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HAVA HARP OKULU

UNDERGRADUATE EDUCATION



The Aim of the undergraduate Education of Air Force Academy is to educate the cadets;

- who have leadership qualities of military, the competence of educating and training; moral, idea and physical development; strong characters and superior personality aspects.
- who have gained the capability of monitoring and maintaining the future duties and who are capable of coping with the internal and external affairs within the framework of Kemalism.
- to give undergraduate education to the officers who have enough knowledge in military, science, technics and social sciences and who are capable of leading Turkish Armed Forces according to the needs of era.

The four year Academic education is the most extensive part of the Officer Development System that is being conducted in Turkish Air Force. This educational development process started with the establishment of Turkish Air Force Academy in Eskişehir in 1951. The education and training period of Turkish Air Force Academy carried on as two-year academic study till 1969, than the three year of academic study took place between the years of 1969 and 1974. There has been a four year academic education since 1974. For the equivalence of the education given in Air Force Academy with the other universities, there had been an improvement study held by the order of Turkish General Staff for the War Academies. Then, having considered the needs of Turkish Air Force, there has been a bachelor's degree education on Aviation, Electronics, Computer and Industrial Engineering programs which began to be applied since 1991-1992 Academic Term. In 1994-1995, academic term departments were reorganized as of Aeronautical, Electronics, Computer and Industrial Engineering. The bachelor's degree education that is already being carried on legalized with the War Academies' Law numbered 4566 on 17th May 2000, since then the officers graduated from Turkish Air Force Academy as pilot candidates started to be given the education of BS in Engineering. Dean of Academics was changed into Deanship after the War Academies' Law took effect.

The duties of Turkish Air Force Academy Deanship are; to train active duty officers in the name of Turkish Air Force, to plan, to perform, to follow, to check, to develop, to coordinate, to supply education and training academically. And also to provide a productive and effective management of the organization under its command according to determined goals and to support the Institute of Aeronautics and Space Technologies by the means of education and training.

The BS which is going to be given in Turkish Air Force Academy is formatted according to the goals of the Turkish Air Force Academy and also in the standards that is programmed in the field of engineering by the Council of Higher Education (CHE). The departments in TUAFA is consisted of two parts as BS Department and sustaining branches. BS Department as it is listed below;

-Aeronautical Engineering
-Electronic Engineering
-Computer Engineering
-Industrial Engineering

And the sustaining branches are;
-Military and Social Sciences
-Applied Sciences
-Department of Foreign Languages

The education program of BS has been organized considering the hours of lessons, value of credits, and the contents of the lessons according to the standards of equivalences of national or international institutions.The resultant that is called credit includes theoretical, laboratory and practical lessons. In these lessons one credit is for weekly every theoretical lessons and also 0,5 credit

for practical and laboratory lessons. The training and education year consists of two terms in the Turkish Air Force Academy. Each term includes 15 or 16 weeks for academic training and also final term examinations.The lessons are for each term. There is at least one midterm or final exam for each lesson in a term. Fixed based and fixed letter spaced marking system is being applied in order to evaluate the cadets. Central examination system is performed. Because there is a composite examination system, all classes have the exams at the same time.

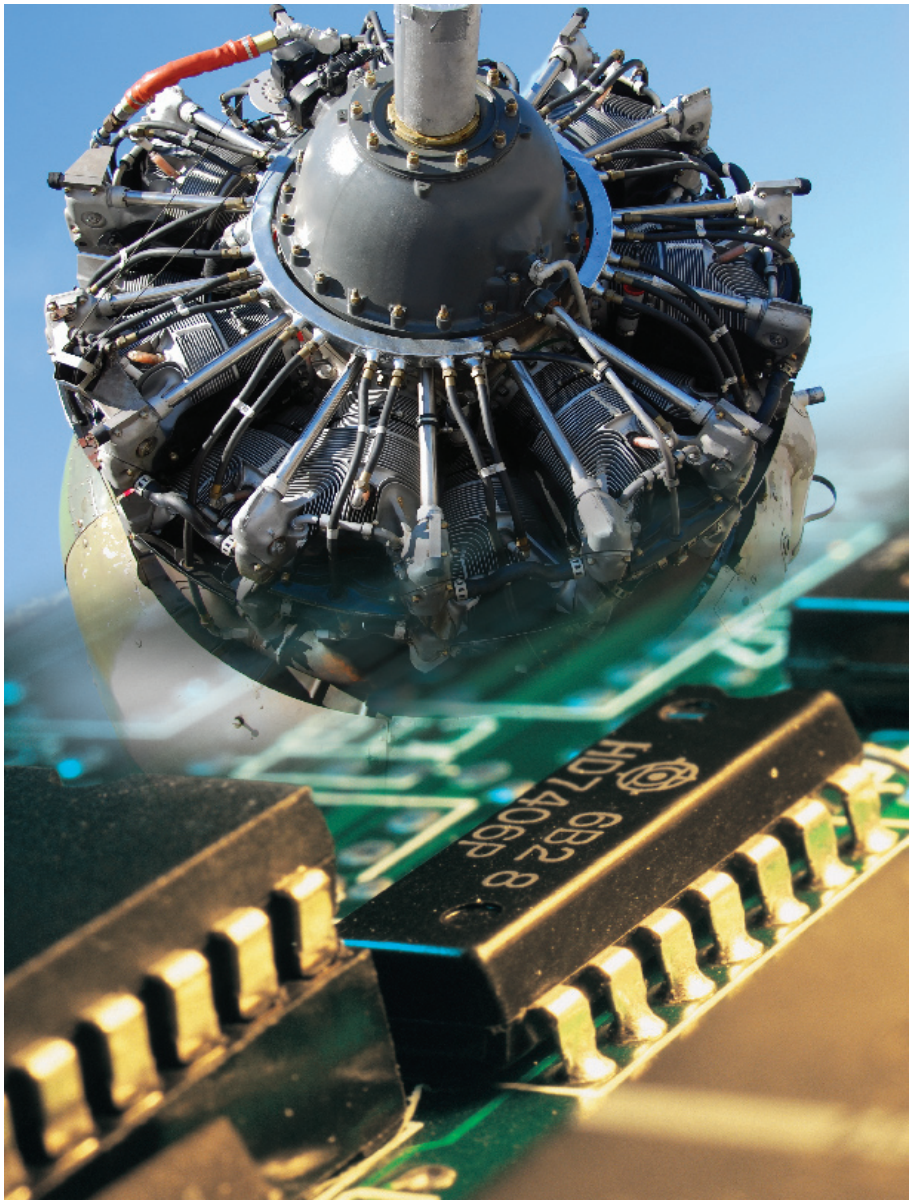
The academic year starts at the last day of September or the first Monday of October and there are five lesson days in a week in the Turkish Air Force Academy.The cadets are given at least two weeks off in an academic year.
In summer Encampment and Military training period, all the activities of military training, orientation training, preparation for the next year and the schedule for cadet passes are planned and executed in "Annual Activity Schedule" .Military training period consists of at least two weeks and it never exceeds eight weeks.

Lessons are planned and applied to improve cadets' reading and research habits.During the class maximum active .

Learning Techniques are used. Applications regarding reading, observation, research techniques from different sources are also taught to cadets. In order to create more efficient and effective educational environments, custom modified educational methods are applied. These methods are applied in laboratories and special classes.

Vital feed back from various departments of Turkish Air Force is used to improve the education system. Future needs are taken into consideration with the developments in science and technology together with close cooperation with similar inland and international institutions.

As outlined above, Air Force Academy continues to educate and train cadets in the departments of Aeronautical Engineering, Computer Engineering, Electronics Engineering, Industrial Engineering, Applied Sciences, Military and Social Sciences, and Foreign Languages in the most contemporary academic knowledge and skills with theoretical and practical lessons.



AERONAUTICAL ENGINEERING DEPARTMENT

Objective and Duty of the Department

Aeronautical Engineering is one of the four departments working under the Dean of the Faculty of the Turkish Air Force Academy. The main target of the department is to educate aeronautical engineer officers who are equipped with information on aeronautical science technologies and open to progress and who can, reach, interpret and question information and who possess scientific thinking and ethics.

Covering this scope, Aeronautical Engineering Department is working on its own part of the mission to train the future pilots by means of its continuously improving and developing academic staff, up-to-date laboratories, supportive course documents and its curriculum equivalent to similar departments in other universities and considering the needs of the Air Force Command.

The engineering education basically covers the following subjects: Aerodynamics, Propulsion Systems, Structural Analysis, Flight Mechanics and Control, Design and Improvement

Aeronautical Engineering has been offering the four year undergraduate education since 1974. Since then, continuous improvement and development are in progress. The curriculum is in harmony with the advancing technology and science world.

Between 1974 and 1997, the name of the department was Aircraft Engineering. In 1992, the curriculum was updated in order to ensure equivalence with the universities offering the same degree of engineering and the department was named as Aeronautics Engineering in 1997. As a result, the department has conformity to the State University Level Education Department's standards and has an identical curriculum with the universities offering the same degree. Since 2000, cadets have been graduating with an aeronautical engineer degree.

Finally, the curriculum was updated in 2003. In addition to that, course contents and applications are examined in detail at the end of every academic year and appropriate revisions are put into practice after thorough assessments.



Courses

Engineering									
Freshman Period									
1st Period					**2nd Period**				
Code	**Course**	**Duration**	**Credits**	**ECTS**	**Code**	**Course**	**Duration**	**Credits**	**ECTS**
BLG 200	Self Develoment -I	(1 0 0)	1,0	2,0	MAT 101	Calculus-I	(3 2 0)	4,0	7,0
ING 101	English -I	(5 10 10)	15,0	25,0	ING 102	English - II	(1 3 3)	4,0	3,0
BLG 100	Inroduction to Computer Systems	(0 0 1)	0,5	3,0	SOS 100	Sociology	(2 0 0)	2,0	2,0
					HVG 100	Introduction to Aviation	(2 0 0)	2,0	2,0
					HRT 100	Mapping	(1 0 0)	1,0	1,0
					HVC 201	Introduction to Aeronautıcal Engineering	(2 0 0)	2,0	3,0
					FIZ 101	Physics-I	(3 1 1)	4,0	7,0
					KIM 100	Chemistry	(2 1 0)	2,5	5,0
TOTAL		**27**	**16,5**	**30**	**TOTAL**		**27**	**21,5**	**30**

Aeronautical Engineering

Sophomore Period

1st Period					2nd Period				
Code	**Course**	**Duration**	**Credits**	**ECTS**	**Code**	**Course**	**Duration**	**Credits**	**ECTS**
İNG 201	English-III	(1 2 1)	2,5	3,0	İNG 202	English -IV	(1 2 1)	2,5	2,5
MAT 202	Differential Equations	(4 0 0)	4,0	4,0	MAT 201	Linear Algebra	(4 0 0)	4,0	5,0
MAT 102	Mathematics-II	(3 2 0)	4,0	5,0	LID 402	Leadership	(2 0 0)	2,0	1,5
FZK 102	Physics-II	(3 1 1)	4,0	5,0	HVC 212	Material Science	(3 0 0)	3,0	3,0
BGL 101	Individual Development	(3 0 1)	3,5	1,0	HVC 214	Mechanics of Materials-I	(3 0 0)	3,0	4,0
HVC 207	Statics	(3 0 0)	3,0	5,0	HVC 216	Fluid Mechanics	(3 0 0)	3,0	4,0
HVC 285	Computer Aided Technical Drawing	(2 1 0)	2,5	3,0	HVC 218	Dynamics	(3 0 0)	3,0	3,0
					HVC 203	Thermodynamic	(4 0 0)	4,0	5,0
					HRK 401	Operation-I	(2 0 0)	2,0	2,0
TOTAL		**28**	**23,5**	**30**	**TOTAL**		**28**	**26,5**	**30**

Aeronautical Engineering

Junior Period

1st Period					2nd Period				
Code	**Course**	**Duration**	**Credits**	**ECTS**	**Code**	**Course**	**Duration**	**Credits**	**ECTS**
İNG 301	English-V	(1 1 1)	2,0	2,0	İNG 302	English-VI	(1 1 1)	2,0	3,0
ELK 200	Electrical engineering	(2 0 0)	2,0	2,5	ITA 202	Revolution History of Tuurkish Republic and Kemalism -III	(2 0 0)	2,0	1,5
THU 301	Fundamentals of Aeronautics & Flight I	(1 0 0)	1,0	1,0	THU 302	Fundamentals of Aeronautics & Flight II	(1 0 0)	1,0	1,0
TRK 100	Turkish	(2 0 0)	2,0	2,0	HSA 300	Air Weaponry and Equipment	(2 0 0)	2,0	1,5
ITA 201	Revolution History of Tuurkish Republic and Kemalism -II	(2 0 0)	2,0	1,5	HVC 316	Heat Transfer	(3 0 0)	3,0	4,0
HVC 311	Manufacturing Processes	(3 0 0)	3,0	3,0	ELK 210	Electronics	(2 0 0)	2,0	2,5
HVC 307	Mechnanics of Materials-II	(2 0 0)	2,0	3,0	SYT 300	Political History	(2 0 0)	2,0	1,5
HVC 301	Aerodynamics-I	(3 1 0)	3,5	5,5	HVC 302	Aerodynamics-II	(3 1 0)	3,5	5,0
HVC 303	Machine Design	(3 0 0)	3,0	3,0		Complementary Course	(3 0 0)	3,0	3,0
HVC 309	Numerical Analysis	(3 0 0)	3,0	4,0		Complementary Course	(3 0 0)	3,0	4,0
	Complementary Course	(3 0 0)	3,0	3,0	BLG 300	Individual Development-II	(1 0 0)	1,0	1,0
					BLG 495	Management Informatıon Systems	(2 0 0)	2,0	2,0
TOTAL		**28**	**26,5**	**30**	**TOTAL**		**28**	**26,5**	**30**

Aeronautical Engineering									
Senior Period									
1st Period					2nd Period				
Code	**Course**	**Duration**	**Credits**	**ECTS**	**Code**	**Course**	**Duration**	**Credits**	**ECTS**
İNG 401	English-VII	(1 0 1)	2,0	2,5	İNG 402	English-VIII	(1 1 1)	2,0	2,5
END 250	Statistis and Probability	(3 0 0)	3,0	4,0	HRK 402	Operation-II	(2 0 0)	2,0	2,0
EKO 200	Economy	(2 0 0)	2,0	1,5	DVB 300		(2 0 0)	2,0	2,0
HTR 400	War History	(2 0 0)	2,0	1,0	AYZ 400	Military Correspondence	(2 0 0)	2,0	2,0
END 496	Management of Logistics Systems	(2 0 0)	2,0	1,5	YÖN 302	Management and Organi-zation	(2 0 0)	2,0	2,0
HUK 400	Law	(2 0 0)	2,0	1,5	ISL 402	International relations	(2 0 0)	2,0	1,0
HVC 493	Research Methods and Techniques	(1 0 0)	1,0	1,0	HVC 494	Graduation Project	(2 1 0)	2,5	5,0
HVC 409	Flight Mechanics	(3 1 0)	3,5	4,5		Complementary Course	(2 0 0)	2,0	3,0
HVC 403	Propulsion Systems	(4 0 0)	4,0	4,5		Complementary Course	(2 2 0)	3,0	5,0
	Complementary Course	(3 0 0)	3,0	4,0		Complementary Course	(3 0 0)	3,0	4,0
	Complementary Course	(2 0 0)	2,0	2,0		Complementary Course	(2 0 0)	2,0	1,5
STR 401	Stratetgy and Security-I	(2 0 9)	2,0	1,5	STR 402	Stratetgy and Security-II	(2 0 0)	2,0	1,5
TOTAL		**28**	**27**	**30**	**TOTAL**		**27**	**24,5**	**30**

COMPLEMANTRY COURSES

S/N	Code Code	Course	Duration
1	HVC 361	GAS DYNAMICS	(3 0 0)
2	HVC 362	TURBOMACHINERY THEORY	(3 0 0)
3	HVC 363	COMBUSTION	(3 0 0)
4	HVC 364	RECIPROCATING ENGINES	(3 0 0)
5	HVC 365	MEASUREMENT TECHNIQUES *	(3 0 0)
6	HVC 366	MECHANICS OF COMPOSITE MATERIALS	(3 0 0)
7	HVC 368	MECHANICAL VIBRATIONS *	(3 0 0)
8	HVC 369	COMPUTER AIDED DESIGN AND MANUFACTURING	(3 0 0)
9	HVC 372	AIRCRAFT STRUCTURAL ANALYSIS **	(3 0 0)
10	HVC 461	BOUNDARY LAYERS	(3 0 0)
11	HVC 462	INTRODUCTION TO SPACE SCIENCES *	(2 0 0)
12	HVC 463	FINITE ELEMENT ANALYSIS	(3 0 0)
13	HVC 464	INTRODUCTION TO HELICOPTER AERODYNAMICS AND DESIGN	(3 0 0)
14	HVC 465	AUTOMATIC CONTROL *	(2 0 0)
15	HVC 466	METEOROLOGY	(2 0 0)
16	HVC 467	COMPUTATIONAL FLUID DYNAMICS *	(3 0 0)
17	HVC 468	AIRCRAFT MAINTENANCE AND PREPARATION	(2 0 0)
18	HVC 472	PROPULSION SYSTEMS II	(3 0 0)
19	HVC 474	AIRCRAFT ENGINE DESIGN	(2 2 0)
20	HVC 476	AIRCRAFT DESIGN **	(2 2 0)
21	HVC 478	STABILITY AND CONTROL **	(3 0 0)
22	END 308	INTERNATIONAL RELATIONS	(2 0 0)

Course Descriptions

Compulsory Courses

HVC 201 Introduction to Aeronautical Engineering: Basic physic laws of atmospheric and space flight, fundamentals of thermodynamics, fundamentals of fluid mechanics, aircraft elements and components, components of aircraft gas turbine engines, performance comparisons of gas turbine engines.

HVC 203 Thermodynamics: Basic concepts of thermodynamics, properties of pure substances, the first law of thermodynamics: closed systems, the first law of thermodynamics: control volumes, the second law of thermodynamics, entropy, gas power cycles.

HVC 285 Computer Aided Technical Drawing: Fundamentals of technical drawing, techniques to create two dimensional drawing, formatting techniques, auxiliary commands, resizing commands, listing and viewing commands, create three dimensional drawing, arranging three dimensional objects, special commands.

HVC 207 Statics: Fundamental concepts and principles, statics of particles, rigid bodies: equivalent systems of forces, equilibrium of rigid bodies, analysis of structures, forces in beams, friction, distributed forces: moments of inertia.

HVC 212-HVC 282-HVC 284 Materials Science & Engineering: Materials science and structure, properties of materials, diffusion, solid solutions – phase diagrams, Fe-C diagrams, heat treatment procedures, non-ferrous metals and alloys, ceramic materials, composite materials, corrosion.

HVC 214 Structural Analysis-I: Introduction, planar frames and stress analysis, Mohr circle and equilibrium equations, strain, Hooke Law and energy equations, failure theories, ring problem and statically indefinite systems, composite structures and thermal effects, torsion and moment of inertia.

HVC 216 Fluid Mechanics: Introduction to fluid mechanics, fluid statics, , basic concepts of fluid motion, finite control volume analysis, differential analysis of fluid motion, simple form of Navier-Stokes equations, fundamental characteristics of boundary layer, dimensional analysis and modeling.

HVC 218 Dynamic: Kinematics of a massless point: force and acceleration, work, energy, impulse, momentum, kinematics of rigid bodies: force, acceleration, work, energy, impulse, momentum, mechanical vibrations.

HVC 301 Aerodynamics-I: Fundamental principles of aerodynamics and physical properties of air flow types, one dimensional inviscid flow, aerodynamic forces and moments, two dimensional potential flows.

HVC 302 Aerodynamics -II: Thin airfoil theory, three dimensional wing theory, blade theory, compressible flows, isentropic relations, shock waves-expansion waves.

HVC 303 Machine Components: Basic principles, connection elements, tribology, bearings, power and movement transmitting elements.

HVC 307 Structural Analysis–II: Bending, combined loadings, shear center, elastic curve, normal force and bending, bending and torsion, energy methods, buckling.

HVC 309-HVC 389 Numerical Methods: Numerical solution of a mathematical model, differences between analytical and numerical solutions, numerical differentiation, numerical integration, solutions of linear algebraic equations, roots of equations, ordinary differential equations, curve fitting.

HVC 311 Manufacturing Processes: Casting, welding and soldering, plastic deformation, metal cutting and machining, powder metallurgy, other metal working techniques.

HVC 314 Design Project: Distribution of project and its data, calculations of project and selection of standard values, drawings of project.

HVC 316 Heat Transfer: Introduction to heat transfer, conduction, one dimensional, steady-state conduction, transient conduction, convection, heat transfer in external flow, free convection, radiation.

HVC 403 Propulsion Systems-I: Introduction and basic thrust equation, propeller, fan and rotor, thermodynamic cycles for space ship, combustion, gas turbines, ramjet and scramjet engines, rocket engines.

HVC 409 Flight Mechanics: Profile geometry, profiles and profile groups, forces acting on an aircraft, aircraft thrust, specific engine characteristics and performance properties, weight ration, speed characteristics, aircraft performance; level flight, level ceiling, the best range flight, level flight in some limitations, taking off motion, climbing, losing altitude, performance analysis of turn motion, effect of power units on an aircraft.

HVC 493 Research Method and Techniques: Scientific research and education, basic approaches, science, scientific method, research, research training, process and techniques in research, process and techniques in research, evidence and comment, summary, ruling and proposal, preparation of sample temporary key and discussion, preparation of sample research proposal and discussion, source and footnote techniques.

Complementary Courses

HVC 361 Gas Dynamics: Governing equations, incompressible internal flows, compressible pipe flows oblique shock Prandtl-Meyer expansion, inviscid compressible flow equations, turbo machineries, external viscous flows.

HVC 362 Turbomachinery Theory: Introduction and classification in turbomachinery, relative motion, rotational flow, isotropic flow of ideal gas, potential flows, axial symmetric flow in rotational and static passages, two dimensional flow in turbomachineries, stages axial flow compressor, one dimensional flow on turbine stages.

HVC 363 Combustion: Combustion and energy, combustion

and entropy, solid fuels, liquid fuels, gas fuels, combustion on the spark ignition engine, combustion on the compressing ignition engine.

HVC 364 Reciprocating Engines: The ideal cycle of the reciprocating engines, definition and working of reciprocating engines, fuels, chemistry of combustion, real cycle times on engines, forming of mixture on Otto engines, forming of mixture on Diesel engines.

HVC 365 Measurement Techniques: Measurement systems, error analysis and evaluation of measurement results, dimension, angle and area measurement, pressure measurement, flow measurement, temperature measurement, strain, force and moment measurement, general repeat and lab work.

HVC 366 Mechanics of Composite Materials: Introduction, basic concept and characteristics, stress-strain relationships of the layers, modulus of fiber reinforced layers, strength of fiber reinforced layered composites, thermal behavioral analysis of layered composites, stress and fracture analysis of multidirectional layers.

HVC 368 Mechanical Vibrations: Kinematics of vibrations, one degree of freedom vibrations, degenerate two degrees of freedom vibrations, two degrees of freedom vibrations.

HVC 369 Computer Aided Design and Manufacturing: The aim of manufacturing, conventional manufacturing, automation CAD/CAM as part of automation, computer aided manufacturing machines, techniques for generating the tool path, automation in manufacturing

HVC 372 Aircraft Structural Analysis: Introductions to structural design concept, external loads on the aircraft structures, mechanical properties of structural materials, stress analyses, deflection analysis of structures, buckling, Finite Element Methods on structural analysis.

HVC 461 Boundary Layers: Viscous flows, exact solutions for Navier-Stokes, boundary layer theory, thermal boundary layer, free convection boundary layer.

HVC 462 Introduction to Space Sciences: Introduction to astronomy and astrophysics, basic measurements, solar system, introduction to celestial mechanics, orbital maneuvers, multibody problems, attitude motions of rigid bodies, remote sensing, international space law.

HVC 463 Finite Element Analysis: Finite element analysis (FEA) and other techniques, formulation of methods, fundamental steps in FEA, equilibrium equations, body equations, displacement and shape equations, adaptation equations, formulation methods for structure mechanics, total potential energy for an elastic structure, work for a finite element, 1-d elements,, beam systems, bending element, torsion element, stress and strain, solids.

HVC 464 Introductions to Helicopter Aerodynamics and Design: Introduction, momentum theory in vertical flight, blade element theory in vertical flight, rotor mechanisms in forward flight, blade aerodynamics in forward flight, performance analysis, performance improving, stability and control, introduction to conceptual design of the helicopter.

HVC 465 Automatic Control: Introduction to automatic control, Laplace transformation, introduction to system dynamics, transfer function, block diagram and sign flow diagram, temporary regime response, types of control unit.

HVC 466 Meteorology: Definition of aeronautical meteorology, importance of aeronautical meteorology, some meteorological terms used in aviation, ICAO standard atmosphere, air in motion, development of cyclones and anti-cyclones, flight in fronts, stability in the atmosphere, convection, cumulus and cumulonimbus clouds, waves and flying in waves, local winds, visibility, satellites, weather maps and forecast, the analysis and forecast of main weather events in flight.

HVC 467 Computational Fluid Dynamics: Introduction and a general , surface singularity methods for wing profiles, lifting surface theories for 3-D wings, surface singularity based methods for body calculations, panel methods for body calculations, boundary layer calculation methods.

HVC 468 Aircraft Maintenance and Reparation: Aircraft main systems and accessories, aircraft avionic and weapon systems, aircraft maintenance and support systems, maintenance management and principles, maintenance operation methods.

HVC 472 Propulsion Systems-II: Introduction to propulsion systems, ideal cycle analysis, non-ideal cycle analysis, air intake and exhaust, combustion and combustion chambers.

HVC 474 Aircraft Engine Design: Design concept, analysis of requirements for engine systems, mission analysis, engine selection (on-design and off-design), engine dimensionalization, design of engine components, engine component design: rotating turbomachines, combustion systems, intakes and nozzles.

HVC 476 Aeronautical Engineering: Overview of aircraft configuration, general arrangement of configuration, fuselage design, subsonic and supersonic engines, design to the performance, propulsion and its installation, airfoil and wing geometry selection, weight and balance.

HVC 478 Stability and Control: Static stability and control, longitudinal static stability, fixed and free stick stability, maneuver stability, longitudinal control, lateral static stability, lateral control, spiral mode approach, linearization of equations, dimensional and non-dimensional stability derivatives, longitudinal dynamic stability, reduction of equation of motion, short-long period approach, lateral dynamic stability, reduction of equation of motion, dynamic stability and control, aircraft equations of motion, coordinate systems and their transformation.

Laboratories

Aerodynamics Laboratory

This laboratory provides experimental environment for aeronautical engineering courses like aerodynamics, fluid mechanics, thermodynamics, and flight mechanics. Besides, some of

our cadets use this laboratory for their graduate projects.

In this laboratory, there is a supersonic wind tunnel in which air velocities up to 1.8 as Mach number can be created and shock waves can be observed.

There is also a smoke wind tunnel for flow visualization and a subsonic wind tunnel in which air velocity, pressure distribution, forces acting on a model can be measured.

There are some measuring systems like scan valve, Laser Doppler Anemometer and Hot Wire. By using these systems, some air flow parameters like turbulence level, temperature and velocity can be determined.



Aircraft Components Laboratory

In this laboratory, some of the aircraft components like flap, control surfaces, hydraulic lines, actuators, autopilot system and some of the cockpit control panels of F-4 aircraft are assembled. There is also an F-5 and F-4 engines, which are disjoined for the students to see the internal sections.

The aim of these systems is to show our cadets how an aircraft and its components work and what the related principles are.



Materials Science and Manufacturing Technologies Laboratory

Materials Science & Manufacturing Technologies Laboratory aims to demonstrate the practical issues of various manufacturing processes and materials testing procedures. In addition to that, senior cadets use the manufacturing and testing facilities while they are working on their final projects.



In the Materials Science & Manufacturing Technologies Laboratory, tensile, impact, fatigue and hardness testing equipment are used for mechanical testing and optical microscope is used for microstructural characterization. The manufacturing bench includes a turning machine, a heat treatment furnace and sheet metal cutting and bending equipment.



Measurement Systems Laboratory

Measurement Systems Laboratory is used to demonstrate the testing applications related to Measurement Techniques course. Additionally, senior cadets use the testing facilities while they are working on their final projects.

In the Measurement Systems Laboratory, pressure, temperature and deformation testing equipment and related software are available.

ELECTRONIC ENGINEERING DEPARTMENT

Objective and Duty of the Department

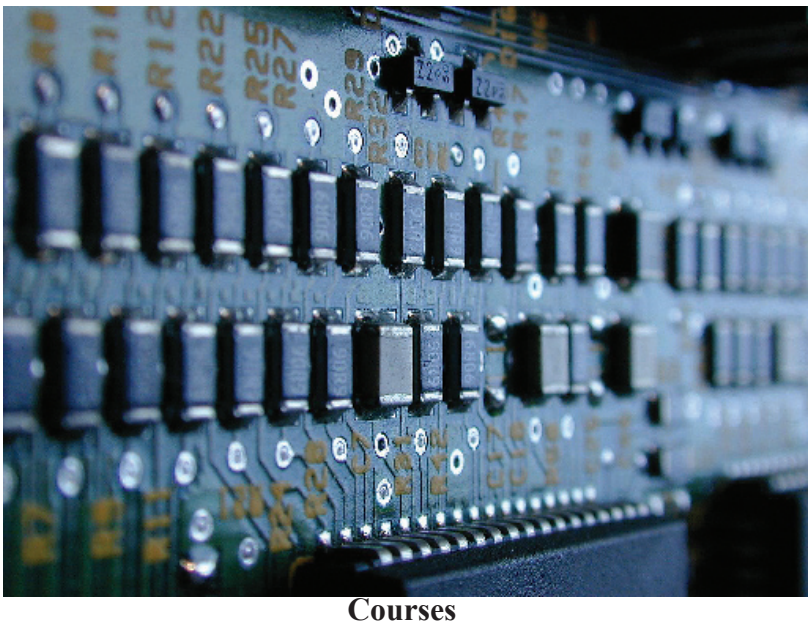
The mission of the Department of Electronic Engineering is to provide professional training and information to the cadets about the usage and design of electronical devices and systems and moreover to provide further education on developing scientific aspects and to help them acquire technical feedbacks.

Department of Electronic Engineering aims to develop the abilities of the cadets in the application of the necessary mathematical tools, scientific basics, and fundamental knowledge of the profession. It also aims to reach, produce, apply and promote knowledge, and educate the Air Force cadets with that knowledge for the scientific and technological development of our society and humanity. This is to be done by teaching research and scientific services up to universal standards.

Covering this scope, Electronic Engineering Department is working on its own part of the mission to educate the pilots of the future by means of its continuously improving and developing academic staff, modern laboratories, up-to-date course documents and its curriculum equivalent to similar departments in other universities, considering the needs of the Air Force Command. Electronic Engineering Department has three main branches:

- Electronics
- Communication
- Control

The Department is in conformity with the standards of the Level Education Department of the State University and has an identical curriculum with the universities offering the same degree. Since 2000, cadets have been graduating with an official engineer's degree.



Courses

Electronic Engineering									
Freshman Period									
1st Period					2nd Period				
Code	Course	Duration	Credits	ECTS	Code	Course	Duration	Credits	ECTS
BLG 100	Introduction to Computer Systems	(0 0 1)	0,5	3,0	MAT 101	Calculus -I1	(3 2 0)	4,0	7,0
BLG 200	Indıvıdual Develop-ment-I	(1 0 0)	1,0	2,0	FİZ 101	Physics -I	(3 1 1)	4,0	7,0
ING 101	English-I	(5 10 10)	15	25	ING 102	English -II	(1 3 3)	4,0	3,0
					SOS 100	Sociology	(2 0 0)	2,0	3,0
					HVG 100	Introduction to Aviation	(2 0 0)	2,0	2,0
					HRT 100	Mapping	(1 0 0)	1,0	2,0
					THU 301	Fundamental Aviation and Flight Informatıon -I	(1 0 0)	1,0	1,0
					BLG 101	Introduction to Computer Programming	(3 0 1)	3,5	5,0
TOTAL		27	16,5	30	TOTAL		27	21,5	30

Electronic Engineering

Sophomore Period

1st Period

Code	Course	Duration	Credits	ECTS
İNG 201	English-III	(1 2 3)	2,5	3,0
MAT 202	Differential Equations	(4 0 0)	4,0	3,5
HRK 401	Operatıon-I	(2 0 0)	2,0	2,0
MAT 102	Mathematics-II	(3 2 0)	4,0	6,0
FZK 102	Physics-II	(3 1 1)	4,0	6,0
KİM 100	Chemistry	(2 1 0)	2,5	3,5
ELK 211	Elements of Electronic Circuits	(2 0 0)	2,0	2,5
ELK 201	Fundamentals of Electrical Engineering	(3 0 0)	3,0	3,5
TOTAL		**28**	**24**	**30**

2nd Period

Code	Course	Duration	Credits	ECTS
İNG 202	English –IV	(1 2 1)	2,5	2,5
MAT 201	Linear Algebra	(4 0 0)	4,0	5,0
BGL 300	Indıvidual Development-II	(1 0 0)	1,0	1,0
ELK 212	Electronics-I	(3 0 0)	3,0	3,0
ELK 203	Circuit Theory-I	(3 0 0)	3,0	4,0
ELK 204	Circuit Theory Laboratory	(0 0 2)	1,0	2,0
HVC 284	Material Sciences	(2 1 0)	2,5	4,0
HVC 285	Computer Aided Technical Drawing	(2 1 0)	2,5	3,0
ELK 202	Fundamentals of Energy Conversion	(3 0 0)	3,0	4,0
LİD 402	Leadership	(2 0 0)	2,0	1,5
TOTAL		**28**	**24,5**	**30**

Electronic Engineering

Junior Period

1st Period

Code	Course	Duration	Credits	ECTS
İNG 301	English-V	(1 1 1)	2,0	2,0
HSA 300	Air War Weapons and Technologies	(2 0 0)	2,0	2,0
HRT 400	War History	(2 0 0)	2,0	2,0
TRK 100	Turkish	(2 0 0)	2,0	1,5
İTA 301	Revolution History of Turkish Republic and Kemalism-I	(2 0 0)	2,0	2,0
END 253	Statistics and Probability	(1 1 0)	1,5	2,0
ELK 311	Electronics-II	(3 0 0)	3,0	4,0
ELK 301	Circuit Theory-II	(3 0 0)	3,0	3,5
ELK 361	Analog Signal Processing	(3 0 0)	3,0	4,0
ELK 312	Analog Electronics Laboratory	(0 0 3)	1,5	2,0
ELK 361	Analog Electronics Lap	(0 0 3)	1,5	2,0
TOTAL		**28**	**25**	**30**

2nd Period

Code	Course	Duration	Credits	ECTS
İNG 302	English-VI	(1 1 1)	2,0	3,0
İTA 302	Revolution History of Turkish Republic and Kemalism-II	(2 0 0)	2,0	2,0
DVB 300	Behavioral Sciences	(2 0 0)	2,0	2,0
THU 302	Fundamentals of Aeronautics & Flight-II	(1 0 1)	1,0	1,0
SYT 300	Political History	(2 0 0)	2,0	2,0
BGL 495	Management Informatıonal Systems	(2 0 0)	2,0	1,0
ELK 362	Digital Signal Processing	(3 0 0)	3,0	4,0
ELK 333	Theory of Electromagnetic Waves	(3 0 0)	3,0	4,0
ELK 340	Automatic Control	(3 1 0)	3,5	4,5
HVC 381	Introduction to Aeronautics Sciences-I	(3 0 0)	3,0	3,0
ELK 314	Digital Electronics	(3 0 0)	3,0	4,0
TOTAL		**28**	**26,5**	**30**

Electronics Engineering									
Senior Period									
1st Period					2nd Period				
Code	**Course**	**Duration**	**Credits**	**ECTS**	**Code**	**Course**	**Duration**	**Credits**	**ECTS**
İNG 401	English-VII	(1 1 1)	2,0	2,5	İNG 402	English –VIII	(1 1 1)	2,0	2,5
HUK 400	Law	(2 0 0)	2,0	2,0	HRK 402	Operation –II	(2 0 0)	2,0	2,0
STR 401	Strategy and Security-I	(2 0 0)	2,0	1,5	ISL 402	International Relationships	(2 0 0)	2,0	1,0
EKO 200	Economy	(2 0 0)	2,0	2,0	AYZ 400	Military Correspondence	(2 0 0)	2,0	2,0
ELK 313	Digital Electronic Lap	(0 0 3)	1,5	4,0	YÖN 302	Management and Organization	(2 0 0)	2,0	2,0
ELK 411	Microprocessors	(3 0 0)	3,0	4,0	ELK 494	Graduation Project	(2 1 0)	2,5	4,0
ELK 493	Research Process and Techniques	(1 0 0)	1,0	1,0		Complementary Course	(3 0 0)	3,0	4,5
HVC 382	Introduction to Aeronautics II	(3 0 0)	3,0	0,0		Complementary Course	(3 2 0)	3,0	4,5
	Complementary Course	(3 0 0)	3,0	2,0		Complementary Course	(3 0 0)	3,0	4,5
	Complementary Course	(3 0 0)	3,0	4,0	END 496	Management of Logistics	(2 0 0)	2,0	2,0
	Complementary Course	(3 0 0)	3,0	2,0	STR 402	Strategy and Security-II	(2 0 0)	2,0	1,5
TOTAL		**28**	**25,5**	**30**	**TOTAL**		**27**	**23,5**	**30**

COMPLEMENTARY COURSES

S/N	Code	Course	Duration
1	ELK 421	ANTENNAS AND PROPAGATION	(3 0 0)
2	ELK 422	MICROWAVE CIRCUITS	(3 0 0)
3	ELK 423	REMOTE SENSING	(3 0 0)
4	ELK 424	CONTROL SYSTEM THEORY	(3 0 0)
5	ELK 431	DIGITAL CONTROL	(3 0 0)
6	ELK 441	MEASUREMENT AND SENSING TECHNOLOGY	(3 0 0)
7	ELK 443	POWER ELECTRONICS	(3 0 0)
8	ELK 444	ADVANCED ELECTRONICS	(3 0 0)
9	ELK 461	RADAR TECHNIQUES (H)	(3 0 0)
10	ELK 464	ANALOG COMMUNICATIONS	(3 0 0)
11	ELK 467	COMMUNICATION LAB.	(3 0 0)
12	ELK 471	CONTROL SYSTEM DESIGN	(3 0 0)
13	ELK 472	CONTROL LAB.	(3 0 0)
14	ELK 481	COMMUNICATIONS ELECTRONICS CIRCUITS	(3 0 0)
15	ELK 486	ADVANCED ELECTRONICS LAB.	(3 0 0)
16	ELK 487	COMPUTER ARCHITECTURE	(3 0 0)
17	ELK 488	MICROPROCESSOR BASED SYSTEM DESIGN	(3 0 0)
18	ELK 492	AUTOMATIC FLIGHT CONTROL SYSTEMS	(3 0 0)
19	ELK 493	INTRODUCTION TO ROBOT CONTROL SYSTEMS	(3 0 0)
20	ELK 466	DIGITAL COMMUNICATONS	(3 0 0)
21	ELK 495	AVIONICS SYSTEMS	(3 0 0)

Course Descriptions

Compulsory Courses

ELK 200-ELK 201 Fundamentals of Electrical Engineering: Electrical Identities and Circuit Elements, Serial and Parallel Circuits (DC), Analysis Methods for Electrical Circuits (DC), Circuit Theorems (DC), DC Measurement Instruments, Transient States of Circuits, Sinusoidal Alternating Current and Phasors, Serial and Parallel Circuits (AC), Analysis Methods of AC Circuits.

ELK 202 Basics of Energy Transform: Electromechanic Energy Transform, AC and DC Magnetic Circuits, Transformators, Electromagnetic Systems, Asynchronic Machines, Synchronic Machines, DC Machines, Step Motors

ELK 203 Circuit Theory-I: System Definition, Calculate Mathematical Models of Systems, System Figure, Learn to Make Matrix of Obtained Figure, Solve Preprepared Matrix of Figure, Preparing Status Equations and Solutions.

ELK 204 Laboratory of Circuit Fundamentals: Introduction to Measurement Instruments, Serial and Parallel Resistor Circuits, Control and Measurement of Alternating Current, Ohm‘s Law and Serial Circuits, Parallel Circuits, Serial And Parallel Circuits, Kirchoff’s Laws, Thevenen Theorem, Alternating Current Measurements, Capacitors, Capacitive Reactance and Phase Measurements, Inductance, Serial-Parallel Resonance Circuits, Filter Circuits.

ELK 211 Electronics Circuit Components: The electron ballistics and electron release (electron emission) issue, the conductivity rules on metals and semi conductors, Junctioned diode types and able to acquire diodes equation, Junctioned transistor and able to acquire current-voltage figures, operation modes, mean figures, transistor as an amplificator and able to implement in circuit.

ELK 212 Electronics-I: n-type and p-type extrinsic materials, Semiconductor diodes, Diode applications and types, Constructions of the bipolar junction transistor and the field effect transistor, Concepts of the equivalent circuits, dBm and amplifying, Audio frequency, voltage and power amplifiers, Specifications of the power electronic devices.

ELK 301 Circuit Theory-II: Input/Output functions of Electronic circuits, Recognize double gate circuits and solving, Block diagrams, Feedback logic and able to implement, Signal Flow Diagrams, Electronics Circuits Synthesis and able to solve related problems.

ELK 312 Analog Electronics Laboratory: The circuits which contain diodes, using the oscilloscope, frequency generator and multi meter, Parameters of Transistor, Circuits of operational amplifiers, Design the logic circuits.

ELK 313 Digital Electronics Laboratory: The theoretical knowledge when performing the experiment, the experiment materials, Measuring the experiment results and making conclusions, Preparing a report about the concerning experiment, Improving writing skills by preparing technical reports.

ELK 314-ELK 316 Digital Electronics: Analog and digital systems, Different based number systems, Transforms each other, separate and define each of them, Combined circuit design and makes the application these circuits, The techniques of consecutive circuit design applications, Definition and design, Operation principles of computer systems, The microprocessors and their units, The digital systems in Defense and Aviation.

ELK 332 Introduction to Electromagnetic Fields: Fundamental hypothesis, electrostatic/magnetostatic/magnetism calculation, maxwell equations solutions in distribution manner and electromagnetic field definitions.

ELK 333 Electromagnetic Wave Theory: Solution of wave equations in simple environments, monocromatic waves in simple environments, flat waves calculations, guided waves, electromagnetic waves definitions and antennas calculations.

ELK 340 Automatic Control: Feedback, Transfer Functions, Block Diagrams, Mathematical Model of Physical Systems, State Variables Analysis, Stability of Direct Control Systems, Time Domain Analysis of Control Systems, Frequency Domain Analysis, Design Of Control Systems

ELK 361 Analog Signal Processing: Linearity, stability, time stability technique, signal expression with impulse response, continuous time systems convolution, linear time-invariant systems, Fourier series and signal expression with Fourier series expansion.

ELK 362 Digital Signal Processing: Signal and systems definitions, Discrete Fourier Transform (DFT), digital filters, Finite Impulse Response (FIR) filters, Infinite Impulse Response (IIR) filters, spectral estimation and Fast Fourier Transform (FFT).

ELK 411 Microprocessors: Microprocessor Architecture; 8051 Microprocessor Software, I/O Interfacing, Interrupt Processed I/O, Direct Memory Access, Microprocessor Based Communications, Programming of 8051, Design of Software and Documentation Preparing, 8051 Applications

ELK 491 Research Method and Techniques: Scientific Research and Fundamental (Educational) Approaches, Scientific Methods, Research Education, Process in Research and Techniques, Research Process and Techniques, Invention and Explanation, Preparing a Temporary Example Key and Discussion, Preparing an Example of Research Proposal, Techniques of Referring.

Complementary Courses

ELK 421 Antennas and Propagation: Fundamental information, antenna analysis, directivity of antennas, propagation techniques, environmental effects to propagation and wave transmission.

ELK 422 Microwave Circuits: Transmission lines, transmission tubes, analysis of microwave platforms with "S" distribution parameters, microwave tubes, microwave semi conductors platforms, milimetric waves and optoelectronics platforms.

ELK 423 Remote Sensing: Elecromagnetics fundamentals related to remote sensing, passive/active remote sensing systems, operating concept and sensing platforms of microwave imaging radars, imaging characteristics, image processing hardware and digital image processing algorithms.

ELK 424 Control System Theory: The Algebraic Theory of Linear Systems (Including Controllability, Observability, Feedback Equivalence, Realization and Minimality), Stability via Lyapunov, Input/Output Methods, Ideas of Optimal Control, Observers and Dynamic Feedback, Z-Transforms and Computer Applications.

E**LK 431 Digital Control:** Introduction to Digital Control Systems, Z-Transforms, Discrete Transfer Functions, Synthesis of Digital Control Systems, Discrete Time Systems in State Space.

ELK 441 Measurement and Sensing Technology: Principles of Measurement, Error Measurements, Analog Measurement Devices, Power and Energy Measurement, Measurement of Circuit Elements (R, L, C), Digital Measurement, Instrumentation, Converters.

ELK 443 Power Electronics: Power Electronic Systems, Semi Conductors Power Diodes, Diode Circuits and Rectifiers, Thyristor, Controlled Rectifiers, Power Transistors, DC Choppers, Control of DC Machines, Control of AC Machines.

ELK 444 Advanced Electronics: Large Signal and Switching properties of Electronics Circuit Components, Resistor-Transistor Logic, Diode-Transistor Logic, Transistor-Transistor Logic, Classification of ECL Circuit, CMOS Logic Gate Circuit, Consequent Circuit Design, Microprocessor Interface Circuit Design.

ELK 461 Radar Techniques: Radar operating concept, fundamental information, measurable parameters and radar antennas.

ELK 464 Analog Communications: Information and band width definitions, Fourier transforms, signal transfer in linear system, transfer function, impulse response, analog/digital filters, base band, amplitude modulation types, frequency and phase modulation.

ELK 466 Digital Communications: Digital communication systems, base band digital information systems, digital modulations types, Pulse Code Modulation (PCM), multiplexing coding, information theory fundamentals, bit error rate, symbol interference preventation.

ELK 467 Communication Laboratory: Labview programming environment and programming with Labview virtual instruments, Pulse Code Modulation (PCM), Delta Modulation (DM), Adaptive Delta Modulation (ADM), Amplitude Modulation (AM), Frequency Modulation (FM), Finite Impulse Response and Infinite Impulse Response filter design, Intersymbol interference and equalization, Digital Modulation.

ELK 471 Control System Design: General Control Theories, Control Criterion, Selection of Control Components by Obeying Control Criterions, Analysis Proper Transfer Functions, Compensation Pole Allocation and Pole Deletion, Analysis and Simulation on Mathematical Model, Process Amplifier and Correction of Characteristics, Correction of Feedback Way Currents and Transducer's Characteristics, Electromechanics System and Actuators, Digitalization of Control System.

ELK 472 Control Laboratory: Feedback, Gain, P,I and D Control Characteristics, Stability On Feedback Systems, Frequency Response On Feedback Systems, Conversion of Analog Control Systems to Digital, Effect of Digital Word Length On Control Quality, Effect of Sampling Frequency On Control Quality, Feed-Forward Control via the Computer.

ELK 481 Communication Electronics: Principles of amplitude modulating receivers and transmitters, Principles of frequency, Modulating receivers and transmitters, The television systems and their principles, The communication environment and related topics.

ELK 486 Advanced Electronics Laboratory: Combinational, Counter/Divider and code decoder Circuit and explain results, A/D and D/A Converter, Microprocessor, and Microcontroller circuit.

ELK 487 Architecture of Computer: Printer Transfer Level Design, Fundamentals of Computer, Order Sets, Addressing Techniques, Arithmetic Logic Unit, Micro-Controllers, Memory Unit, Input/Output Unit and Interrupt Masks, Improvement of Von Neumann Machinery, Bus Structure, Programming with Assembler Language.

ELK 488 Microprocessor Based System Design: Microprocessor Hardware Organization, Microprocessor Architecture, Comparison of Microprocessor Architectures, Interfacing of Microprocessors, Monitor Programming, Assembly Programming Language, Hardware Production Support, Software Production Support.

ELK 492 Automatic Flight Control Systems: Manned and Unmanned Aerial Vehicles Movement Equations, open loop close loop structures of control systems, stability and observation, classical control techniques, cencors,

actuators, navigation systems, manned and unmanned aerial vehicles movement equations simulations, flight control and path planning control systems.

ELK 493 Introduction to Robot Control Systems: Robot kinematics. Robot dynamics computer simulation. Cencors and actuators on robotic applications. Classic robot control algorithms. Robot path planning precision position and control applications, selected industrial applications.

ELK 495 Introduction to Avionics Systems: Introduction and history, air space concept, national and international civillian aviation organization committees RF flight and landing aids, satellite navigation systems, surveillance systems, communication(HF, VHF, UHF, Intercom) systems, indicator systems, air data systems, control systems, inertial navigation systems, avionics systems engineering.

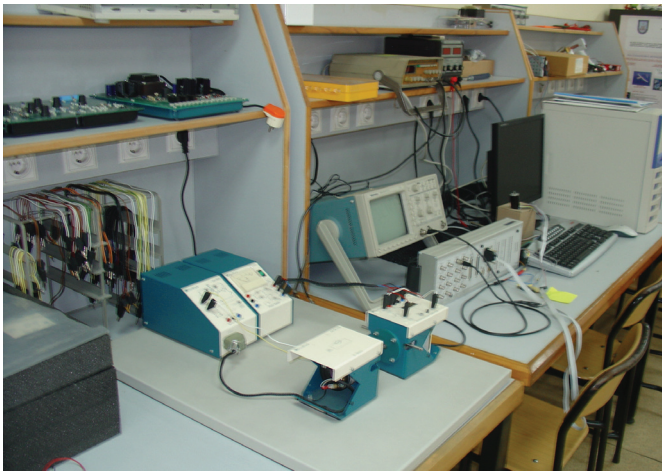
Laboratories

In the Electronic Engineering Department, there are 4 laboratories, Electronics, Control, Communications, and Microcontroller, in order to perform experiments about the theoretical subjects which are taught during the lectures of department's courses. Experiments are performed in groups of 2-4 students under the supervision of laboratory course instructor.



Electronics Laboratory

In the Electronics Laboratory necessary fundamental measurement equipments, such as oscilloscopes, signal generators, digital multimeters and special experiment devices and kits are available in order to achieve the experiments about analog andigital electronic circuits and components. Experiments about the three courses, analog and digital electronics, electric circuits fundamentals, are done in the Electronics Laboratory.



Control Laboratory

In Control Laboratory, there are various experiment kits available in order to perform experiments about fundamental subjects of the control theory, such as DC/AC motor position and speed control, analog and digital controllers, Proportional Integral and Derivative (PID) type controllers.

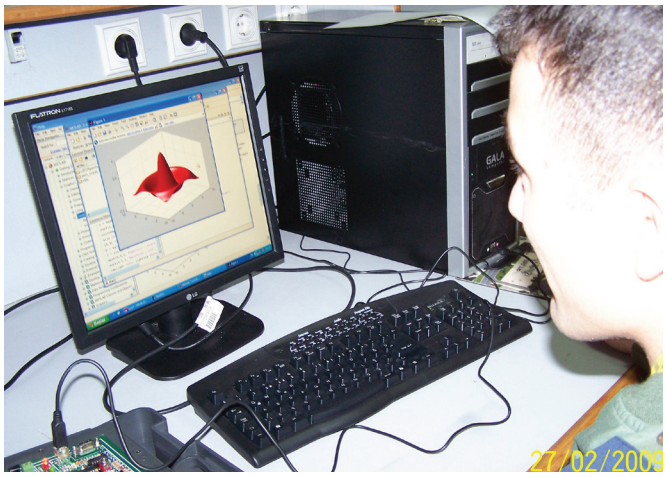


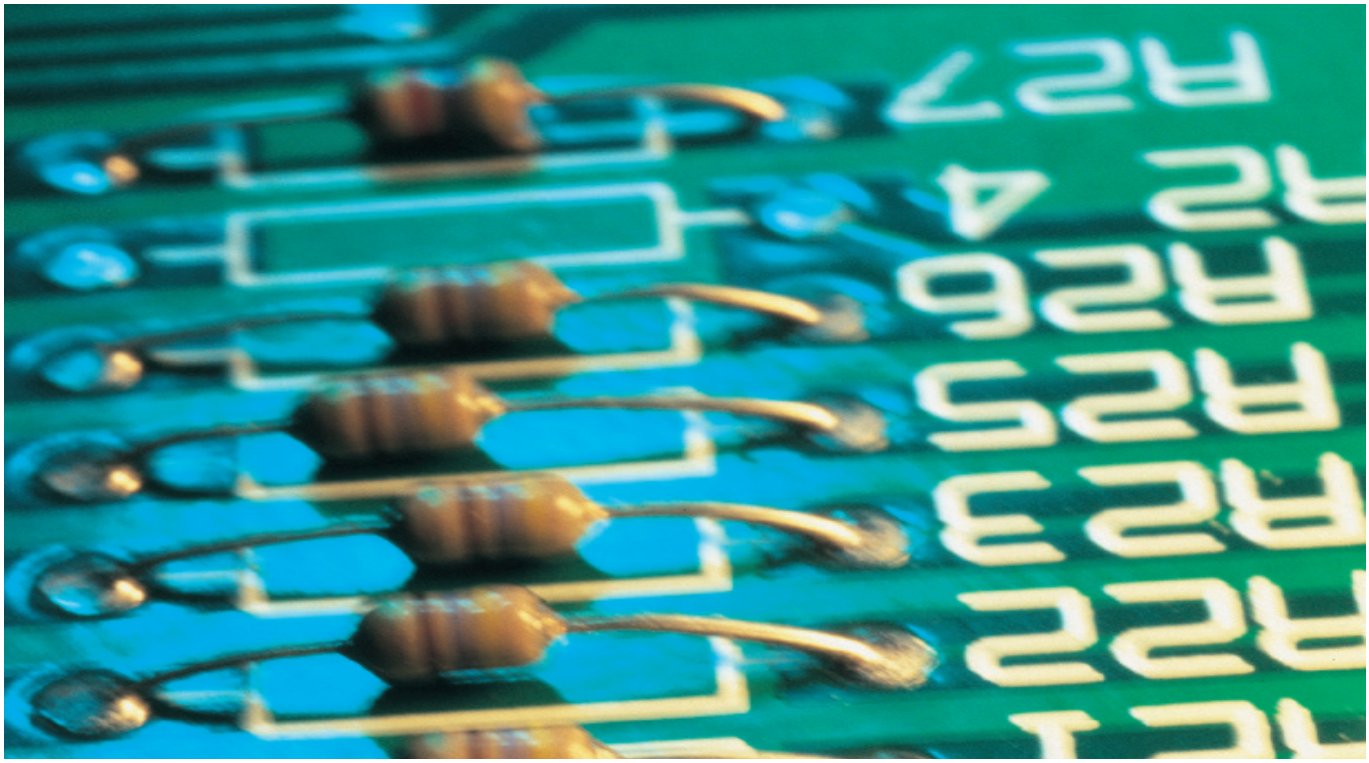
Communications Laboratory

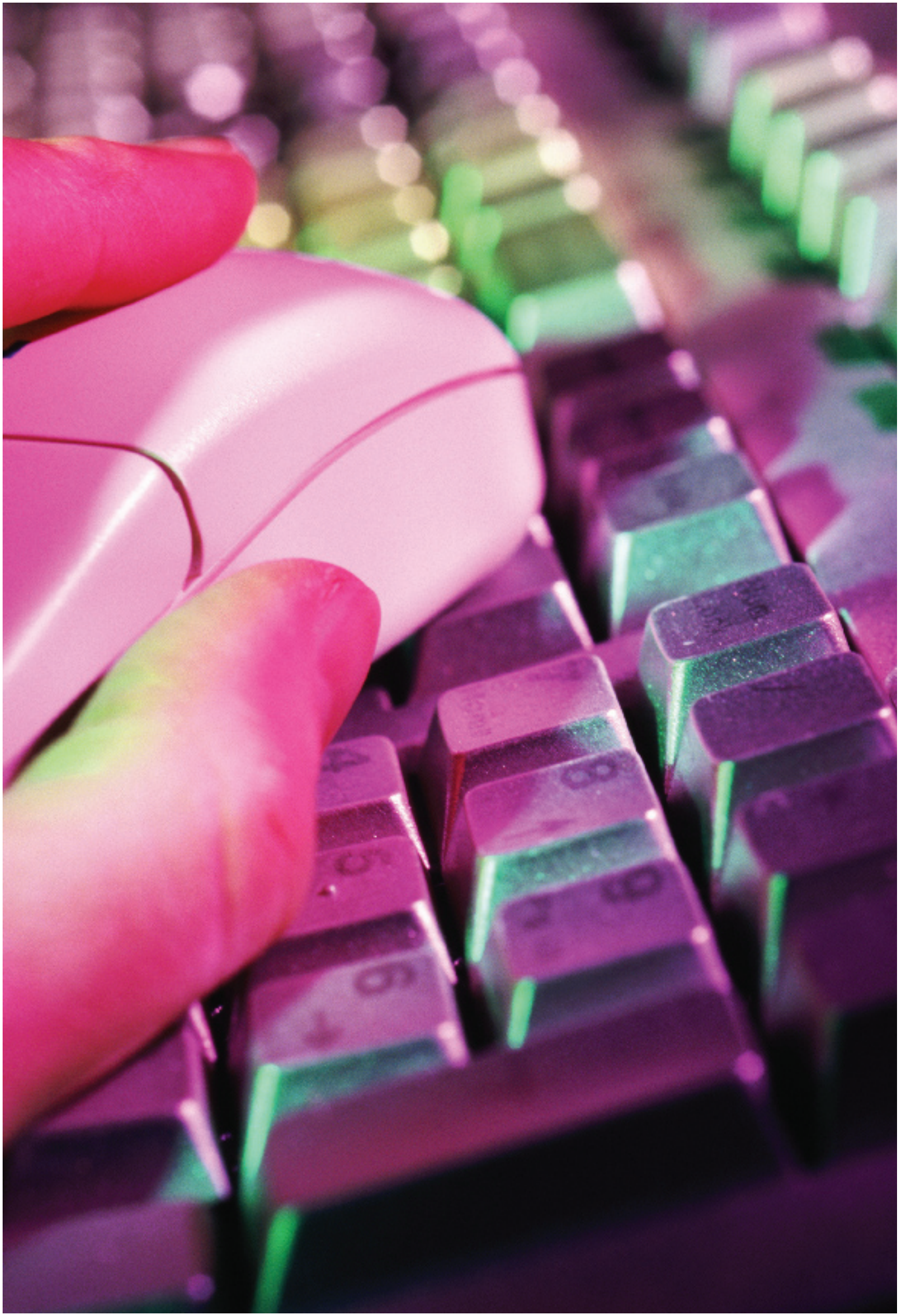
In Communications Laboratory, the experiments about the fundamental methods and theories of communication systems, modulation and filtering are done by using National Instruments LabView Virtual Instruments and programming environment. In the laboratory, necessary fundamental measurement equipments, such as oscilloscopes, signal generators, digital multimeters are also available. In Communications Laboratory, Communications Laboratory courses are taught.

Microcontroller Laboratory

In Microcontroller Laboratory, there are 8051 Intel microcontroller based training kits available in order to make experiments about 8051 architecture and programming language and its communications with the peripheral devices. In Microcontroller Laboratory, Microcontroller Laboratory courses are taught.







COMPUTER ENGINEERING DEPARTMENT

Objective and Duty of the Department

Computer Engineering Department is one of the engineering departments in the Turkish Air Force Academy. The basic aim of the department is to train officers that can produce information and technologies that Turkish Air Force needs, and who can find creative solutions, compete according to international standards, and who are sensitive to global values and fulfilled with professional values.

With this aim, the Computer Engineering Department trains officers that can follow, interpret and improve technology which is at home and in the world.

Computer Engineering Department was founded in 1991 to provide personal education according to fulfill the needs of technology field in Turkish Air Force Academy. In accordance with the Council of Higher Education (CHE) standards, an equivalent education program is established like the other universities. Since 2000, cadets graduate as computer engineers.



Courses

Computer Engineering									
Freshman Period									
1st Period					2nd Period				
Code	**Course**	**Duration**	**Credits**	**ECTS**	**Code**	**Course**	**Duration**	**Credits**	**ECTS**
BLG 100	Introduction to Computer Systems	(0 0 1)	0,5	3,0	MAT 101	Calculus-I	(3 2 0)	4,0	7,0
BGL 200	Individual Development-I	(1 0 0)	1,0	2,0	FIZ 101	Physics-I	(3 1 1)	4,0	7,0
ING 101	English-I	(5 10 10)	15	25	ING 102	English-II	(1 3 3)	4,0	3,0
					TRK 100	Turkish	(2 0 0)	2,0	2,0
					HVG 100	Introduction to Aviation	(2 0 0)	2,0	2,0
					BLG 101	Introduction to Computer Programming	(3 0 1)	3,5	6,0
					THU 301	Fundamental Aviation and Flight Information-I	(1 0 0)	1,0	1,0
TOTAL		**27**	**16,5**	**30**	**TOTAL**		**27**	**21,5**	**30**

Computer Engineering

Sophomore Period

1st Period

Code	Course	Duration	Credits	ECTS
İNG 201	English-III	(1 2 1)	2,5	3,0
MAT 201	Linear Algebra	(4 0 0)	4,0	4,0
LİD 402	Operation-I	(2 0 0)	1,0	1,0
MAT 102	Mathematics-II	(3 2 0)	4,0	5,0
FZK 102	Physics-II	(3 1 1)	4,0	5,0
KİM 100	Chemistry	(2 1 0)	2,5	5,0
BLG 211	Data Structures and Algorithms	(3 0 0)	3,0	4,5
ELK 200	Introduction to Electrical Engineering	(2 0 0)	2,0	2,5
TOTAL		**28**	**24**	**30**

2nd Period

Code	Course	Duration	Credits	ECTS
İNG 202	English-IV	(1 2 1)	2,5	2,5
MAT 202	Differential Equations	(4 0 0)	4,0	4,0
LİD 402	Leadership	(2 0 0)	2,0	1,0
SOS 100	Sociology	(2 0 0)	2,0	1,0
BLG 381	Discrete Mathematics	(3 0 0)	3,0	3,5
HVC 284	Invertory Planing	(2 0 0)	2,0	2,5
BLG 202	Object Oriented Programming	(2 0 0)	3,0	6,0
ELK 210	Electronics	(3 0 0)	3,0	4,0
HVC 285	Computer Aided Technical Drawings	(2 1 0)	2,5	4,0
ELK 310	Analog Electronics Lap.	(0 0 2)	1,0	1,5
TOTAL		**28**	**25**	**30**

Computer Engineering

Junior Period

1st Period

Code	Course	Duration	Credits	ECTS
İNG 301	English-V	(1 1 1)	2,0	2,0
HSA 300	Air War Weapon and Technologies	(2 0 0)	2,0	1,0
EKO 200	Economy	(2 0 0)	2,0	1,0
BGL 300	Individual Development-II	(1 0 0)	1,0	1,0
İTA 301	Revolution History of Turkish Republic and Kemalizm-I	(2 0 0)	2,0	1,5
BLG 321	Introduction to Database Systems	(4 0 0)	4,0	4,5
ELK 315	Digital Design	(3 0 0)	3,0	3,5
END 250	Statistics and Probability	(3 0 0)	3,0	4,0
ELK 316	Electronic Lab.	(0 0 2)	1,0	2,0
TOTAL		**28**	**25**	**30**

2nd Period

Code	Course	Duration	Credits	ECTS
İNG 302	English -VI	(1 1 1)	2,0	3,0
HRK 402	Operation-II	(2 0 0)	2,0	2,0
BLG 372	Computer Organization	(4 0 0)	4,0	5,0
BLG 332	Operating Systems	(4 0 0)	4,0	5,0
HVC 389	Numerical Analysis	(3 0 0)	3,0	3,5
SYT 300	Political History	(2 0 0)	2,0	1,5
DVB 300	Behavioral Sciences	(2 0 0)	2,0	2,0
END 305	Operational Research	(3 0 0)	3,0	3,5
	Complementary Course	(2 1 0)	2,5	3,0
TOTAL		**28**	**26,5**	**30**

Computer Engineering									
Senior Period									
1st Period					2nd Period				
Code	**Course**	**Duration**	**Credits**	**ECTS**	**Code**	**Course**	**Duration**	**Credits**	**ECTS**
İNG 401	English -VII	(2 1 1)	2,0	2,5	İNG 402	English-VIII	(1 1 1)	2,5	2,0
HTR 400	War History	(2 0 0)	2,0	1,5	STR 402	Strategy and Security-II	(2 0 0)	2,0	1,5
STR 401	Strategy and Security-I	(2 0 0)	2,0	1,5	THU 302	Fundamental Aviation and Flight Information-II	(1 0 0)	1,0	1,0
YÖN 302	Management and Organization	(2 0 0)	2,0	1,5	AYZ 400	Military Core-spondance	(2 0 0)	2,0	2,0
BLG 495	Management Information Systems	(2 0 0)	2,0	2,0	İŞL 402	International Relationship	(2 0 0)	2,0	2,0
HUK 400	Law-I	(2 0 0)	2,0	1,0	BLG 494	Graduation Project	(2 1 0)	2,5	5,0
BLG 472	Micropro-cessors and Microcompu-ters Lab.	(0 0 2)	1,0	2,0	HVC 382	Introduction to Aviation Sciences	(3 0 0)	3,0	3,0
BLG 451	Software Engi-neering	(3 0 0)	3,0	4,0		Complementary Course	(2 1 0)	2,5	4,5
BLG 441	Computer Networks	(3 0 0)	3,0	5,0		Complementary Course	(2 1 0)	2,5	4,5
BLG 471	Microproces-sors and Micro-computers	(3 0 0)	3,0	4,5		Complementary Course	(2 1 0)	2,5	4,5
BLG 493	Research Methods and Techniques	(3 0 0)	1,0	1,0	END 496	Management of Logistics	(2 0 0)	2,0	1,5
TOTAL		**28**	**26**	**30**	**TOTAL**		**27**	**24**	**30**

COMPLEMENTARY COURSES

S/N	Code	Course	Schedule
1	BLG 304	ADVANCED PROGRAMMING	(2 1 0)
2	BLG 305	VISUAL PROGRAMMING	(2 1 0)
3	BLG 353	SYSTEM ANALYSIS	(2 1 0)
4	BLG 452	ALGORITHM ANALYSIS	(2 1 0)
5	BLG 461	COMPUTER GRAPHICS	(2 1 0)
6	BLG 431	COMPILER DESIGN	(2 1 0)
7	BLG 442	COMPUTER NETWORKS - II	(2 1 0)
8	BLG 463	ARTIFICIAL INTELLIGENCE	(2 1 0)
9	BLG 466	IMAGE PROCESSING	(2 1 0)
10	BLG 444	CRYPTOGRAPHY	(2 1 0)
11	BLG 446	INTERNET PROGRAMMING	(2 1 0)
12	BLG 456	SYSTEM SIMULATION	(2 1 0)
13	BLG 467	CAD/CAM	(2 1 0)

Course Descriptions

Compulsory Courses

BLG 100 Introduction to Computer Systems: Basic principles of computer and its main component's, Windows Operating System, Microsoft Office programs (Microsoft Word, Excel and Power Point) and basic principles of internet.

BLG 101 Introduction to Computer Programming: Introduction, hardware and software, data types, variables and input operations, user defined functions, usage of conditional statements, loops, arrays, multidimensional arrays, user defined data types, procedures, functions, files, and random access files.

BLG 202 Object Oriented Programming: Object oriented programming, classes and objects, usage of classes, object oriented design and UML, inheritance, polymorphism, interface, advanced data structures, graphical user interface, event handling.

BLG 211 Data Structures and Algorithms: Linked lists, sorting algorithms, searching algorithms, stacks, queues, trees, graphs, files.

BLG 321 Introduction to Database Systems: Defining and distinguishing database and database management system, designing a database, introduction to SQL and writing simple select command, using where and order by, interrogation from many tables, using group functions, using low interrogation, data manipulation, defining database objects, user and access management.

BLG 332 Operating Systems: Introduction, functions and classifications of operating systems, processes, semaphores, monitors, job-scheduling methods, virtual memory management, input/output management, file and disk management.

BLG 372 Computer Organization: Introduction-digital circuits, register transfer and microoperations, basic computer organization and design, programming the basic computer, microprogrammed control, central processing unit, computer arithmetic, input-output organization, memory organization.

BLG 381 Discrete Mathematics: Propositions algebra, set theory, grammars and languages, relations, functions, counting techniques, permutation, graph theory and trees.

BLG 441 Computer Networks - I: Introduction to computer networks, network structure and OSI model, physical layer, data link layer, MAC layer, network layer, session layer, presentation layer and application layer.

BLG 451 Software Engineering: Introduction, software life cycle, planning, system analysis, software design, software development, software verification and validation, software maintenance, object oriented design, software architectures, software quality and configuration management.

BLG 471 Microprocessors and Microcomputers: Microprocessors, number systems and conversion rules, microprocessor and its operation, addressing modes, assembly instructions, assembly advanced programming, 8086/8088 microprocessors hardware features, memory interface, basic input/output interface, interrupts, dma controlled I/O, 80186/80188 and 80286 microprocessor, 80386 and 80486 microprocessor, Pentium microprocessor.

BLG 472 Microprocessors and Microcomputers Laboratory: Basic arithmetic programs (addition, subtraction, multiplication, and division), addressing modes, analog-digital, digital-analog input/output, input/output control programs and interrupt controlled input/output.

BLG 491 Research Methods and Techniques: Scientific research and education, science, scientific methods, research, research education, research process and techniques, research process and techniques, findings and interpolation, summary and suggestions, samples and discussion (with cadets), bibliography and referencing.

BLG 495 Management Informaion Systems: Fundamental system concepts, mutual interaction of organizational behavior and management information systems, decision support and operation support information systems, artificial intelligence, ofice automotion, information systems and processing technology, database management systems, development of the user's applications.

Complementary Courses

BLG 304 Advanced Programming: Introduction to advanced programming environment, advanced programming structure, elements of advanced programming language, complex data types in advanced programming, database tools in advanced programming and object oriented advanced programming.

BLG 305-BLG 206 Visual Programming: Introduction to visual programming language, installing a visual programming language, visual programming components in a visual language, form design, database usage in visual programming language and report creation.

BLG 353 System Analysis: Basics of system development, improving job state, system analysis, system design, application and protection, advanced analysis and design methods.

BLG 431 Compiler Design: Introduction, lexical analyzing, parsing, intermediate code generation, intermediate code generation for arithmetic statements, intermediate code generation for logical statements, intermediate code generation for procedure calls, memory allocation techniques, declarations and code generation.

BLG 442 Computer Networks – II Developments in computer networks, wireless communication and OSI layers, wireless LAN, wireless WAN, ad hoc wireless networks, sensor networks and satellite networks.

BLG 444 Cryptography: Introduction, symmetric key cryptography, general key cryptography, cryptographic protocols, probability and algorithms, one way functions and basic hypothesis, bit security of one way functions, one way functions

and forged randomization, proceed secure cryptography and secure digital signature.

BLG 446 Internet Programming: Introduction, making connections with telnet, e-mail usage and protocols, FTP (file transfer protocol), WWW (world wide web) and HTML, DHTML (dynamic html), CGI (common gateway interface), JavaScript, internet security, asp programming, java programming in the internet.

BLG 452 Algorithm Analysis: Introduction, asymptomatic behaviors, complexity measurements of repetitions, complexity measurements of recursive functions, greedy algorithms, divide and conquer, Fourier transform, FFT (fast Fourier transform) applications, network flow problems, dynamic programming, parallel algorithms and parallel sorts.

BLG 456 System Simulation: Basic simulation models, complex systems modeling, repeating of basic possibility and statistics subjects, simulation software, selecting possibility dispersion of inputs, random number generators, generating of random variables and output analysis of a single system.

BLG 461 Computer Graphics: Computer graphics and graphics systems, geometry and line drawing, properties of monitoring primitives, 2 dimensional geometric transformation, 2 dimensional viewing, 3 dimensional geometric and modeling transformations, 3 dimensional viewing, hidden surfaces and lines, lighting, coloring and shadowing.

BLG 463 Artificial Intelligence: Introduction, predicate logic, AI programming with PROLOG, rule based systems, usage of searching algorithms in problem solving graph model, basic searching algorithms, what is learning, expert systems, learning in problem solving, agents.

BLG 466 Image Processing: Introduction, signal theory, basics of colors, color systems, digital images, operations on images, sampling and restructuring, digital half toning, image combining, twisting and morphing, image systems.

BLG 467 CAD/CAM: Introduction, basics of graphic programming, computer aided draft systems, geometric modeling systems, representation and routing of twists, representation and routing of surfaces, infinite element modeling, optimization, numerical control, tool path generation algorithms, quick prototype, manufacturing.

Laboratories

Computer Laboratories

Computer Engineering Department makes use of 5 computer laboratories in order to develop and make applications based on the courses. The courses are first given in the classes, and then the laboratory applications are done. The instructors present all the steps of application developments in one computer screen to all of the students in their own computer screens.

Microprocessor Laboratory

Microprocessor Laboratory is used in Microprocessors and Microcomputers course to make experiments. This laboratory is under the responsibility of Electronic Engineering Department. Assembly programming with 8051 microcomputers are done for basic arithmetic programs (addition, subtraction, multiplication and division). Also addressing modes, analog to digital conversions, digital to analog conversion input / output, interrupt initiated input / output experiments are done in this laboratory.





INDUSTRIAL ENGINEERING DEPARTMENT

Objective and Duty of the Department

The Objective of the department is to execute academic education in the area of Industrial Engineering in accordance with Air Force Academy's general and specific purposes under the present laws, regulations and directives.

The Objectives of the department is to plan, coordinate and apply all Industrial Engineering Department Courses at TUAFA and to arrange programs under the needs of Turkish Air Force and finally to evaluate cadets and contribute to Turkish Air Force projects.

Industrial Engineering is an engineering branch which uses insufficient resources efficiently and connects its engineering infrastructure with the system concept.

Since 1991, Industrial Engineering undergraduate program has been put into practice at TUAFA.

The second lieutenant graduates of the Air Force Academy Industrial Engineering Department are classified according to the needs of the Air Force and they use their knowledge of engineering analysis and design methods with math, computer, and natural sciences to establish systems in every unit of the Air Force and even in the Armed Forces.

The objective of the Industrial Engineering Department education given by the Dean of Faculty is to train candidate pilot officers, who have the knowledge of engineering to work in every unit of the Air Force, who are loyal to Atatürk's principles, and who have the quality of leadership and ready to adapt themselves to the requirements of the modern day.

If they wish, the graduates may go on their master and PhD education both in and out of the country to work in the required fields of the Air Force.



Courses

Industrial Engineering									
Freshman Period									
1st Period					2nd Period				
Code	**Course**	**Duration**	**Credits**	**ECTS**	**Code**	**Course**	**Duration**	**Credits**	**ECTS**
BGL 200	Indıvıdual Development	(1 0 0)	1,0	2,0	MAT 101	Course Calculus -I	(3 2 0)	4,0	7,0
BLG 100	Introductıon to Computer	(0 0 1)	0,5	3,0	FİZ 101	Physics -I	(3 1 1)	4,0	7,0
İNG 101	English-I	(5 10 10)	15	25	İNG 102	English -II	(1 3 3)	4,0	3,0
					HVG 100	Introduction to Aviation	(2 0 0)	2,0	1,0
					HRT 100	Mapping	(1 0 0)	1,0	2,0
					SOS 100	Sociology	(2 0 0)	2,0	2,0
					END 201	Introduction to Industrial Engineering	(2 0 0)	2,0	3,0
					KİM 100	Chemistry	(2 1 0)	2,5	5,0
TOTAL		**27**	**16,5**	**30**	**TOTAL**		**27**	**21,5**	**30**

Industrial Engineering

Sophomore Period

1st Period

Code	Course	Duration	Credits	ECTS
İNG 201	English-III	(1 2 1)	2,5	3,0
MAT 201	Linear Algebra	(4 0 0)	4,0	5,0
FZK 102	Physics-II	(3 1 1)	4,0	5,0
EKO 201	Economy-I	(2 1 0)	2,5	2,0
MAT 102	Mathematics-II	(3 2 0)	4,0	5,0
BLG 101	Computer Programming	(3 0 1)	3,5	5,0
END 251	Probability Theory	(3 0 0)	3,0	5,0
TOTAL		**28**	**23,5**	**30**

2nd Period

Code	Course	Duration	Credits	ECTS
İNG 202	English -IV	(1 2 1)	2,5	2,5
MAT 202	Differential Equations	(4 0 0)	4,0	4,0
LİD 402	Leadership	(2 0 0)	2,0	1,0
EKO 202	Economy -II	(2 1 0)	2,5	2,5
HVC 285	Computer Supported Technical Picture	(2 1 0)	2,5	4,0
ISL 216	Finance and Cost Accounting	(2 1 0)	2,5	3,5
END 252	Statistics	(3 1 0)	3,5	5,0
HVC 287	Engineering Mechanics	(1 1 0)	1,5	2,5
END 203	Operational Research-I	(3 0 0)	3,0	5,0
TOTAL		**28**	**24**	**30**

Industrial Engineering

Junior Period

1st Period

Code	Course	Duration	Credits	AKTS
İNG 301	English-V	(1 1 1)	2,0	2,0
HRK 401	Operation-I	(2 0 0)	2,0	1,0
TRK 100	Turkish	(2 0 0)	2,0	2,0
İTA 301	Revolution History of Turkish Republic and Kemalism-I	(2 0 0)	2,0	1,5
HSA 300	Air War Weapons	(2 0 0)	2,0	1,0
END 342	Planing Four Engineers	(3 0 0)	3,0	3,0
END 303	Operational Research-II	(3 0 0)	3,0	6,0
END 341	Engineering Economics	(3 0 0)	3,0	4,5
END 361	System Simulation	(3 0 1)	3,5	4,5
HVC 282	Material Sciences	(2 0 1)	2,5	3,5
TOTAL		**28**	**26**	**30**

2nd Period

Code	Course	Duration	Credits	AKTS
İNG 302	English -VI	(1 1 1)	2,0	3,0
THU 301	Fundamentals of Aeronautics & Flight I	(1 0 0)	1,0	1,0
HRK 402	Operation-II	(2 0 0)	2,0	1,0
HRT 400	War History	(2 0 0)	2,0	2,0
İTA 302	Revolution History of Turkish Republic and Kemalism-II	(2 0 0)	2,0	1,5
DVB 300	Behavioral Sciences	(2 0 0)	2,0	2,0
END 304	Operations Research-II	(3 0 0)	3,0	5,0
END 361	System Simulation	(3 0 1)	3,5	4,5
HVC 391	Manufacturing Processes	(2 0 1)	2,5	4,5
BLG 206	Visual Programming	(3 0 0)	3,0	3,0
TOTAL		**28**	**26**	**30**

Industrial Engineering									
Senior Period									
1st Period					2nd Period				
Code	**Course**	**Duration**	**Credits**	**ECTS**	**Code**	**Course**	**Duration**	**Credits**	**ECTS**
İNG 401	English-VII	(1 1 1)	2,0	2,5	İNG 402	English -VIII	(1 1 1)	2,0	2,5
HUK 400	Law	(2 0 0)	2,0	1,5	STR 402	Strategy and Security-II	(2 0 0)	2,0	1,5
STR 401	Strategy and Security-I	(2 0 0)	2,0	1,5	THU 302	Fundamental Air and Flight Information-II	(1 0 0)	1,0	1,0
AYZ 400	Military Correspondence	(2 0 0)	2,0	1,0	İŞL 402	International Relationships	(2 0 0)	2,0	1,0
END 495	Management of Logistics	(3 0 0)	3,0	4,0	END 402	Decision Theory	(2 0 0)	2,0	3,0
BGL 300	Individual Development -III	(1 0 0)	1,0	1,0	END 494	Graduation Project	(2 1 0)	2,5	5,0
BGL 495	Management Information Systems	(2 0 0)	2,0	2,5	HVC 382	Introduction to Aeronautics Sciences-II	(3 0 0)	3,0	4,0
END 423	Production Planing and Control	(3 0 0)	3,0	5,0		Complementary Course	(2 1 0)	2,5	3,0
HVC 381	Introduction to Aviation	(3 0 0)	3,0	4,0		Complementary Course	(2 1 0)	2,5	3,0
END 493	Research Process and Techniques	(1 0 0)	1,0	1,0	END 484	Quality Management and Control	(3 1 0)	3,5	4,0
	Complementary Course	(2 1 0)	2,5	3,0	YÖN 302	Management and Organization	(2 0 0)	2,0	2,5
TOTAL		**28**	**26**	**30**	**TOTAL**		**27**	**24,5**	**30**

COMPLEMENTARY COURSES

No	Code	Course	Duration
1	END 312	TECHNOLOGY MANAGEMENT	(2 0 1)
2	END 404	MATHEMATICAL PROGRAMMING	(2 0 0)
3	END 462	SYSTEM DYNAMICS	(2 1 0)
4	END 414	SUPPLY CHAIN MANAGEMENT	(1 0 2)
5	END 422	SCHEDULING	(1 0 2)
6	END 424	GROUP TECHNOLOGY AND FLEXIBLE MANUFACTURING SYSTEMS	(2 1 0)
7	END 425	COMPUTER INTEGRATED MANUFACTURING SYSTEMS-I (CIM-I)	(2 1 0)
8	END 426	COMPUTER INTEGRATED MANUFACTURING SYSTEMS-II (CIM-II)	(2 1 0)
9	END 427	INVENTORY CONTROL	(2 1 0)
10	END 438	MAINTENANCE PLANNING	(2 1 0)
11	END 451	EXPERIMENTAL DESIGN	(2 1 0)
12	END 453	RISK ANALYSIS AND RISK MANAGEMENT	(2 1 0)
13	END 414	SUPPLY CHAIN MANAGEMENT	(2 1 0)
14	END 454	QUEUEİNG THEORY	(2 1 0)
15	END 452	STATISTICAL DECISION MAKING	(2 1 0)
16	END 456	STOCHASTIC PROCESSES	(2 1 0)
17	EKO 462	SYSTEM DYNAMICS	(2 0 0)
18	EKO 411	TURKEY'S ECONOMY	(2 0 0)
19	ISL 410	SYSTEM ANALYSIS	(2 0 0)
20	ISL 412	HUMAN RESOURCES MANAGEMENT	(2 0 0)
21	ISL 415	INTERNATIONAL INTEGRATION	(2 0 0)

Course Descriptions

Compulsory Courses

END 211 Introduction to Industrial Engineering: To provide cadets, the importance of Industrial Engineering, the history and evolution of Industrial Engineering. Basic concepts and definitions in Industrial Engineering. Activity sets in Industrial Engineering, the sample of application in Industrial Engineering practice. Cadets know Industrial Engineering science, models and approaches in Industrial Engineering and the future of Industrial Engineering. Cadets define the Productivity Analaysis, and know the formulations for the concept.

END 250 Statistics and Probability: This course presents an introduction to the use of the data analyzing techniques in problem solving process. Statistics and Probability topics include basic concepts in probability theory, counting rules and calculation of conditional probability, random variables, discrete probability distributions, continuous probability distributions, the probability functions of discrete random variables, the probability functions of continuous random variables, moment functions, the Central Limit Theorem, the normal approximation to the Binomial and Normal distribution, point and interval estimation, estimation of the confidence interval, hypothesis test concept and calculations and formulizations about hypothesis tests. Cadets will apply the data analyzing techniques in problem solving process.

END 251 Probability Theory: This course presents an introduction to the use of the data analyzing techniques in problem solving process. Probability Theory topics include basic concepts in probability theory, counting rules and calculation of conditional probability, random variables, discrete probability distributions, continuous probability distributions, the probability functions of discrete random variables, the probability functions of continuous random variables, moment functions. Cadets will apply the data analyzing techniques in problem solving process.

END 252 Statistics: This course presents how to collect, organize, present, analyze and evaluate the data. Statistics topics include the Central Limit Theorem, the normal approximation to the Binomial and Normal distribution, interval estimation, the confidence interval, hypothesis test concept and formulizations about hypothesis tests, models for linear correlation and regression, estimation theorems, measures of central tendency and asymmetry. Cadets will collect, organize, present, analyze and evaluate the data.

END 303 Operations Research-I: Modeling concepts; linear programming; problem formulation; simplex and dual simplex methods; duality and sensitivity analysis; transportation, transshipment and assignment problems; integer programming; cutting plane algorithms and branch and bound techniques.

END 304 Operations Research-II: Nonlinear programming; optimization in one variable, convexity, unconstrained and constrained optimization in many variables, Kuhn-Tucker optimality conditions, direct search and gradient methods; dynamic programming; introduction to stochastic processes; queuing models; Markov decision processors; value iteration method; successive approximations and policy improvement algorithms.

END 305 Operations Research: Modeling concepts; linear programming; problem formulation; simplex and dual simplex methods; duality and sensitivity analysis; transportation, transshipment and assignment problems; decision theory; game theory.

END 312 Technology Management: The source of the technological development, innovative organizations, the sucess os countries and organizations, the importance of competition and the requirements of innovative organization, technological competition strategies, national and international technopark samples and entreprises in these parks.

END 322 Facilities Layout and Planning: To provide the cadets with some concepts concerning with nature and classification of production systems, product design, forecasting methods; simple linear regression, moving average and exponential smoothing methods, capacity requirements planning, design of discrete production systems: product–based layout and assembly line balancing; process-based layout and design of work stations; group technology and cell design; material handling and storage systems, facility location; discrete and continuous space location models.

END 332 Time and Work Analysis and Ergonomics: The objective of this course is to provide cadets with knowledge of time and motion analysis and industrial ergonomics. Course contents are; productivity, methods analysis, work measurement, human in ergonomics, anthropometry, energy consumption, ergonomic risks at physical work, workspace design, environmental factors at work; climate, noise and lighting, cognitive ergonomics, human-machine system and office ergonomics. The course is supplemented with Design Tools software and applied projects are carried out.

END 341 Engineering Economic Analysis: Topics include time equivalence of money, annual cost method, and present worth method, rate of return method, depreciation, benefit/cost, break-even analysis, income taxes, equipment replacement and risk.

END 342 Planning for Engineers: Purpose of this course is to teach planning techniques and application areas of these techniques. Main topics of this course is, introduction and basic concepts, Project and management concept, phases in projects, planning in project management, introduction to network analysis, network notation and transformations, shortest path algorithm, minimum spanning tree algorithm, maximum flow algorithm, classification of projects, project management methodology, costs and benefits, phases of project management, arrow diagrams, network diagramming, critical path method, activity durations, critical path, program evaluation and review technique(pert), block diagramming, resource planning and speeding up projects, time-cost trade off, project control, project closing, computer aided project management.

END 361 System Simulation: To provide the cadets with concepts concerning system simulation. System dynamics, simulation and modeling concepts, simulation softwares and programming languages, statistics and mathematical models in simulation, data collection and analysis, random numbers, random variant generation techniques, model verification and validation, queuing models, analysis of simulation model.

END 372 Management Information Systems:
MIS is a subset of overall information systems and analyses informations in the organizations, life cycle of system developments, developing structural hardwares, computer based data systems, user needs, analysing system needs and spesification, life cycle and security, improving the information systems, a leadership in an
information system, cooperative works, group decision making, management and evaluation of organization and technological dimension.

END 382 Quality Control: To provide the cadets with quality concepts and Statistical Quality Control applications in modern organizations operating both manufacturing and service sectors. At the end of this course, every cadet differentiates between variable and attribute control charts. Uses control charts in order to control process mean and variance. Knows which control charts to apply to processes including correlated quality characteristics.

END 402 Decision Theory: To provide the cadets with some concepts concerning with economics and engineering decisions; principles of decision theory; Bayesian decision models; decision trees; value of information; utility theory, use of judgmental probability, study of strategies; economics of sampling; risk sharing and decisions; implementation of decision models. Topics include modeling decisions, modeling uncertainty and preferences (risk altitudes, utility theory) with game theory. Cadets evaluate the observed action whether rational or not and know the decision making methods under different environments.

END 423 Production Planning and Control: This course presents enterprise resources planning, operating and controlling production systems, aggregate planning and inventory management, material requirements planning, production resources planning and work programming techniques. Production Planning and Control topics include production planning, aggregate planning, inventory controls, material requirements planning and job sequencing and scheduling.

END 481 Total Quality Management: This course aims at covering the fundamental issues of total quality management. Cadets know the history of change in quality concept and the TQM transformation program and implementation basics. Cadets comprehend the requirement of becoming the owner of company's core values and know the proposal system and its application principles, ISO 9000 quality standards, cost aspects, quality improvement tools, quality function deployment, business process reengineering, benchmarking are discussed. Actual case studies from industry will supplement the lectures.

Complementary Courses

END 404 Mathematical Programming: The aim of this course is to develop better skills in building and understanding mathematical modeling. Deterministic models in the areas of transportation, distribution, location, production and economic planning are analyzed.

END 406 Discrete Optimization: The linear minimal cost flow problem and its solution by the network simplex algorithm; maximal flow, shortest route and circulation problems; the integer programming problem and its solution by branch and bound and decomposition methods; LaGrangian relaxation.

END 408 Heuristic Search and Artificial Intelligence: This course introduces problem-solving techniques: state-space approach, problem-reduction approach, problem model, problem representation, exhaustive search algorithms, heuristic search algorithms, inductive inference, analogical inference, adductive inference, learning by instruction, learning from examples, conceptual clustering, explanation-based learning, connectionist learning (neural networks).

END 412 Industrial Systems Analysis and Evaluation: Course provides a perspective to students about industrial systems design, organization, methods of system analysis and application. Main topics include basic concepts in industrial systems, system analysis in industrial systems, system approach and problem solving stages, modeling of industrial systems with the help of system analysis approach, system approach tools, system approach techniques, contributions of analysis to the enterprises, evaluation of the analysis, computer aided analysis and industrial applications.

END 414 Supply Chain Management: Teaching the cadets steps of Supply Chain Management, new approaches, system approach in Logistics Management effects of globalism and electronic data interchange, purchasing at logistics management, ordering procedure, vendor selection, storing and techniques of layout. After teaching contents of this course, every cadet knows strategies of supply chain management and explains product and customer in Logistics Management, knows the solution methods which are used in vehicle routing and transportation decision., solves discrete and continue space layout problems.

END 422 Production Scheduling: Sequencing and scheduling concepts and terminology; characteristics of sequencing problems; sequencing heuristics and procedures; scheduling approaches; basic formulation; single processor, multi processor scheduling procedures and heuristics; priority rules and job shop scheduling.

END 424 Group Technology and Flexible Manufacturing Systems: Learning to plan and application of group technology and flexible manufacturing systems. Topics include production systems design, group technology and cellular production, cellular organization and team work, group technology clustering methods, parts classification and coding systems, cell layout - introduction to flexible manufacturing systems -cost analysis of the conversion to cellular/ flexible manufacturing systems from conventional manufacturing systems, group technology and fms simulation application.

END 425 Computer Integrated Manufacturing Systems-I: To provide the cadets with some concepts concerning with computer integrated manufacturing, computer aided design, computer aided manufacturing, computer aided quality control, computer aided production control, etc. Focuses on computer aided manufacturing, numerical control production systems, industrial robotics, process type manufacturing, machine vision systems, programmable logic controllers (plc), computer aided design, tools, group technology, process engineering, process planning/concurrent engineering and shop floor control and scheduling

END 426 Computer Integrated Manufacturing Systems-II: Presents a more advanced study of the computer integrated manufacturing systems. Expands the basis topics of CIM-1, and to provide the cadets with making some practice about computer integrated manufacturing, robot programming, CNC, process control, machine vision, 3d scanning-digitizing, pneumatic sensors plc, etc in computer aided manufacturing lab.

END 427 Inventory Control: To teach cadets new developments in inventory management systems and the importance of inventory management systems in organizations, supply function goals and importance for organization. To teach analytical methods in inventory planning. At the end of this course, every cadet knows the inventory concept and essentials of inventory control and classifies the inventory systems. Cadets defines the basic economic order quantity models concept and hypothesis and know the material requirement planning inputs , outputs and process and apply the analytical methods in inventory control.

END 428 Manufacturing Resources Planning: An introduction to manufacturing resources planning and to distinguish MRP II from other systems. Topics include MRP II and its structural elements, MRP II and planning, MRP II and other managerial functions, MRP II and project management and MRP II and logistics management.

END 429 Just in Time (JIT) MANUFACTURİNG: This Course is to provide the cadets with just in time production concept and applications. Topics include just in time production system ingredients, just in time production goals and advantages, just in time production system requirements, data automation in just in time production and just in time production, an application.

END 432 New Product Development: To provide the cadets with some concepts concerning new product development process. Topics include basic concept in new product development process, market analysis, MRP and product planning process, demand forecasting for new product, product-oriented QFD, product design, computer aided product development, design optimization, being developed new product is provided transition process, new product activity of modernization process, visit to enterprises.

END 434 Planning Production Systems: This course is to provide the cadets with determine and explains general structures and specifications of all planning activities. Topics include strategic planning, facility layout, material requirements planning, manufacturing resource planning, manufacturing resource planning, project planning.

END 438 Maintenance Planning: To provide the cadets with having maintenance planning general information, teaching maintenance framework and relationships with other planning activities and give examples about practices. At the end of this course, every cadet recognizes maintenance equipments and explains repair activities. Cadets carry out necessary maintenance activities for system productivity and computer aided maintenance management.

END 452 Statistical Decision Making (2+1+0): The objective of this course is to provide cadets with knowledge about statistical analysis methods used in decision making process within manufacturing and service industries. Course contents are; review of basic statistics, correlation, simple linear regression, multiple regression, independent samples and paired samples t-tests, One way and two-way analysis of variance.

END 454 Queuing Theory: To provide the cadets with concepts concerning queuing theory. Basic structure of queuing models, examples of real queuing systems, the role of exponential distribution, the birth and death process, queuing models based on the birth and death process, queuing models involving nonexponential distribution, queuing networks.

END 456 Stochastic Processes: Probability spaces and classification of stochastic processes; Markov chains with discrete and continuous parameter spaces; characterization and limiting behavior; birth and death processes and their application to queuing theory.

END 462 System Dynamics: To provide the cadets with concepts concerning system dynamics. History and place in scientific evolution of system dynamics, definition of system dynamics approach, study of methods and application areas, forming of influence and flow diagrams which are basic steps of system dynamics approach, preparation of Dynamo equations, research of the behaviors of positive and negative feedback loops, and S-curve, examination of industrial systems by system dynamics approach.

END 463 Production Systems Simulation: The objective of this course is, to teach the students how to analyze and solve complex and extensive automated production systems planning problems by using computer and simulation techniques. Main topics are, production systems, manufacturing, dynamics of production, markov chains, queuing theory, scheduling, analysis of simulation models and student projects.

END 464 Dynamics of Socio–Economic Systems: The course uses computer simulation as an experiential platform to study and analyze the dynamics of socio-economic problems. The course has two broad objectives: The first one is to learn dynamic systems approach and systems simulation as a methodology to study and understand complex, dynamic socio-economic problems. Students will learn the concepts of stocks and flows, negative and positive feedback loops, structure and causal-loop diagrams and various typical behavior patterns. The second objective of the course is to expose the students to a variety of real socio-economic case studies and demonstrate how systems approach and simulation can be used to tackle such problems. A system simulation software will be heavily utilized through the course.

END 466 Simulation Softwares: To provide the cadets with concepts concerning system simulation. System dynamics, simulation and modeling concepts, simulation softwares and programming languages, statistics and mathematical models in simulation, simulation with hand, queuing models, analysis of simulation model.

END 471 Production Knowledge Systems: To provide the cadets with concepts concerning production knowledge systems. Importance of computer in production systems, management of data base, materials requirement planning, production resources planning, project management, process analysis and applications of e-commerce.

END 482 Quality Assurance in Production: This course presents to teach students how product/service quality be attained and assured in production systems and give real life application examples. Topics include basic concepts in quality assurance process, organizational structure of production systems, quality assurance planning process in production systems, training activities in the establishment of quality assurance systems - quality assurance system establishment process in production systems, establishing quality assurance system in production systems, efficiency of quality assurance in production systems, the effects of quality assurance efforts in production systems, managerial responsibilities concerning quality assurance system performance, computer aided quality assurance system.





Laboratories

Industrial Engineering Application Laboratory

Industrial Engineering Department has an application laboratory. There are three main modules for analyzing and testing industrial applications in this laboratory. These modules are,

- Modeling and Simulation (MODSIM) Module
- Optimization Module
- Statistical Analysis and Quality Control Module

Industrial Engineering Application Laboratory is used for Operations Research I-II, System Simulation, Work Study and Ergonomics, Probability, Statistics, Introduction to Industrial Engineering, Production Planning and Control, Quality Control, Facility Layout and Planning lessons.

APPLIED SCIENCES DEPARTMENT

Objective and Duty of the Department

The objective of the Department of Applied Sciences is to make the cadets have the ability of abstract thinking, improve the problem solving capabilities and construct the knowledge of background of technical courses. Besides these, the department is responsible for planning lectures, evaluating the cadets academically and improving the relations with universities about related subjects.



Courses

No	Code	Course	Duration
1	MAT 101	Mathematıcs -I	(3 2 0)
2	FİZ 101	Physics -I	(3 1 1)
3	KİM 100*	Chemistry	(2 1 0)
4	MAT 102	Mathematics -II	(3 2 0)
5	FİZ 102	Physics -II	(3 1 1)
6	MAT 201*	Linear Algebra	(4 0 0)
7	MAT 202*	Differential Equations	(4 0 0)

* These courses are just given for one semester. Every class must take these lessons only for one semester according to their department schedule.

Course Descriptions

MAT 101 Mathematics-I: Functions, limits and continuity, derivative and differential, applications of derivatives, integral, applications of integrals, sequences and series, function series.

FIZ 101 Physics-I: Subject of physics, units and dimension analysis, vectors, balance, motion in one dimension, second law of Newton, motion in 2 dimensions, work, power and energy, impulse and momentum, rotational dynamics, harmonic motion, gravitation.

KİM 100 Chemistry: Atomic structure and properties of a substance, periodic system and chemical bond, gases, chemical reactions, energy relations in chemical reactions, liquids, solutions, electrochemistry and applications.

MAT 102 Mathematics-II: Multi variable functions, vector algebra, vectoral analysis, contour integral, multiple integrals.

FİZ 102 Physics-II: Coulomb law, electric field and potential, capacity, dielectric, current and resistance, current circuits, magnetic field, source of magnetic field, induction, inductance, alternate currents.

MAT 201 Linear Algebra: Matrix algebra, determinants, linear equation systems, vector algebra, linear transformations, eigenvalus and eigenvectors, MAT-LAB applications.

MAT 202 Differential Equations: First order differential equations, higher order differential equations, laplace transformations and applications, serial solutions of differential equations, partial differential equations.

Laboratories

Physics lessons (Physics-I and Physics-II) have two hours of laboratory applications every week in both semesters. When the department is evaluated for laboratory opportunities, in the first semester as applications of Physics-I course, ten mechanical experiments are performed. In the second semester, as applications of Physics-II lesson ten electrical and magnetism experiments are performed. In physics laboratories, there are measurements, gadgets, experiment sets and computers.



MILITARY AND SOCIAL SCIENCES DEPARTMENT

Objective and Duty of the Department

According to the general and special missions of the Air Force Academy, the department's objective is to educate cadets in the field of military and social sciences.

The department is responsible for planning all the lessons given in the department, evaluating cadets, giving support to the projects that are managed by Turkish Air Forces.



COURSES

No	Code	Course	Duration
1	HVG 100	INTRODUCTİON TO AVİATİON	(1 0 0)
2	HRT 100	MAPPİNG	(2 0 0)
3	İTA 102	REVOLUTİON HİSTORY OF TURKİSH REPUBLİC AND KEMALİSM- I	(2 0 0)
4	TRK 100	TURKISH	(2 0 0)
5	İTA 201	REVOLUTİON HİSTORY OF TURKİSH REPUBLİC AND KEMALİSM- II	(2 0 0)
6	İTA 202	REVOLUTİON HİSTORY OF TURKİSH REPUBLİC AND KEMALİSM- III	(2 0 0)
7	BGL 200	INDİVİDUAL DEVELOPMENT –I	(1 0 0)
8	İST 200	INTELLİGENCE	(1 0 0)
9	HUK 301	LAW-I	(2 0 0)
10	HUK-302	LAW-II	(2 0 0)
11	LOJ 201	LOGİSTİCS	(1 0 0)
12	HSA 300	AİR WEAPONRY AND EQUİPMENT	(2 0 0)
13	PSK 301	PSYCHOLOGY	(2 0 0)
14	BGL 300	INDİVİDUAL DEVELOPMENT –II	(1 0 0)
15	THU 301	FUNDAMENTALS OF AERONAUTİCS & FLİGHT I	(1 0 0)
16	THU 302	FUNDAMENTALS OF AERONAUTİCS & FLİGHT II	(1 0 0)
17	YÖN 302, YÖN 304	MANAGEMENT AND ORGANİZATİON	(2 1 0)
18	AYZ 400	MİLİTARY CORRESPONDENCE	(2 0 0)
19	SYT 400	POLİTİCAL HİSTORY	(2 0 0)
20	BGL 400	INDİVİDUAL DEVELOPMENT –III	(1 0 0)
21	THU 401	FUNDAMENTALS OF AERONAUTİCS & FLİGHT III	(1 0 0)
22	HRK 401	OPERATİON-I	(2 0 0)
23	HRK 402	OPERATİON-II	(2 0 0)
24	LİD 402	LEADERSHİP	(2 0 0)
25	HTR 400	WAR HİSTORY	(2 0 0)
26	EKO 200	ECONOMİCS	(2 0 0)
27	EKO 201	ECONOMİCS-I	(2 1 0)
28	EKO 202	ECONOMİCS-II	(2 1 0)
29	ISL 216	GENERAL AND COST ACCOUNTING	(2 1 0)

INDUSTRIAL ENGINEERING SOCIAL SCIENCES COMPLEMENTARY COURSES

No	Code	Course	Duration
1	ISL 402	INTERNATIOANL RELATIONS	(2 0 0)
2	ISL 410	ORGANIZATIONAL BEHAVIOR	(2 0 0)
3	ISL 404	STRATEGIC PLANING	(2 0 0)
4	ISL 414	HUMAN RESOURCES MANAGEMENT	(2 0 0)
5	ISL 413	MARKETING MANAGEMENT	(2 0 0)
6	ISL 412	LABOR LAW	(2 0 0)
7	ISL 415	INTERNATIOANL INTEGRATION	(2 0 0)
8	ISL 421	ANALYSES OF FINANCIAL TABLES	(2 0 0)
9	ISL 422	AUDITING AND CONTROL IN ENTERPRISES	(2 0 0)
10	ISL 423	INDUSTRIAL RELATIONS	(2 0 0)
11	ISL 425	CAPITAL MARKETS	(2 0 0)
12	EKO 411	TURKISH ECONOMICS	(2 0 0)
13	EKO 412	INTERNATIONAL ECONOMICS	(2 0 0)
14	EKO 413	MONETARY POLICY	(2 0 0)
15	EKO 414	INDUSTRIAL SECTOR ECONOMICS	(2 0 0)
16	EKO 415	ECONOMIC GROWTH	(2 0 0)
17	EKO 416	PUBLIC ECONOMICS	(2 0 0)

Course Descriptions

HVG 100 Introduction to Aviation: The goal of the course is to teach History of Aviation, the Turkish Air Force Academy and the Turkish Air Force Organizations, Doctrines of Turkish Air Force, Power of Air Force, atmosphere and space subjects.

HRT 100 Mapping: The goal of the course is to introduce the maps and charts to the cadets and to teach map reading, reference systems, direction finding, slope and profile, geographical reference system, georef system, grid reference system, the relations between compass heading and distance measures and aeronautical photos, Global Positioning System(GPS), Geographical Information Systems (GIS) and to give information about Military Applications Aided by Digital Maps.

İTA 102 Revolution History of Turkish Republic-I and Kemalism: The description of civilization, The ideology of first era, middle and new era, political management systems around the world, the ideology of Kemalism.

TRK 100 Turkish: The goal of the course is to teach the students communication, listening, reading, speaking and writing rules to use their mother tongue efficiently.

İTA 201 Revolution History of Turkish Republic-II and Kemalism: The govermental system and fall of Ottoman Empire, Restoration Movements in Ottoman Empire, Turkish National Liberation Struggle, Armistice Period, International politics and relationship of Turkey, The Great Attack, and ebolisment of Sultanate.

İTA 202 Revolution History of Turkish Republic-III and Kemalism: The definition and importance of Kemalism, stucrure of goverment, Repuclicanism, Populism, Secularism, Reformism, Nationalism, Statism. The basic properties of Kemalist View, Kemalism and National Education System, History, Language, and Fine Arts in Kemalism, Women Rights and Atatürk, Atatürk and Youths, Atatürk and Economy.

BGL 200 Individual Development-I: The goal of the course is to teach the students the fundamental qualities that a cadet should have. In order to achieve this objective, basic principle of impromptu/prepared speech is lectured during class. By making artificial events and case studies, students acquire the basic qualities that a leader should have.

İST 200 Intelligence: The goal of the course is to teach the cadets the intelligence and counter intelligence.

HUK 301-HUK 302 Law-I-II: The goal of the course is to teach the students fundamental principles of the constitution, civil organization of the government and basic principles dominating this organization and other fundamental concepts of law.

LOJ 201 Logistics: The goal of the course is to teach the student the system and process of logistics used in the Air Force.

HSA 300 Air Weaponry and Equipment: The goal of the course is to introduce students, aircraft weapons, tools, ammunition and to teach them their usage.

PSK 301 Psychology: The aim is to teach the students about psychological, emotional, logical human behaviors and social aspects as the basis for related upper courses.

BGL 300 Individual Development-II: The goal of the course is to teach the students the fundamental qualities that a cadet should have. In order to achieve this objective; basic principles of impromptu/prepared speech is lectured during class. By making artificial events and case studies, students are acquiring the basic qualities that a leader should have.

THU 301-THU 302 Basic Aviation and Flight Information-I-II: The goal of the course is to support the practical flight education by giving the theoretical basic information that make cadets more prepared for the flight education.

YON 302-304 Management and Organization: This course presents the management methods and management functions, organization design and management principles and methods,

the basics of the quality management. System engineering topics include classical management theories, neoclassical management theories, the theories about human being, modern management theories, planning, organizing, orientation, coordination, control, motivation and motivation theories and total quality management.

AYZ 400 Military Correspondence: The goal of the course is to teach the students the ways and rules of military correspondence. At the end of teaching period, the subjects in this scope; each student should know the writing techniques to distinguish the principles of military correspondence, perform the principles of military correspondence to know how to write a military message, know the types of briefing and know the principles of preparing a graduation thesis.

SYT 400 Political History: The goal of the course is to get the students to comprehend the formation of today's political map of the world and power by giving them the samples of artificial events and developments taking place among world nations primarily of Turkish foreign policy in modern times and also teach them to achieve the mission to preserve the Turkish Republic's unity and independence more consciously and powerfully.

BGL 400 Individual Development-III: The goal of the course is to teach the students the fundamental qualities that a cadet should have. In order to achieve this objective, basic principles of impromptu / prepared speech is lectured during class. By making artificial events and case studies, students acquire the basic qualities that a leader should have.

THU 401 Basic Aviation and Flight Information-III: The goal of the course is to support the practical flight education by giving the theoretical basic information that makes the cadets more prepared for the flight education.

HRK 401-HRK 402 Operation-I-II: The goal of the course is to teach the students related points of security, strategy, the Turkish Air Force and air operations. At the end of teaching the subjects in this scope; each student should know the international affairs and security, the strategy, operational and tactical concepts, describe the principles of battle, know the tactical air operation system and armed force operation, the command-control battle, counter air operation, the air defense operation, the offensive air operation, the air isolation operation, tactical aerial reconnaissance operation, air transportation operation.

LİD 402 Leadership: The goal of the course is to teach the students basic concepts of leadership, principles of leadership, the principles that a leader should apply and leader consultancy. At the end of teaching the subjects in this scope; each student should remember the definition and principles of leadership, understand the important points in leadership, comprehend the importance of belief, value systems and moral rules in military, the importance of personality and character in leadership, know the duties of leadership and types of leadership, comprehend the necessary skills that a leader should have and effective virtues of a leader, distinguish the application and improvisation qualities of a leader, understand the basic principles of leader consultancy.

HTR 400 War History: The goal of the course is to teach the students the causes of past wars, position of forces, their preparations, qualifications of commanders, battle and operation plans and while searching the sides of the decisions and the decision decided by opponent commanders according to different situation.

EKO 200 Economics: Introduces microeconomic concepts and analysis, supply and demand analysis, theories of the firm and of individual behavior, competition and monopoly, welfare economics. Application to problems of current economic policy. An overview of macroeconomic issues: the determination of output, employment, unemployment, interest rates, and inflation. Monetary and fiscal policies are discussed as well as international economic issues. Introduces basic models of macroeconomics and illustrates principles with the experience of Turkish and foreign economies.

EKO 201 Economics-I: To provide the cadets with some concepts concerning economics and general information about economics. Economics and the economy; tools of economic analysis; demand, supply and the market; the effect of price and income on demand and supply quantities; government in the mixed economy; developing the theory of demand: consumption; developing the theory of supply: costs and production; perfect competition and pure monopoly; market structure and imperfect competition; introduction to macroeconomics and national income; the determination of national income; aggregate demand and aggregate supply; money and modern banking; central banking and the monetary system; inflation and unemployment; open economy macroeconomics; international monetary system; international trade and commercial policy; EU; economic growth; problems of developing countries.

EKO 202 Economics-II: National income and its determination; changes in national income, elements of public finance, money and banking, international trade, macroeconomic policy, economic growth and development. Illustrations and applications from the Turkish economy.

SL 216 General and Cost Accounting: This course is for basic concepts and evaluation methods of accounting. Basis of accounting, financial reports, profit of the period, spreadsheet, profit and loss account. Cost accounting for products and services. Cost control, cost effectiveness standards, analysis, variable costing system, grouping of the firm expenses

Social Sciences Complementary Courses

ISL 402 International Relations: The basic purpose of this introductory course is to provide a general framework for the understanding of contemporary international relations (politics). The course will be organized in two parts: the first one being conceptual and the second one being historical. To this end, the discussion of international politics as a subject and activity will be our first endeavor, concentrating on the basic concepts, actors, elements and institutions. Then comes the contemporary international politics of the twentieth century under which we will be looking at the structure, major features and developments. The topic will be examined under three historical phases, namely pre WWII era, post-WWII era and post-Cold War era.

ISL 404 Organizational Behavior: This course introduces the key principles of how people behave in organizations, individual differences, attitudes, group dynamics, conflicts, authority, to take power and job satisfaction. Subject contents are like these: the foundation of organizational behaviors, individuality and individual differences, attitudes, group dynamics, morale, conflicts in organizations and conflict management, the resources of authority, the betterments of relations between ranks, job satisfaction, psychological problems and complaints and stress management.

ISL 410 Strategic Planning: Methods and techniques of strategic management, that is, formulation, implementation and evaluation of actions that enable an organization to achieve its mission and objectives; strategic choice and decision making, strategy implementation process structure and planning style, strategy review, evaluation and control.

ISL 412 Human Resources Management: This course presents people, productivity and the quality of working life; evaluation of human resources management; how personnel decisions are made; analyzing and designing jobs; determining human resources requirements. Subject contents are: Introduction to Human resources Management, history of HRM, analyzing and designing jobs, the planning of HRM, Research of HRM, selecting of HRM, education and development, evaluation of performance, career planning, cost management, evaluating jobs, job security, health of an employee, adaptation of the employees, relations between employee and employer and information system of human resources.

ISL 413 Marketing Management: This course provides how marketing concepts affect consumer, manager and organizational strategic plans. Marketing and its interfaces with other business functions as well as the environmental constraints; marketing tools and strategies, such as marketing research, sales forecasting, market targeting, services and international marketing; overview of marketing mix: product, price, distribution channels and promotion.

ISL 415 International Integration: This course presents world economy and globalization and includes globalization and localization in world economy, European Coal and Steel Community (ECSC), European Economic Community (EEC), European Atomic Energy Community (EAEC), EEC and The European Union, Maastricht Treaty and its conclusion, formation of EEC, European Monetary Union (EMU), harmonization of social and economic policy, European Union Budget and European Investment Bank, relationship between European Union and Turkey, European Customs Union (ECU), ECU affect on Turkey economy.

ISL 421 Analysis of Financial Tables: The aim of this course is to teach the definition of financial tables, types of financial tables and theory of financial tables. According to this course, cadets have to know definition, features and arrangement of basic financial tables. Cadets can arrange balance sheet and income tables to get ready for analysis.

ISL 423 Industrial Relations: To provide the cadets with having rise to industrial society, industrial relations and collective trade, employee – employer relations, and to affect automation with industrial relations. To teach cadets developing industrial relations and automation.

ISL 425 Capital Markets: To provide the cadets with having financial markets, savings - investment relations, investment enterprises, investment analysis, stock market analysis, technical analysis, and market organs. To teach cadets bond, equity and another investment assets and to apply stock market analysis.

EKO 411 Turkish Economics: To provide the cadets with having general information about industry organization and Turkish Economics properties than Turkish Republic period of time to present day. Cadets know about Turkish's economics master indicators.

EKO 412 International Economics: The purpose of the course is to provide the students with tools that help us understand how an open economy to the world trade and international capital movements work. This course is intended to cover national income accounting, trade balance, international capital movements, exchange rate dynamics and economic policy, production in an open economy, expectations, inflation and business cycles.

EKO 413 Monetary Policy: Survey of the Role of Money and Monetary Policy, the Functions and Definitions of Money, Monetary Transmission Mechanisms, Demand For and Supply of Money, Classical and Keynesian Systems, Monetarism/ Monetary Control and Monetary Policy Tools.

EKO 415 Economic Growth: The Meaning of Growth and Development. Introduction to One Sector Growth Model. Harrod - Domar Model. Properties of Neo - Classical Production Function. Solow Model: Comparative Dynamics. Golden Rule. Notion of Convergence, the Meaning and Measurement of Technical Changes. Introduction to Endogenous Growth: AK Model, Arrow Models.

EKO 416 Public Economics: To teach cadets with some concepts concerning with public economics and general information about public income and spending. At the end of this course, every cadet knows economics systems and reasons of public sector activities. Cadets know kinds of budget and economics budget process and comprehend national income issues.



Laboratories

Kemalism Classroom: Kemalism and Revolution History classroom with the capacity of 30 students contains documentary archive, Ataturk`s posters and proverbs. Revolution History of Turkish Republic lessons are instructed in this classroom.

Air Weaponary and Equipment Classroom: Air Weaponry and Equipment classroom with the capacity of 60 students contains documentary archive, air weaponry and equipment. This classroom is used for practical education of Air Weaponry and Equipment lessons.



Mapping Classroom: Mapping Classroom, with the capacity of 30 students, contains various kinds of maps. This classroom is used for practical education of mapping lessons.





DEPARTMENT OF FOREIGN LANGUAGES

Objective and Duty of the Department

The main goal of the Department of Foreign Languages is to make the officer candidate cadets learn English which is mission oriented and that covers all four skills to be able to accomplish missions/operations effectively. Foreign language is viewed as a tool which leads the way to achieve technological, educational and administrative interests on behalf of the Turkish Air Force. For this purpose, activities such as; diagnosis of the English level of the cadets, arrangement of the classes, application of the lessons, evaluation of the cadets, material development, arrangements and maintenance of the laboratories and providing supplementary course materials, native speakers and secong foreign language education in coordination with civilian institutions are being held by the Department of Foreign Languages.



Course Schedule for the Department of Foreign Languages

No	Code	Course	Duration
1	ING 101	ENGLISH-I	(1 4 3)
2	ING 102	ENGLISH-II	(1 4 2)
3	ING 201	ENGLISH-III	(2 2 2)
4	ING 202	ENGLISH-IV	(2 2 2)
5	ING 301	ENGLISH-V	(1 1 1)
6	ING 302	ENGLISH-VI	(2 1 1)
7	ING 401	ENGLISH-VII	(2 0 1)
8	ING 402	ENGLISH-VIII	(2 0 1)

Course Description

The aim of given English Lessons is to improve four skills of objective language at the same time, listenin, speaking, reading, writing. Besides standart education materials, there are some course books prepared by the department. The target of these course books are to develop four English skills of cadetsin the mean of content based education. There are four different levels according to the needs of cadets. These levels are:

English I-VIII Elementary: For the cadets, who didn't attend a preparatory class or had an education in another foreign language, with the ALCPT* score between 0-39. They are expected to have a score of 65 ALCPT and 2, 2, 2, 2 LSRW**.

English I-VIII Intermediate: For the cadets, who didn't attend a preparatory class or had an education in another foreign language, with the ALCPT score between 40-69. They are expected to have a score of 75 ALCPT and 2+, 2+, 2+, 2+ LSRW.



English I-VIII Advanced: For the cadets, who attended a preparatory class ,with the ALCPT score between 70-84. They are expected to have a score of 90 ALCPT and 4, 3+, 4, 3+ LSRW.

English I-VIII Super: For the cadets with the ALCPT score between 85 and above. These cadets follow a syllabus specially designed to enhance four skills of language and they are expected to have a score of 90 and above ALCPT and 4, 3+, 4, 3+ LSRW.

* ALCPT (American Language Course Placement Test) is a diagnostic test which tests and evaluates learner's level of English language comprehension.

** LSRW (Listening, Speaking, Reading, and Writing) is a test which intends to measure the four major skills of the language.

Laboratories

There are 4 computer assisted language laboratories with the capacity of 118 cadets and an audio laboratory with the capacity of 30 cadets in order to make use of audio-visual and interactive CD-ROMS of ALC modules effectively. Furthermore, for the purpose of enrichment of interactivity, some TOEFL, Grammar, Pronunciation, Listening and Reading development software are applied in addition to various sources available on the internet.

Learning Center, another laboratory-like class equipped with Smart-Board, DVD player, TV, and Video Player, is used mainly to improve speaking and listening skills in a friendly environment.

