTENTS AND RESULTS GAINED	
4.1. ***Mode of study*** Full-Time	**4.2.** ***Programme requirements*** A student is required to have a minimum CGPA of 2.OO/4.00 and no failing grades (below DD).
4.3. ***Objectives*** Educate and train students to demonstrate ability to research, analyze and present scientific and technological concepts and data in a precise and logical manner; knowledge and understanding the functions and operations of the industry; knowledge or the scientific and technological factors involved in the sector and ability to integrate and apply such knowledge in the management of operational activities; ability to adapt professionally in a rapidly changing society; their perspectives with respect to social issues, responsibilities and ethics.	***4.4. Programme details and the individual grades/marks obtained*** Please see the next page.

4.5. ***Grading scheme, grade translation and grade distribution guidance:***

For each course taken, the student is assigned one of the following grades by the course teacher.
For A.Sc., B.Sc. or B.A. degrees, students must obtain at least DD or S from each course and have a GGPA of not less than 2.00 out of 4.00 and have completed all the courses and summer practices in the program. For graduate degrees, students must obtain at least CC or S from each course for M.Sc. and M.A., at least BB for Ph.D. They also need to have a GCPA of 3.00 to graduate. The student's standing is calculated in the form of a Graduate Point Average (GPA) and Cumulative Grade Point (CGPA) and is announced at the end of each semester by the Registrar's Office. The total credit points for a course are obtained by multiplying the coefficient of the final grade by the credit hours. In order to obtain the GPA for any given semester, the total credit points are divided by the total credit hours. The averages are given up to two decimal points. Students who obtain a CGPA of 3.00-3.49 at the end of a semester are considered as "Honour Students" and those who obtain a CGPA of 3.50-4.00 at the end of a semester are considered as "High Honour Students" and this is recorded in their academic report. The letter grades, the quality point equivalents are:

Percentage	**Course Coefficient**	**Grade**	**Percentage**	**Course Coefficient**	**Grade**
90-100	4	AA	70-74	2	CC
85-89	3.5	BA	65-69	1.5	DC
80-84	3	BB	60-64	1	DD
75-79	2.5	CB	50-59	0.5	FD
49 and below	0	FF			

I- Incomplete **S**- Satisfactory Completion, **U**-Unsatisfactory, **NA**-Never Attended,**E**-Exempted, **W**– Withdrawn

4.6*Overall classification of the award* CGPA: …../4.00

5. INFORMATION ON THE FUNCTION OF THE QUALIFICATION	
5.1. ***Access to further study*** May apply to second cycle programmes.	**5.2.** ***Professional status conferred*** This degree enables the graduates to exercise the profession.
6. ADDITIONAL INFORMATION	
6. 1. ***Additional information***	***6.2. Sources for further information*** ***Faculty web site***http://www.neu.edu.tr/en/node/6190 ***Department web site*** http://www.neu.edu.tr/en/node/1228 ***University web site*** http://www.neu.edu.tr ***The Council of Higher Education of Turkey*** http://www.yok.gov.tr ***Higher Education Planning, Evaluation Accreditation and Coordination of North Cyprus Council Web site*** http://www.ncyodak.org

4.4. *Program details and the individual grade/marks obtained:*

1 (1st Semester)

Course Code	Course Name	CR	ECTS	Status	Grade
ECC107	Biology	2	3	Compulsory	
CHM104	General Chem. for Biolog. Sci. & Eng.	4	5	Compulsory	
ENG101	English I	3	3	Compulsory	
FDE101	Int. to Food Engineering	1	5	Compulsory	
MTH101	Calculus I	4	5	Compulsory	
PHY101	General Physics I	4	6	Compulsory	
YIT100	Turkish for Foreign Students	2	3	Compulsory	
		20	30		

2 (2nd Semester)

Course Code	Course Name	CR	ECTS	Status	Grade
CHM122	Organic Chemistry	3	6	Compulsory	
ECC106	Int. to Comp. & Prog.	3	6	Compulsory	
ENG102	English II	3	3	Compulsory	
MTH102	Calculus II	4	6	Compulsory	
PHY102	General Physics II	4	6	Compulsory	
TD102	Technical Drawing	3	3	Compulsory	
		20	30		

3 (3rd Semester)

Course Code	Course Name	CR	ECTS	Status	Grade
FDE201	Mass & Energy Balances	3	6	Compulsory	
ECC217	Microbiology	3	5	Compulsory	
FDE205	Biochemistry	3	5	Compulsory	
ENG201	Writting Techniques in Academic English	3	3	Compulsory	
MTH201	Differential Equations	4	6	Compulsory	
ECC426	Economics for Engineers	3	5	Compulsory	
		19	30		

4 (4th Semester)

Course Code	Course Name	CR	ECTS	Status	Grade
FDE202	Thermodynamics	4	6	Compulsory	
FDE206	Food Microbiology	4	4	Compulsory	
FDE212	Food Eng. Unit Op. I	4	6	Compulsory	
CHM212	Analytical Chemistry	4	5	Compulsory	
FDE214	Engineering Materials	3	4	Compulsory	
GER101	German Language	3	5	N.T.Elective	
		22	30		

5 (5th Semester)

Course Code	Course Name	CR	ECTS	Status	Grade
FDE300	Summer Practice I	0	2	Compulsory	
FDE301	Instrumental Analysis	3	6	Compulsory	
FDE303	Food Chemistry I	3	6	Compulsory	
FDE311	Food Eng. Unit Op. II	4	6	Compulsory	
MTH251	Probability & Statistics	3	6	Compulsory	
FDE321	Food Biotechnology	2	4	Tech.Elect.	
		15	30		

6 (6th Semester)

Course Code	Course Name	CR	ECTS	Status	Grade
FDE302	Food Analysis	3	5	Compulsory	
FDE304	Food Chemistry II	3	5	Compulsory	
FDE306	FE. Applied Kinetics	3	5	Compulsory	
FDE312	Food Eng. Unit Op. III	4	6	Compulsory	
ECC427	Management for Engineers	3	5	Compulsory	
FDE322	Principles of Nutrution	2	4	Tech.Elect.	
		18	30		

7 (7th Semester)

Course Code	Course Name	CR	ECTS	Status	Grade
FDE400	Summer Practice II	0	2	Compulsory	
FDE401	Food Eng. Design I	3	5	Compulsory	
FDE403	Process Control	3	5	Compulsory	
FDE407	Food Packaging Tech.	2	3	Compulsory	
FDE411	Food Technology	3	5	Compulsory	
FDE426	Diary Technology	3	5	Tech.Elect.	
FDE427	Meat Technology	3	5	Tech.Elect.	
		17	30		

8 (8th Semester)

Course Code	Course Name	CR	ECTS	Status	Grade
FDE402	Food Eng. Design II	3	7	Compulsory	
FDE404	Quality Control in FE	3	7	Compulsory	
FDE412	FE. Unit Op. Lab.	3	6	Compulsory	
FDE422	Fermentation Technology	3	5	Tech.Elect.	
FDE432	Food Legislation	3	5	Tech.Elect.	
		15	30		

TOTAL ECTS 240

7. CERTIFICATION OF THE SUPPLEMENT

Date :

Name and *Signature* :Ümit Serdaroğlu

Capacity : Registrar

Official stamp or seal :

8. INFORMATION ON THE NATIONAL HIGHER EDUCATION SYSTEM

The basic structure of the North Cyprus Education System consists of four main stages as pre-school education, primary education, secondary education and higher education.

Pre-school education consists of non-compulsory programs whereas primary education is a compulsory 8 year program for all children beginning from the age of 6. The secondary education system includes “General High Schools” and “Vocational and Technical High Schools”.

The Higher Education System in North Cyprus is regulated by the Higher Education Planning, Evaluation, Accreditationand Coordination Council (YükseköğretimPlanlama,Denetleme,AkreditasyonveKoordinasyonKurulu – YÖDAK). Established in 1988, the Council regulates the activities of higher education institutions with respect to research, governing, planning and organization. The higher education institutions are established within the framework of the Higher Education Law. All programs of higher education should be accredited by YÖDAK.

Higher education in North Cyprus comprises all post-secondary higher education programmes, consisting of short, first, second, and third cycle degrees in terms of terminology of the Bologna Process. The structure of North Cyprus higher education degrees is based on a two-tier system, except for dentistry, pharmacy, medicine and veterinary medicine programmes which have a one-tier system. The duration of these one-tier programmes is five years except for medicine which lasts six years. The qualifications in these one-tier programmes are equivalent to the first cycle (bachelor degree) plus secondary cycle (master degree) degree. Undergraduate level of study consists of short cycle (associate degree) - (önlisansderecesi) and first cycle (bachelor degree) - (lisansderecesi) degrees which are awarded after the successful completion of full-time two-year and four-year study programmes, respectively.

Graduate level of study consists of second cycle (master degree) – (yükseklisansderecesi) and third cycle (doctorate) – (doktoraderecesi) degree programmes. Second cycle is divided into two sub-types named as master without thesis and master with thesis. Master programmes without thesis consists of courses and semester project. The master programmes with a thesis consist of courses, a seminar, and a thesis. Third cycle (doctorate) degree programmes consist of completion of courses, passing a qualifying examination and a doctoral thesis. Specializations in dentistry, accepted as equivalent to third cycle programmes are carried out within the faculties of dentistry. Specialization in medicine, accepted as equivalent to third cycle programmes are carried out within the faculties of medicine, and university hospitals and training hospitals operated by the Ministry of Health.

Universities consist of graduate schools (institutes) offering second cycle (master degree) and third cycle (doctorate) degree programmes, faculties offering first cycle (bachelor degree) programmes, four-year higher schools offering first cycle (bachelor degree) degree programmes with a vocational emphasis and two-year vocational schools offering short cycle (associate degree) degree programmes of strictly vocational nature.

Second cycle degree holders may apply to third cycle programmes if their performance at the first cycle degree level is exceptionally high and their national central Graduate Education Entrance Examination (ALES) score is also high and their application is approved. The doctoral degree is conferred subject to at least one publication in a cited and refereed journal.

GENERAL STRUCTURE OF THE NORTH CYPRUS EDUCATION SYSTEM