TURKISH NAVAL ACADEMY
EDUCATIONAL ADMINISTRATION AND ACADEMIC PROGRAMMES

Objectives of Education and Training at the Turkish Naval Academy :

1. Who are dedicated followers of the principles of Atatürk, the founder of the modern Turkish republic, as well traditional military culture, good order and discipline,

2. Who maintain a high level of professional and physical readiness,

3 Who have satisfactorily completed the required course of study, and earned a bachelor of science degree in an engineering major,

4. Who are capable of assuming leadership position to meet the future demands of the navy,

5. Who have the due talents and knowledge in military, basic, technical and social sciences in order to keep up with the improvements in naval technology,

6. Who are expected to serve as officers of the deck (OOD),

7. Who assume division officer duties on surface ships following a brief period of on the job training related to the duties they are assigned to.

To accomplish its mission, the curriculum of the Turkish Naval Academy incorporates professional subjects into the required courses comparable to those offered at civilian universities. Therefore, the Naval Academy curriculum is designed to graduate well-rounded naval officers who are technically competent and fully capable of employing some most sophisticated military equipment and systems. At the same time, graduates are prepared to learn quickly, apply individual creativity and good judgement and make early contributions to their ships or duty stations. During four-year education and training each cadet is given fundamental academic knowledge or skills of the related field of study. These majors are industrial, mechanical, electrical-electronic (including, electronics, communication systems, control systems) and computer engineering as well as naval architecture.

Admission Procedure:

The Naval High School in Istanbul provides graduates for the Naval Academy. The curriculum of the four-year Naval High School is identical to that of a civilian high school with the exceptions of infantry drills and professional courses such as seamanship, navigation and at-sea training. The graduates of the Naval High School are directly admitted to the Academy without any examinations. However, civilian high schools may also provide nominees for the Naval Academy on condition that they get the required degree on the University Entrance Examination as well as they are the graduates of the science major. Female cadets were first admitted to the Academy in the 1992/1993 Academic Year. Admission of foreign nationals is carried out according to the consent of the Turkish General Staff and the international treaties signed with respect to the motion of the Cabinet.

Organisation:

Aiming to activate the application, co-ordination and the control factors, the organisation of the Turkish Naval Academy consists of the Chief of Staff, Commandant of Midshipmen, Academic Dean, and the Guidance and Counseling Department which are all functioning under the supervision of the Superintendent.

Education and Training Programmes:

As a result of rapidly improving technology, increasing demand for highly skilled and competent personnel who can handle the most sophisticated command and control, navigation and weapon systems, it is aimed that the graduates of the Turkish Naval Academy will be granted with two diplomas for both naval profession and an engineering major. Therefore education and training programmes include three aspects:

1. The academic programme of the Turkish Naval Academy consists of common-core and major programmes. The purpose of the common-core is to provide the cadets with not only the professional knowledge required for command at sea but also the basic and social science background necessary to follow the major area courses. As an initial step to have scientific aptitude, all first year students take common courses in basic and social sciences while improving their skills in research, problem solving and analysis-synthesis for the purpose of enabling them to arrive at sound decisions and to express their ideas with a good command of English,

2. Through professional training, cadets are equipped with knowledge and behaviour in such a way as to make them apply the tactics and techniques under combat conditions. Professional training is provided in two ways: as academic courses and on the job training. As an inseparable part of the professional development programme, cadets also undergo combat military training, on the job naval training as well as leadership training programmes,

3. At the end of the four-year education period, the graduates are granted a bachelor of science degree in an engineering major; with respect to the requirements of the Turkish Naval Command.

Foreign Language Education:

English is the main foreign language at the Turkish Naval Academy.In addition the students can take Japanese, Arable, Russian and Greek courses. Main objective in foreign language education is to enable student to speak and understand the target language as well as read, understand and write any documents related to their profession.

Laboratories:

Cadets are supposed to attend all laboratory practices, theoretical courses and on the job training. For the purpose of intensifying academic studies, there are numerous laboratories at the Academy; namely;

- Electric engines and circuit analysis
- Electronics, communications and microprocessors
- Mechanics, fluid mechanics, material science, heat and thermodynamics
- Steam engines, diesel and gas turbines
- Ship design, technical drawing
- Balance and damage control simulator
- Surface and underwater weapons
- Meteorology
- Ship handling simulator
- Seamanship
- Navigation and plotting
- Physics, mechanics, electricity/electronics,
- Chemistry
- Planetorium
- Foreign languages

Academic Majors:

The major area courses are aimed to give the fundamental academic knowledge or skills of the related field of study. These majors are:

- Industrial Engineering
- Mechanical Engineering
- Naval Architecture Engineering
- Electrical/Electronic Engineering
- Computer Engineering

Before starting their second year education, first year students are required to select one of the major courses of study considering their preferences, academic records as well as the personnel policy of the navy.

Duration of Education and Training:

Turkish Naval Academy is a four-year college providing education in 5 engineering majors to the naval officer candidates.

An academic year consists of two sessions:
- Academic Education and Training
- Summer Training (On the job naval training)

An academic year at the Academy usually commences either on the last Monday of September or on the first Monday of October. It comprises two semesters which last 15 weeks each. At the end of each semester, cadets take their final examinations during two weeks. Then, they take their leave for a fortnight. There is another two-week final examination period at the end of the second semester. Following that, a four-week period is reserved for re-sit and make up examinations. All in all, a teaching year consists of a 42- week Academic and 10- week on the job training held during the summer session.

Cadets attend 25 hours of classes a week, taken 5 hours a day during 5 days. Combat physical training is practiced four days of the week and basic military training is practiced every Wednesday after classed.

Summer Training (On The Job Naval Training):

During the four or five-week summer training period, cadets assume enlistedmen, petty officer and officer responsibilities. The aim of on the job naval training at the Turkish Naval Academy is to make the cadets practice what they have learnt during the academic year and adapt themselves to the life on board as well as developing their leadership, navigation, training and commanding skills as the naval officers of the future. More specifically, the purpose of the on the job training is to have the cadets apply the theoretical knowledge, acquired in classroom and laboratory activities, in real situations, familiarize themselves with the conditions in which they are to serve in the future under any circumstances and adapt themselves to the life at sea.

Assessment:

By creating competitive academic atmosphere, students are prompted to show maximum effectiveness in their studies. In addition, for the purpose of preventing some problems which may arise from the medium of education, “dependent evaluation system” is applied.

As far as the assessment of cadets is concerned, they are examined once within a semester and once at the end of it for each course they take. The final grades are evaluated on a quality point rating system.

Total quality points are divided by total credit hours to calculate a student's grade point average. For a cadet to pass, his or her GPA should not be less than 2.0 out of 4 and he or she should have no F's. Students that do not meet these qualifications repeat their classes. The maximum period to finish the four-year-programme is five years.

The Faculty:

The courses at the Academy are offerred in modern classrooms and laboratories by distinguished officers as well as erudite academicians from several notable universities. Courses are given by about 110 to 125 instructors, 15 to 25 % of whom are civilian professors. Of all the faculty, 15 % are professors, 5 % associate professors and 10 % assistant professors.There is one instructor for every nine cadets.

An adviser is assigned for each section among the officers who teach them. Advisers consider the requirements of cadets related to their academic studies, inform them about examination results, care for the unsuccessful ones and take the due precautions and enable those who perform superb academic performance to be rewarded.

Combat Physical Training:

Cadets are graded depending on their performance in swimming, quickness and strength exercises. For physical training, there are athletic facilities containing an olympic sized indoor swimming pool, two outdoor tracks, a synthetic surfaced indoor track, shooting ranges, two soccer fields and both indoor and outdoor fields for tennis, volleyball and basketball. There is also a marina, which is the home for sailing and crew squads of the Naval Academy. The courses are given by professionals. In sports activities, water sports are attributed greater importance. Cadets are obliged to do sports individually and as members of various teams. Besides they are encouraged to participate in several intramural and intermural activities as well as the members of the Turkish Naval Command, Turkish Naval Academy, Turkish Armed Forces, Education and Training Command teams.

Academic Departments

1. Department Of Military (professional) Sciences

Military Sciences
Naval Machinery Operation
Navigation-Shiphandling
Weapons-Tactics

2. Department Of Basic Sciences

Physics
Chemistry
Mathematics

3. Department Of Social Sciences

Social Sciences

4. Department Of Foreign Languages

- English
- Greek
- Arabic
- Russian
- Japanese

Academic Programs

5. Department Of Industrial Engineering

Industrial Engineering
Operation Research

6. Department Of Mechanical Engineering

Thermodynamics And Energy
Machinery Theory, Manufacturing and Mechanics

7. Department Of Naval Architecture

Naval Architecture
Hydromechanics

8. Department Of Computer Engineering

Hardware and Software

9. Department Of Electric/electronics Engineering

Electronics
Communication
Control Systems

SUMMARY OF COURSE DESCRIPTIONS

INDUSTRIAL ENGINEERING

EN-211 INTRODUCTION TO INDUSTRIAL ENGINEERING
An introduction to operation research and industrial engineering, system approach and modeling examples from different fields in engineering.Introduction to CAD/CAM and CIM Use of PC software; Spreadsheets, word processing and data base programs, utilizing methods from the internet.

EN-212 PROBABILITY
Basic counting rules. Probability and axioms of probability. Bayes rule and conditional probability. Discrete and continuous random variables. Expectation and variance. Jointly distributed random variables. Limit theorems.

EN-221 STATISTICAL METHODS
Descriptive Statistics: Frequencies, Mod, Median, Average, Quartiles and percentiles, Variations, Standard Deviation, Skewness and Kurtosis. Estimation and confidence intervals. Hypothesis testing. Chi-square tests. Correlation and regression. Linear regression analysis. Variance analysis.

EN-222 STOCHASTIC PROCESSES
Conditional expectation and variance. Central Limit Theorem. Chebychev Inequality. Weak and Strong Law of Large Numbers. Discrete and Continuous Time Markov chains. Poisson and Bernoulli Processes. Queuing Theory

EN-311 OPERATIONAL RESEARCH-1
Fundamentals of mathematical modeling, linear programming : various examples of problem formulation, simplex and dual simplex methods; duality and sensitivity analyses parametric programming, transportation, transshipment and assignment problems, an overview if interior point (Karmarkar) algorithm.

EN-312 ALGORITHMS FOR OPERATIONS RESEARCH
Pointer, Linked Lists, Vector, Stack and Queue data structures. Binary Trees and Binary Search. Introduction to Graph Theory. Euler and Hamiltonuous Circuits. Packing, Covering and Matching Problems. Knapsack Problem. Shortest Path and Traveling Salesman Problem. Minimum Spanning Tree and Node Coloring Algorithms.

EN-313 ENGINEERING ECONOMICS
Economic analysis of decision making in engineering. Time value of money. Basic interest formulas. Annual cash-flow analysis. Rate of return analysis. Present value analysis. Comparisons of inversion. Replacement investment analysis. Depreciation, inflation and taxes. Risk analysis in investment. Computer implementations.

EN-314 WORK STUDY AND ERGONOMICS
Ergonomics, scope and purpose, work organization, anatomy and body mechanism, anthropometric principals of work station and equipment design, physiology work load, physical environment design, protectors for personal and machine, risk assessment, human-machine interaction, importance of ergonomics on product design.

EN-315 PRINCIPLES OF ACCOUNTANCY
Accountancy concepts, basic finantial tables, structure of a balance sheet, accountacy records and recording process, balance sheet teckniques, income table, transactions in service and trade companies, closing procedures in a company, end-of-period financial tables, cache flow tables, financial rates and analysis of financial tables, planning, budgeting applications, concept of costing, cost accountancy concepts, cost distributions, costing systems.

EN-321 OPERATIONAL RESEARCH-2
Integer programming; cutting plane algorithms, branch bound technique and additive algorithm, dynamic programming modeling technique and recursive algorithm, quadratic separable programming, assembly line balancing, single machine scheduling problems.

EN-322 MATHEMATICAL MODELLING AND PROGRAMMING
Introduction to MS EXCEL and VBA environment. Blending problems. Product mix problems. Employee scheduling problem. Production planning problem. Minimum Cost Network Flow problem.Capital Budgeting problem. Queueing models. Portfolio selection problem.

EN-325 SYSTEM SIMULATION
A short review of probability statistics, random occurrence of events and modeling concepts, simulation methodology; time advance mechanism, random number and random variety generation, input and output analysis, case studies, and simple applications using up to date simulation software.

EN-326 PROJECT-1
Project-I aims to determine the basics of the project as the junior cadets select the project topic under supervision, then literature review and scheduling the calendar.

EN-411 PRODUCTION PLANNING AND CONTROL
Logistics distribution network design and supply chain. Bullwhip effect. Forecasting methods. Transportation, transshipment and assignment problem. Deterministic and stochastic inventory models. Aggregate production planning. Multi-echelon inventory models.

EN-412 STATISTIC MANAGEMENT AND ITS CONTROL METHODS
Principles of Quality Management and its histrorical progress. Classic quality control Methods, Control Diagrams, Exemplary, acceptance inspections, curved line processing characteristics, basic tendancy in Total Quality Management. Principals of Deming, Cosby and Juran. Organisation of Total Quality Management. Continous progress, Guarantee of Quality and Quality Control Circle. Standarts of ISO-9000

EN-413 NETWORK MODELS
Introduction to the network models and basic definitions. Paths, trees and cycles. Transportation and transshipment problems. Shortest path problem. Maximum flow problem. Minimum cost network flow problem. Network Simplex algorithm. Minimum Spanning tree problem. Multi commodity network flow problem.

EN-414 PROJECT-2
Includes implementation phase of the project study.

EN-415 DECISION AND GAME THEORY (ELECTIVE COURSE)
The components of decision making, decision making techniques. Decision making in certainty, uncertainity and risk environments. Decision tree structure, components and applications. Game theory. Classification of games and solution techniques. Zero-sum games. Nonzero-sum games. Utility theory.

EN-415 SUPPLY CHAIN MANAGEMENT (ELECTIVE COURSE)
Introduction to the supply chain management and basic definitions.Importance for businesses. System Desing. The creation of strategies for supply chain manegement. Inventory and order management, optimization, information management in supply chain. Information Technologies in supply chain manegement.

EN-421 PROJECT MANAGEMENT
The scope of project management. The history of project management. Project selection methods. Types of costs. Cost Forecasting Methods. Gannt Diagram. Network represantation of the projects. Activities and events. Dummy activities. Critical Path and PERT Methods. Resource balancing, project control, quality control and project risk management.

EN-422 OPERATIONAL RESEARCH-3
Military applications in OR. Naval Operation Analysis. Search and detection. Search and patrol models. Anti-submarine and anti-air warfare models. Mine warfare. Statistical analysis of gun fire. Lanchester warfare models. War games.

EN-423 SCHEDULING
Preliminaries, Single Machine Problems, Paralel Machine Problems, Flow Shps and Flexible Flow Shops, Jop Shops, Open Shops, Stochastic Models, Scheduling in Practice. Ms

EN-424 PRODUCTION PLANNING
Forecasting methods: linear regression, moving average and exponential smoothing methods. Capacity requirement planning. Aggregate production planning. Inventory systems and models. Material Requirement Planning (MRP). Operations scheduling. Just-in-Time production and lean production.

EN-426 PROJECT-3
Senior cadets are aimed to evaluate the project implementation results, representing the results in text form and finalizing the study by the presentation.

MECHANICAL ENGINEERING

MK-121 TECHNICAL DRAWING
Principles of engineering drawing, fundamentals and techniques. Lettering and dimensioning. Geometric figures. Projection methods. Sectional views. Surface forms. Representation of various elements.

MK-211 INTRODUCTION TO MECHANICAL ENGINEERING
Introductory concepts in mechanical engineering, professional and academic ethics, machine, device concepts, manufacturing techniques, machine elements, engineering design, materials, otomation,CNC,quality control.

MK-212 STATICS
Forces on a particle in a plane an in space, equilibrium of particles. equivalent of forces on rigid bodies. Free body diagrams.Equilibrium of rigid bodies. Distributed forces, centroids, frames and machines. Shear and bending moment diagrams for beams. Friction, moment of inertia of areas and masses.

MK-213 MATERIAL SCIENCE
Atomic structure and inter atomic bonding. Crystal structure defects in crystal structures. Dislocations, alloys, phase diagrams equilibrium phase diagrams. The Iron-Iron carbide (Fe-Fe3C) phase diagram. Phase transformations. Thermal processing of material. Methods for increasing strength. Mechanical properties. Corrosion, ceramics, polymers, composite materials.

MK-214 THERMODYNAMICS-1
Fundamentals of thermodynamics. Control volume, thermodynamic systems and its properties. PVT properties of pure matter. Steam tables, P-V and T-V diagrams. Work and heat interactions. First law of thermodynamics for systems second law of thermodynamics. Entropy, heat change in reversible processes, second law of thermodynamics for state change of system. Entropy change in irreversible process. Entropy change of inert gases. Isotropic and irreversible polytropic change. Open system analyses. Applications of systems, usable energy.

MK-215 COMPUTER-AIDED DRAWING
Introduction to Auto CAD drawing software. General drawing commands and analysis, library creation, arranging the drawing environment. Layers, outer references, special commands, use coordinate systems. Viewing drawings, isometric and solid modelling, 3D surfaces, parametric design.

MK-221 DYNAMICS
Rectilinear and curvilinear motion of particles Kinetics of particles. Newton's second law of motion. Principle of work and energy .Principle of impulse and momentum. Power and efficiency. Impact. Linear and angular momentum. Kinematics of rigid bodies. Energy and momentum methods for plane motion of rigid bodies. Forces and accelerations.

MK-222 THERMODYNAMICS-2
Steam cycles. Refrigeration cycles. Ideal gas cycles, gas-steam mixtures. refrigeration and air-conditioning system and methods of refrigeration and air-conditioning.

MK-311 STRENGHT OF MATERIALS
Analysis of internal forces, Stresses Axial deformation (Hooke's law) torsion and shear stress, bending moment and flexure stress, stresses in beams, Mohr circle, deflection of beams, combined stresses.

MK-312 FLUID MECHANICS
Properties of fluids. Fluid static Fluid flow concepts. Conservation equations and applications. Dimensional analysis and similitude. Flow of viscous fluids. Turbulent flows. Boundary layer theory.

MK-314 MANUFACTURING TECHNIQUES
Casting techniques. Modeling and Moulding techniques casting cleansing, plastic deformation. Rolling techniques. Extrusion Welding technology and techniques, techniques of sticking by melting special welding techniques.

MK-315 HVAC AND REFRIGERATION
Types of cooling media, refrigeration methods, mechanical refrigeration cycle, elements of refrigeration cycle. Attributes of air, psychometric diagram and definitions, sensible and latent heat, HVAC systems, elements of HVAC systems, heat pumps, chilling with adsorbsion principle.

MK-321 MACHINE ELEMENT
Critical speeds in the shafts, spur gears, helical gears, worm and bevel gears, rolling contact bearings, lubrication and journal bearings, clutches and couplings.

MK-322 HEAT TRANSFER
Fundamentals of heat transfer and applications. One dimensional steady conduction. Two dimensional steady conduction. unsteady conduction. Principles of convection. Forced convection. Natural convection. Heat exchangers, radiation, condensation and boiling.

MK-324 COMPUTER-AIDED DESIGN
Introduction to Finite Element Method (FEM), application of basic elements, two and three dimensional part design and application of FEM, improving part desing using one of the computer aided desing program, I-DEAS

MK-325 PROJECT-1
Project-I aims to determine the basics of the project as the junior cadets select the project topic under supervision, then literature review and scheduling the calendar.

MK-411 HYDRAULICS AND PNEUMATICS POWER CONTROL
Fundamentals of hydraulic systems, direction and velocity control in hydraulic cylinders, flow control, valves, pipes, hydraulic pumps, accumulators, hydraulic fluids, filters leakage, maintenance pneumatic control and systems, compressors, flow control,Hydraulic and pneumatic control systems applications.

MK-413 CONTROL AND MODELLING OF DYNAMIC SYSTEMS
Modelling of dynamic systems. Laplace transforms. Transient-response analysis. Transfer functions. Frequency response analysis Block diagrams. Feedback control. Root locus. Logarithmic plots. State-Space analysis.

MK-414 PROJECT-2
Includes implementation phase of the project study.

MK-415 THEORY OF MACHİNES
Basic definitions and consepts related to machinery and mechanisms, classification of mechanisms, crank mechanisms, kinematic analiysis of mechanisms, static and dynamic balance problems in the mechanism, energy balancing and flywheel calculations, the mass balance in the mechanism and machinery, cam mechanisms.

MK-416 THERMAL SYSTEM DESIGN
Fundamentals of machinery design, conceptual desing and innovation, determining intoductory design parameters, reviewing the fundamental information of design, design process, cost analysis, project final report preparation, Project presentation and evaluation.

MK-421 MECHATRONICS
Collective of mechanical, electrical, electronical, control systems Technology programs, computer programming, using preliminary datas from these sciences and converting via sensors and actuators

MK-422 EXPERIMENTAL METHODS IN MECHANICAL ENGINEERING
Stress strain refrigeration, flow visualization flow in pipes, hydraulic pressure distribution, etc. Data analysis. Report writing. Measurement techniques.

MK-423 MECHANICAL VIBRATIONS
Kinematics of mechanical vibrations and basis concepts. Systems with one, two and multiple degrees of freedom. Energy and Rayleigh method. Equivalent and string and mass systems Damped free vibrations. Coulomb damping and differential equation solutions, undamped free vibrations, damped, forced vibrations, resonance, damped response to periodic excitation, vibration isolation, vibration measurement equipment. Beam and shaft vibrations, noise and vibration control

MK-424 GAS TURBINES (ELECTIVE COURSE)
General overview of gas turbine cycles. Regeneration double combustion, open and closed cycles. Basic components of gas turbine.Jet motors and power source applications. Active parameters of gas turbines. Combined cycles. Operational problems, auxiliary systems. COSAG, COGAG,GODAG STIG cycles. Material problems and solution methods naval applications.

MK-424 INTERNAL COMBUSTION ENGINES (ELECTIVE COURSE)
General overview of internal combustion engines. Otto, diesel cycle and real cycles. Performance parameters of engines. Mean effective pressure and specific fuel consumption, columetric efficiency. Main structural components of engine, starting-up air Exhaust lubricating cooling speed control and power transmission systems .Thermal analysis and naval applications of thermal engines.

MK-425 PROJECT-3
Senior cadets are aimed to evaluate the project implementation results, representing the results in text form and finalizing the study by the presentation.

MK-426 MECHATRONICS
Collective of mechanical, electrical, electronical, control systems Technology programs, computer programming, using preliminary datas from these sciences and converting via sensors and actuators

MK-427 MECHANİCAL SYSTEM DESIGN
Fundamentals of machinery design, conceptual desing and innovation, determining intoductory design parameters, reviewing the fundamental information of design, design process, cost analysis, project final report preparation, Project presentation and evaluation.

NAVAL ARCHITECTURE ENGINEERING

Gİ-211 INTRODUCTION TO NAVAL ARCHITECTURE
Basic definitions and information about Naval Architects, ships, classification of ships, main performance areas in ship design, etc. This course aims to provide the Naval Architecture students with fundamental information, on which the following Naval Architecture courses are to be based.

GI-212 NAVAL ARCHITECTURE
General description of ships. Classification of ship types. Geometrical properties of ships. Hydrostatic parameters. Numerical Integration methods. Transverse and longitudinal stability of ships. Ship structures and structural elements. This course aims to provide those, who are not Naval Architecture students, with the basics of Naval Architecture.

GI-311 NAVAL GEOMETRY
Basics on the hull geometry of ships. Ship lines, body plan, sheer plan and water plane area curves. Offsets. Form factors to be considered in ship design. Applications.

GI-321 SHIP STRUCTURES AND CONSTRUCTION
The framing systems of various ship types. The function of the structural components of the ships. Classification societies and rules. Application of classification rules. Welding. Materials used in ship construction. Structure, alignment and continuity. Frames, beams and stiffeners. Bottom constructions. Shell and deck plating. LonGItudinal framing. Bulkheads, superstructures and deckhouses, foundations.Pillars, GIrders and hatch comings. Machinery casings. Stress concentrations and cuts in structures Crak arresting methods. Bow and structures. Submarine structure and construction.

GI-322 SHIP THEORY
Numerical integration methods. Ship hydrostatic curves. Transverse stability. Weight addition, removal, shifting. Heeling experiment. Longitudinal stability and trim. Free surface effect. Dynamic stability. Stability when grounded and docking. Damaged stability. Introduction to naval ship stability criteria.

GI-323 SHIP RESISTANCE
Dimensional analysis. Frictional resistance. Wave resistance. Other components of resistance. Resistance at restricted and shallow water. Relation of hull forms to resistance. Determination of ship resistance, model experiments, standard series of Experiments, statistical methods, diagrams.

GI-324 PROJECT-1
Project-I aims to determine the basics of the project as the junior cadets select the project topic under supervision, then literature review and scheduling the calendar.

Gİ-411 THE AUXILIARY MACHINERY OF THE SHIP
The capacity of the pumping systems, the loss of friction on the pumps, impression pace, absorption pace, the usage of pumps on the ship, pipe systems, valves, ventillation fans, ventillation fans of engine room, ventillation of the cargo storehouses, fuel pumps, air compressors, rudder equipments, iron laborers**.**

GI-412 SHIP STRENGTH
Response to waves. Load, shearing force, bending moments and deflection evaluation methods Stresses in inclined vessels. Effect to the load translation on the structure. Effect wave form and height to lonGItudinal strength. Experimental ship strength. Strength of ship beams. Methods used in

ship beam solutions. Transverse strength of ships. Elementary methods applied to plate strength of ships. Critical buckling loads on offshore structures. Supported longitudinal stringer and ring stiffened tubes under loads and hydrostatic pressure. Critical loads on plates supported by stringers under axial loading and hydrostatic pressure.

GI-413 NAVAL DESIGN
The definition of design, the characteristics of ship design. The objective of ship design. Ship design methodologies, approaches, ship design phases. The naval ship as a "total system". Design practices on determining main particulars, estimating machinery power, estimating weights and centers, areas and volumes, principles for developing general arrangement, preliminary stability checks, preliminary seakeeping and maneuvering checks, preliminary costing.

GI-414 COMPUTER APPLICATIONS IN NAVAL ARCHITECTURE
Introduction to a ship design software capable of carrying out basic design calculations. These calculations consist of generating a new hull form by distorting a parent hull, ship hydrostatics, initial stability, resistance and power prediction, longitudinal strength and seakeeping.

Gİ-415 NAVAL SHIPMENT
Fundamentals of ship propulsion. Different propulsion types. Geometry and hydrodynamic properties of propellers (dimensional analysis, Kt-Kq diagrams, Bp-8 design methods) Interaction between ship and propeller, propeller theories, design of propeller, cavitation, propellers with nozzles.

GI-416 PROJECT-2
Includes implementation phase of the project study.

GI-417 NAVAL ARCHITECTURE
General description of ships. Classification of ship types. Geometrical properties of ships. Hydrostatic parameters. Numerical Integration methods. Transverse and longitudinal stability of ships. Ship structures and structural elements. This course aims to provide those, who are not Naval Architecture students, with the basics of Naval Architecture.

GI-421 SHIP HYDRODYNAMICS
Wave theories. Ship motions and seakeeping. Introduction to ship maneuvering and control. Course keeping.

GI-422 SHIPYARD ORGANIZATION AND MANAGEMENT (FOR NAVAL ARCHITECTURE ENGINEERING)
The history of shipbuilding in the world and in Turkey. Considerations for selection of shipyard site. Shipyard layout planning. Workshop planning methods and organization of man power in shipyards. Production methods and stages in shipbuilding. Production flow in shipyards. Capacity planning is shipyard organization, work capacity. Personnel planning, network planning techniques. Turkish Naval Shipyard organization. Introduction to Turkish Navy Shipbuilding and Ship Repair Directive.

GI-423 NAVAL ARCHITECTURE PROJECT
This course is the application course following Gİ-413. The students (individually or preferably as a team) develop a set of top level requirements first. After finalizing these requirements set with their advisor(s), they perform design works to create a concept/preliminary design of a ship, which fulfill these requirements. The level of detail is subject to the advisors' approval.

GI-424 PROJECT-3
Senior cadets are aimed to evaluate the project implementation results, representing the results in text form and finalizing the study by the presentation.

Gİ-426 COMPUTER-AIDED DESIGN (ELECTIVE COURSE)

Introduction to Finite Element Method (FEM), application of basic elements, two and three dimensional part design and application of FEM, improving part desing using one of the computer aided desing program, I-DEAS

Gİ-426 OCCUPATIONAL HEALTH AND SAFETY (ELECTIVE COURSE)

Teaching of basic theoretical information occupational health and safety field, basic legal arrangements on OHS law in Turkey; especially duties, competencies and responsibilities of the naval architects. To inform causes and effects of occupational accidents and illnesses in the shipyard industry.

ELECTRIC/ELECTRONICS ENGINEERING

EE-211 CIRCUIT ANALYSIS-1
Electrical quantities and elements, source and signals. Characteristics of reference signals and wave forms. Kirhoff's laws and Circuit equations. Method of loop currents and node voltages. State equations and variables. Thevenin and Norton theorems. Sinusoidal steady state operation of circuits.

EE-212 DIGITAL SYSTEMS
Number systems, boolean arithmetic, karnaugh maps, design with logic gates, combinational circuits, concreate circuits registers, memory, numerical computer organization, arithmetical control unit, PLC

EE-221 ELECTRONICS-1
Energy bands in solids and semiconductors. Diode characteristics and applications. Transistor characteristics. BJT transistor amplifiers. H parameters . Field effect (JFET) transistors. JFET and MOSFET applications.

EE-222 CIRCUIT ANALYSIS-2
Steady state analysis of state equations Tree transformations. Laplace transforms. Frequency response and resonance. Two-port Representations.

EE-223 ELECTRICITY
Fundamental units and definitions DC circuits. Circuit analysis methods. Delta-star transformations. Measurement devices. Electromagnetism and magnetic. Electric fields and behavior of conductors in electric. Fields. Alternating current and voltage. RCL circuits.

EE-224 PROGRAMMİNG WİTH MATLAB
The aim of the programming with Matlab course; to learn the inbuilt functions and libraries of Matlab, understand the basic logic operators, matrix operators and loop concept, to write graphical user interface and learn the basic usage of simulink.

EE-311 ELECTRONICS-2
Frequency analysis of BJT and JFET amplifier circuits. Pulse amplifiers. Feedback and its types. Operational amplifiers. Oscillators. Power amplifiers. Power supplies.

EE-312 DIGITAL SYSTEMS
Number systems, boolean arithmetic, karnaugh maps, design with logic gates, combinational circuits, concreate circuits registers, memory, numerical computer organization, arithmetical control unit, PLC.

EE-313 SIGNALS AND SYSTEMS
Sıgnals and systems. Linear time-invariant systems. Convolution. Fourier transforms. Dicrete time fourier transforms. Modulation. Sampling. Filtering Z- Transform.

EE-315 PROGRAMMİNG WİTH MATLAB
The aim of the programming with Matlab course; to learn the inbuilt functions and libraries of Matlab, understand the basic logic operators, matrix operators and loop concept, to write graphical user interface and learn the basic usage of simulink.

EE-321 MODERN COMMUNICATION SYSTEMS
History of communication, broadcasting, Fourier integrals. AM/FM modulation. Random Signals, Effect of noise on communication channels. Phase shifting. Convolution. Modulation. Receivers. FM and properties AM receivers.

EE-322 ELECTRICAL MACHINERY
Energy types, energy conversion principles, electromechanical energy conversion. DC machines: construction, operation, equivalent circuit and control. Synchronous machines . construction, operation, equivalent circuits and control. Synchronous machines: construction, operation and control. DC motors and generators. Alternators and synchronous machines. AC motors and synchronous motors. Parallel operation of electrical machines md efficiency. Transformers. AC measurement devices. electrical systems. In ships. Maintenance of electrical machines

EE-323 CONTROL SYSTEMS
Analysis of linear control systems by differential equations and transfer function methods using Laplace transforms. Stability of closed loop control systems. Routh-Hurwitz criterion, root locus diagrams, bode and polar plots ,nichols charts.Nyguist stability criterion. Introduction to design and optimization of linear control systems, compensation techniques.

EE-324 ELECTRICAL MACHINERY
Energy types, energy conversion principles, electromechanical energy conversion. DC machines: construction, operation, equivalent circuit and control. Synchronous machines . construction, operation, equivalent circuits and control. Synchronous machines: construction, operation and control. DC motors and generators. Alternators and synchronous machines. AC motors and synchronous motors. Parallel operation of electrical machines md efficiency. Transformers. AC measurement devices. electrical systems. In ships. Maintenance of electrical machines

EE-325 ELECTROMAGNETIC ENGINEERING
Vector analysis. Static electrical fields Gauss law. Electrical potential. Poisson and Laplace equations. DC electrical currents. Static magnetic fields and Biot-Savart law. Magnetic circuits. Maxwell equations. Mono -kinematics waves. Energy carried by electromagnetic waves. Planar waves. Wave guides Antennas.

EE-326 ELECTROMAGNETIC ENGINEERING
Vector analysis. Static electrical fields Gauss law. Electrical potential. Poisson and Laplace equations. DC electrical currents. Static magnetic fields and Biot-Savart law. Magnetic circuits. Maxwell equations. Mono -kinematics waves. Energy carried by electromagnetic waves. Planar waves. Wave guides Antennas.

EE-327 PROJECT-1
Project-I aims to determine the basics of the project as the junior cadets select the project topic under supervision, then literature review and scheduling the calendar.

EE-413 MODERN CONTROL SYSTEMS
State space analysis of control systems. Model analysis. Controllability and observability of state space representations. analysis of discrete time systems using state space and Z-transform methods. Controller and observer design. Introduction to nonlinear systems theory. Lyapunov stability analysis

EE-414 ELECTRONICS
Introduction to electronics. Diodes, power supplies. BJT's and small signal amplifiers. Large signal amplifiers. Operational amplifiers. Operational amplifiers. Oscillators and multi -vibrators. Communication systems and radar.

EE-415 DIGITAL SIGNAL PROCESSING
Discrete-time signals. Discrete-time systems sampling. Correlation and convolution sum. FFT Frequency analysis of linear time invariant systems. Digital filters.

EE-416 POWER ELECTRONICS
Applications of electronics. Inverters. Three-phase circuits. Input currents and transformers. Current switching. Direct converters.

EE-418 NAVAL WARFARE SYSTEMS
Intro to communication**,** Radar frequency brands, radar systems, block diagrams. Radar range equation. Power calculations and performance criteria .CW and FM-CW radars. Pulse compression MTI systems. Tracking radars. Radar transmitters. Radar antenna and wave propagation Electronic (EW), Propagation of sound waves in water. Shell law and ray path plot. B/T analysis. Sonar equations. Noise analysis. types of transducers, arrays, signal spectrum and detection threshold. Elektrooptic systems, surface and subsurface weapons.

EE-419 PROJECT-2
Includes implementation phase of the project study.

EE-421 RADAR AND SONAR SYSTEMS
Tracking radars. Radar transmitters. Radar antenna and wave propagation Electronic (EW), Propagation of sound waves in water. Shell law and ray path plot. B/T analysis. Sonar equations. Noise analysis. types of transducers, arrays, signal spectrum and detection threshold. Elektrooptic systems, surface and subsurface weapons.

EE-422 DIGITAL CONTROL SYSTEMS
Linear discrete time systems and Z-transformation. Design of digital filters. Design of digital control systems using transformation techniques and state space methods. Sampled data systems. Controller and observer design state space methods.

EE-423 ELECTROMAGNETİC WAVE THEORY
Vector analysis, Static electrical field, Gauss law, Electric potential, Poisson and Laplace equations, fixed electric currents, Static magnetic fields and Biot-Savart law, Magnetic circuits.

EE-424 COMMUNICATION ELECTRONICS
Introduction to communication systems. RF amplifiers. Noise and distortion. Frequency selective circuits. Oscillators. Modulators and demodulators. Phase-locked loops. Frequency synthesizers.
used in these processes.

EE-425 PROJECT-3
Senior cadets are aimed to evaluate the project implementation results, representing the results in text form and finalizing the study by the presentation.

EE-426 ELECTRONIC MEASUREMENT AND INSTRUMENTATION
Measurement and error. Measurement principles. Measurement techniques. Frequency counters. Digital voltmeter. Oscilloscope. Signal generators. Time-domain measurements Frequency domain measurements. Transducers.

EE-427 ADVANCED COMMUNICATION ENGINEERING
History of communication, broadcasting, Fourier integrals. Phase shifting. Convolution. Modulation. Receivers. FM and properties AM receivers.

EE-428 CONTROL TECHNOLOGY AND DESIGN
System component's equipment, mechanical electric liquid gas and heat components. meaning components. Actuator and control.

EE-429 ELECTRICAL MACHINERY
Energy types, energy conversion principles, electromechanical energy conversion. DC machines: construction, operation, equivalent circuit and control. Synchronous machines . construction, operation, equivalent circuits and control. Synchronous machines: construction, operation and control. DC motors and generators. Alternators and synchronous machines. AC motors and synchronous motors. Parallel operation of electrical machines md efficiency. Transformers. AC measurement devices. electrical systems. In ships. Maintenance of electrical machines

EE-432 IMAGE PROCESSİNG (ELECTIVE COURSE)
Image processing is transferring the image which is coming from sensors to the computer enviroment in order to do some processes and after that sending it to the output. Fundamentals of digital image processing is image enhancement, edge detection, filtering, noise reduction, image restoration, image segmentation and MATLAB programming language wil be

EE-432 ELECTROMAGNETİC APPLİCATİON (ELECTIVE COURSE)
The aim of the electromagnetic applicaton course: To teach Maxwell equations, constitutive laws and their results, elimination of Maxwell equations, Possion equations and monocromatic waves, pointing vector and the energy carried by electromagnetic waves, Maxwell equations in the sense of distribution, planar waves and diffraction, application of vector potential, receiving and transmitting antennas, guided waves, lineer antennas and acoustic waves.

EE-432 INTRODUCTİON TO ROBOTİC SYSTEMS (ELECTIVE COURSE)
The aim of the introduction to robotic systems course; to inform students about the basic principles of robotics, dynamic and kinematic analysis and how to control the robot. The course contains to teach, introduction to robotics, classifying the robots, kinematic of the robot arms, dynamic of the robot arm, path planning, control the robot, robot sensors and robot programming.

COMPUTER ENGINEERING

BG-211 ADVANCED PROGRAMMING
This is an introductory level C++ course for students experienced in C or another programming language. It offers the depth and the rigorous treatment of theory and practice. Topics covered are the principles of procedural programming, object-based programming, object oriented programming and generic programming. In more detail, course firstly covers C procedural programming principles and then C++ enhancements to C. Afterwards, object-based programming key topics such as abstract data types, classes, objects, encapsulation, information hiding, member access control, constructors, destructors, software reusability, constant objects and member functions, composition, friendship, dynamic memory allocation, static members, and this pointer are covered. Course also covers C++ material related to object oriented programming including inheritance, virtual functions, dynamic binding, polymorphism, abstract-concrete classes, stream I/O, templates and exception handling.

BG-212 DISCRETE MATHEMATICS
Logic, Sets, and Functions, Propositional Equivalences, Predicates and Quantifiers, Sets, Functions, Sequences and Summations, Algorithms, the Integers, and Matrices, Complexity of Algorithms, Mathematical Reasoning, Methods of Proof, Counting, The Pigeonhole Principle, Permutations and Combinations, Discrete Probability, Advanced Counting Techniques, Recurrence Relations, Relations and Their Properties, Graphs, Euler and Hamilton Paths, Shortest Path Problems, Planar Graphs, Graph Coloring, Trees, Tree Traversal, Spanning Trees, Boolean Algebra, Languages and Grammars, Finite-State Machines, Turing Machines.

BG-213 PROGRAMMING
Basic programming course aims students to learn problem solving and structured programming techniques using C, high level programming language. Students learn the basic concepts of programming, function definitions, file operations, arrays, and searching/sorting algorithms. Students also learn the basics of computer and computer hardware, programming concepts, and problem solving techniques by using C.

BG-222 COMPUTER ARCHITECTURE
This course is about the structure, function, nature and characteristics of modern-day computer systems. Topics covered are computer evolution and performance, system buses, internal memory, external memory, I/O, operating system support, computer arithmetic, characteristics and functions of instruction sets, addressing modes and formats, CPU structure and function, reduced instruction set computers, instruction level parallelism and super scalar processors, control unit operation, micro-programmed control, parallel processing and digital logic. Pentium, Pentium II and Power PC microprocessor architectures are used as examples to the topics covered.

BG-223 OBJECT ORIENTED PROGRAMMING
Students learn to implement problem solutions using the procedural and object oriented language features of Java. Topics include; program structures and environment, arrays, exceptions, constructors and finalizers, class extension, visibility and casting, overriding and overloading, abstract classes and interfaces, files and streams, class loaders, threads and sockets. Programming projects provide students the opportunity to implement techniques covered in class

BG-311 DATA STRUCTURES AND ALGORITHMS
The abstract concepts for design, implementation and analysis of data structures are introduced. How these concepts are useful in problem solving is shown. Linear lists, stacks, queues, and tree structures are reviewed together with operations applied, using C programming language. Searching, sorting and basic graph algorithms are explained.

BG-312 OPERATING SYSTEMS
Operating-System structures, processes, threads, CPU scheduling, process synchronization, deadlocks, memory management, main memory, virtual memory, storage management, file-system interface, file-system implementation, mass-storage structure, I/O systems.

BG-313 DATABASE
Database System Concepts and Architecture, Data Modeling Using the Entity-Relationship Model, The Relational Data Model and Relational Database Constraints, Relational Algebra and Relational Calculus, Relational Database Design by ER- and EER-to-Relational Mapping, SQL99-Schema Definition, Constraints, and Queries, Functional Dependencies and Normalization for Relational Databases, Relational Database Design Algorithms and Further Dependencies.

BG-314 FORMAL LANGUAGES AND AUTOMATA
This course is an introduction on the undergraduate level to the classical and contemporary theory of computation. In the scope of course, Finite state machines, Languages and Grammers, Turing Machines are included.

BG-321 COMPUTER NETWORKS
Design issues of the communication networks are introduced. LAN topologies and architectures, MAC layer protocols and design issues, Ethernet, Token Ring, FDDI, ATM LAN, Wireless LAN systems are introduced. Communications architecture and protocols, IP, IPv6, multicasting, routing, integrated services, differentiated services, RSVP, transport layer protocols, TCP, congestion and flow control mechanisms, UDP are introduced. Network security issues are discussed.

BG-322 ALGORITHM ANALYSIS AND DESIGN
The complexity of algorithms, Lower and upper bound theory are introduced. Designs of the Divide-and-Conquer, the greedy approach, dynamic programming, backtracking, branch-and-bound algorithms are explained. NP-Complete and NP-Hard problems are reviewed.

BG-323 PROGRAMMING LANGUAGES
Language design, translation, data types, sequence control, subprogram control are taught besides language paradigms.

BG-324 PROJECT-1
Project-I aims to determine the basics of the project as the junior cadets select the project topic under supervision, then literature review and scheduling the calendar.

BG-411 SOFTWARE ENGINEERING
This is an introductory level software engineering course based on the software project development process. Topics covered are importance of software engineering methods, software project development methods such as waterfall, spiral, and incremental, project management and software metrics, estimation techniques such as COCOMO, project-planning techniques such as CPM, PERT networks, system and software requirements analysis, requirements analysis techniques, structured analysis, object-oriented analysis, alternative analysis techniques and formal methods, design and implementation of software, design fundamentals, effective modular design, cohesion, coupling, data-flow oriented design, object-oriented design, data-oriented design methods, programming languages and coding, software quality assurance techniques, software testing techniques such as white box and black box, software testing strategies, software maintenance, and software configuration management techniques. Students also learn to use modern computer aided software engineering tools and technologies such as UML.

BG-413 MİCROPROCESSORS
This is an introductory level microprocessors and microcomputers course. Topics covered are number systems and codes, digital circuits, memory devices, basic computer system structure, microcomputer structure and operation, microprocessors, microcomputer elements-architecture, read and write timing, addressing modes, address space allocation, buses, timing and control section, register section, ALU, interrupts, programming microprocessors, input-output modes, input-output interfacing.

BG-414 PROJECT-2
Includes implementation phase of the project study.

BG-415 COMPUTER GRAPHICS
This is an introductory level computer graphics course, with an emphasis on applications programming with openGL. Topics covered are graphic systems and models, applications of computer graphics, physical and synthetic images, graphics architectures, graphics programming (using openGL), two and three dimensional programming, primitives and attributes, RGB-Indexed color models, input and interaction, input devices, display lists, animation, design of interactive programs, geometric objects and transformations, scalars-points-vectors, affine transformations, translation, rotation, scaling, basics of two and three dimensional viewing, classical and computer viewing, shading, light and material, discrete techniques, texture mapping, environmental maps, bump maps, hierarchical and object-oriented modeling.

BG-416 ARTIFICIAL INTELLIGENCE (ELECTIVE COURSE)
Artificial Intelligence can be defined as the study of agents that perceive percepts from the environment and perform actions. The course first gives an overview of intelligent agents, which can decide what to do and then do it. Next the problem solving methods are introduced for deciding what to do when one needs to think ahead several steps. Knowledge and Reasoning discusses ways to represent knowledge about the world. The planning section explains how to use these reasoning methods to decide what to do, particularly by constructing plans. The reasoning and decision making is also discussed in the presence of uncertainty. Lastly learning describes methods for generating the knowledge required by decision making.

BG-416 DISTRIBUTED SYSTEMS (ELECTIVE COURSE)
Distributed System goals, hardware concepts, software concepts, communication, remote procedure call, remote object invocation, message-oriented communication, stream-oriented communication, processes, threads, code migration, software agents, naming, synchronization, logical clocks, distributed transactions, consistency and replication, fault tolerance, reliable client-server communication, distributed commit, recovery, distributed object-based systems, distributed file systems, distributed document-based systems, distributed coordination-based systems.

BG-423 INFORMATION SYSTEMS SECURITY
Information and computer network security basics, risk analysis, security policies, secure communications concepts are introduced. Digital signatures, authentication protocols, design issues and applications, certificates and Kerberos are introduced. Electronic mail, e-payment and WEB security, IPSec, viruses and intruders and protections, Firewalls and security tools are introduced.

BG-424 MİCROPROCESSORS LAB.
Laboratory exercises related to microprocessors and microcomputers topics covered in Microprocessors course. Arithmetic programs, input-output ports, memory and interrupt circuits are also covered in experiments. These experiments cover programs such as addition-subtraction-multiplication and division algorithms, memory allocation algorithms, and DMA techniques. Microprocessors kits and simulation programs are used to implement experiments.

BG-425 PROJECT-3
Senior cadets are aimed to evaluate the project implementation results, representing the results in text form and finalizing the study by the presentation.

BG-426 PROJECT DESIGN IN SOFTWARE ENGINEERING
Subjects covered in BG-411 are explained with examples from industry. Students develop a software project with its related documentation according to software engineering standards.

BG-427 INTERNET TECHNOLOGIES
Internet, The World Wide Web. Uniform Resource Locators. Multipurpose Internet Mail Extensions, the HyperText Transfer Protocol, HTML, Cascading Style Sheets, Database Access through the Web, ASP,IIS,MS Access/SQL Server, JavaScript and HTML Documents, Java Applets, XML, Perl, CGI, Servers and Servlets, PHP, Apache, MySQL, WAP, VRML, e-commerce, m-business.

BG-428 CYBER SECURITY
Importance of cyber security, cyber attacks and defense mechanisms, basic security concepts, methods for providing security for different operating systems, internet protocol stack, digital certificates for security and integrity, and approaches of the nations to cyber security are covered.

BASIC SCIENCES

FF-111 PHYSICS-1
SI system dimension and unit analysis, Vectorial calculations. One dimensional motion, Two dimensional motion. Kinds of motion in the earth. Newton's law of motion and its applications. Frictional forces. Work, Energy and power. Impulse and momentum, Collisions. Kinematics of rotational motion. Dinamics of rotational motion, Conservation of angular momentum.

FF-121 PHYSICS-2
Coulomb's law, The electric field, Electric potential, Capacitance and dielectric. Current, Resistance, and electromotive force. Direct-current circuits. Kirchoff's Law, the magnetic field and magnetic forces. Sources of magnetic field. Induced electromotive force, Inductance. Alternating currents.

FK-111 CHEMISTRY-1
Characteristics of the light and The electromagnetic spectrum, Wave Mechanics, The structure of the atom, Atomic Spectra, Quantum Levels, Electronic structure of the atom, Enthalpy of Chemical change, The properties of gages and combining the gas laws, The Kinetic-molecular Theory of gases, Real Gases, Forces between molecules, Structure of the liquids, Solid state and Metallic crystallization, The properties of the solutions, The colligative properties of solutions.

FK-121 CHEMISTRY-2
Chemical Kinetics, Meaning and Measurement of Reaction Rate, Chemical Equilibrium and Factor that cause equilibrium, Acids and Bases, Common ion effect, buffer solutions, Solubility of ionics solids, Calculations of solubility product, Radioactivity (Nuclear Chemistry), Electrochemistry, Corrosion and Control of corrosion, Chemical and physical properties of the water, To obtain freshwater from sea water, Control of the boiler and feed water, Structure of the petroleum, Usage of the petroleum products in the Navy.

FM-111 MATHEMATICS-1
Reel numbers, Intervals,finite and infinite intervals, Absolute value and related inequalities, Functions and piecewisely defined functions, Classification of functions and properties, Limits of a variable and a function, Operations on limits and computation of some special limits, Indeterminate forms, Continuity on functions, Derivative of a function, differentiation rules, Geometric interpretation of the first derivatives, Heigher order derivatives, Rolle's and mean value theorems, Implicit functions, implicit function differentation, Trigonometric functions and derivatives, Inverse trigonometric functions and derivatives, Exponentıal functions and derivatives, Logarıthmıc functions and derivatives, Hyperbolic functions and derivatives, Inverse hyperbolic functions and derivatives, Indeterminate forms, Optimization, Graphing of functions, Tangent and normal equations, Primitive funcion and properties of indefinite integrals, Basic integration formulas, İntegration by seperations of elements, Integration by change of variable, Integtations by parts, Hyperbolic functions integrals

FM-121 MATHEMATICS-2
Geometric interpretation of definite integral, Reimann sums and definite integrals, Area computation on cartesian coordinates, Area between curves, Finding volumes, Volume of solids of revolutions (Disks), Volume of solids of revolutions (shells), Lengths of plane curves, Area of surfaces of revolution, Moments and centers of mass, Polar coordinate system, Transforming relations, Symmetry on polar coordinates, Graphing of polar functions, Polar equations for line, circle and konic sections, Computation of angle between radius vector and tangent line, Area in the plane, The length of a curve, Vectors in the plane, i , j unit vectors, Parametric equations, Applications of parametric equations,

Spherical and cylindrical coordinates, Lengths of parametrized curves, Areas of parametrized curves, Vectors in space and orthogonal vectors, Position of vectors in space, The cross and dot product of

two vectors in space, Coordinate systems in space, Plane equations in space, Kinds of plane equations, Line equations in space, Kinds of Line equations in space, Angles between planes, Parallel and orthogonal lines in space, Distance between two lines in space, Sequences and convergent sequences, Indeterminate forms, Series and infinite series, Convergence tests for series of nonnegative terms, Absolute convergence, Conditionally convergence, Alternating series, Power series of functions, Taylor and Mac-Laurien series, Expand of $Sinx, Cosx, e^x$ with series, Computation of natural logarithm and Arctgx, Derivatives of power series, İntegration of power series, Trigonometric series.

FM-211 MATHEMATICS-3

Functions of several variables, Limits and continuity, Partial derivatives, Differentials, Chain rule, Directional derivatives, Tangent planes to surfaces. Extreme of two variables. Multiple integrals; Double integrals, Areas and volumes, Moments and center of mass, Triple integrals. Applications of triple integrals. Triple integrals in cylindrical and spherical coordinates, surface area. Vector fields, Line integrals, Green's theorem, Surface integrals, Divergence theorem, Stokes's theorem. Matrices and determinants, Systems of linear equations (existence and general properties of solutions), Gauss elimination, Systems of linear equations (solution by determinants, the inverse of a matrix), Eigenvalues, Eigenvectors.

FM-212 PROBABILITY AND STATISTICS (FOR ELECTRONICAL AND ELECTRICAL ENGINEERING)

Introduction to Statistics and Data Analysis, Probability, Random Variables and Probability Distributions, Mathematical Expectation, Some Discrete Probability Distributions, Some Continuous Probability Distributions, Functions of Random Variables, Fundamental Sampling Distributions and Data Descripttions, One- and Two-Sample Estimation Problems, One- and Two-Sample Tests of Hypotheses

FM-213 NUMERICAL METODS

Error Analysis, Introduction To Numerical Methods, Approximations And Round-Off Errors, Truncation Errors And The Taylor Series, Introduction To Matlab And Programming, Matlab User Interface, Programming With Matlab, Application Of Error Analysis And Machine Epsilon With Matlab, Loops And Logical Operators And Their Applications, Root Finding Methods, Bracketing Methods, Bisection Method, False-Position Method, Fixed Point Iteration, Newton-Raphson, Secant Method, Linear Equations Gauss-Jordan, LU Decomposition, Cholseky Decomposition, Gauss-Seidel, Curve Fitting, Least Squares Regression, Linear Regression, Polynomial Regression, Interpolation, Newton's Divided-Difference Interpolating Polynomials, Lagrange Interpolating Polynomials, Cubic Spline Interpolation, Numerical Integration, Newton-Cotes Integral Formulations (Trapezoidal Rule, Simpson's Rules) Romberg Integration, Gauss Quadrature, Numerical Differentiation, High Accuracy Differentiation Formulas, Richardson Extrapolation, Ordinary Differential Equations, Runge-Kutta Methods, Boundary Value And Eigenvalue Problems, Partial Differential Equations, Finite Difference, Elliptic Equations, Parabolic Equations, Applications To The Engineering Problems.

FM-221 DIFFERANTIAL EQUATIONS

Differential Equations; Introduction, Solutions of Differential equations. First order equations; separuble equations, Homogenous equations, linear equations, Exact differential equations, equations of first order and higher degree (Solvable for y', solvable for y, solvable for x and Lagrenge and Clairaut Differantial Equations) Homogenous linear equations with constant coefficients, (Distinct real roots, repeated roots and complex roots.) linear equations with constant coefficients (Variation of parameters, Undetermined coefficients) linear equations with constant coefficients (The Cauchy linear equation). Systems of simultaneous linear differential equations. The Laplace Transform; Laplace of some elementary functions. Some important properties of Laplace transforms. The inverse Laplace transform; Some important properties of inverse Laplace transforms. The convolution theorem, Partial

fractions, Heaviside's expansion formula, Applications to ordinary differential equations with constant coefficients. Fourier series; Half-range Fourier sine and cosine series. Partial differential equation and boundary-valued problems.

FM-311 COMPLEX ANALYSIS (FOR ELECTRONICAL AND ELECTRICAL ENGINEERING)
Matrices and determinants. Vector Spaces, linear mappings, eigen values and eigen vectors. Complex numbers and their properties. Functions of a complex variable, the Cauchy-Riemann equations.Complex line integrals, Cauchy-Goursat theorem.Infinite series in the complex plane, Taylor's series and Laurent's series. Cauchy integral formula. Classification of singular points. The residue theorem, Integration with residues. Evaluation of Improper real integrals, improper integrals involving trigonometric functions, definite integrals of trigonometric functions.

FM-312 NUMERICAL METODS
Error Analysis, Introduction To Numerical Methods, Approximations And Round-Off Errors, Truncation Errors And The Taylor Series, Introduction To Matlab And Programming, Matlab User Interface, Programming With Matlab, Application Of Error Analysis And Machine Epsilon With Matlab, Loops And Logical Operators And Their Applications, Root Finding Methods, Bracketing Methods, Bisection Method, False-Position Method, Fixed Point Iteration, Newton-Raphson, Secant Method, Linear Equations Gauss-Jordan, LU Decomposition, Cholseky Decomposition, Gauss-Seidel, Curve Fitting, Least Squares Regression, Linear Regression, Polynomial Regression, Interpolation, Newton's Divided-Difference Interpolating Polynomials, Lagrange Interpolating Polynomials, Cubic Spline Interpolation, Numerical Integration, Newton-Cotes Integral Formulations (Trapezoidal Rule, Simpson's Rules) Romberg Integration, Gauss Quadrature, Numerical Differentiation, High Accuracy Differentiation Formulas, Richardson Extrapolation, Ordinary Differential Equations, Runge-Kutta Methods, Boundary Value And Eigenvalue Problems, Partial Differential Equations, Finite Difference, Elliptic Equations, Parabolic Equations, Applications To The Engineering Problems.

FM-321 PROBABILITY AND STATISTICS (FOR ENGINEERS)
The main objective of this course is to provide the student the necessary probability and statistics background for further engineering courses. Probability axioms and Bayes' Rule, Random variables and probability distributions, Mathematical expectation, Some discrete (Binomial and Poisson) and continuous (Normal) probability distributions, Fundamental sampling distributions (Z, t, Chi square, F), One and two sample estimation problems, One and two sample tests of hypotheses, Some non-parametric tests of categorical data are the main topics to be covered.

FM-322 NUMERICAL METODS FOR INDUSTRIAL ENGINEERING
Introduction to programming with Matlab, Introducing program interface, Introduction to programming language and command structure, conditional commands and loops, subfunctions, sketching graps using matlab and linear equations, graphic drawings, introduction of linear equations and solutions, Introduction to numerical methods, Approximations and round-off errors, Truncation errors and the Taylor Series, Root Finding Methods, Bracketing Methods, Bisection Method, Newton-Raphson, Secant Method, Gauss-Jordan, LU Decomposition, Special Matrices and Cholseky Decomposition, Gauss-Seidel method, One dimensional unconstraint optimization, Golden division algorithm, second degree interpolation, Newton method, multi dimensional unconstraint optimization, linear methods, gradient methods, constraint optimization, linear programming, nonlinear constraint optimization, Least Squares Regression, Linear Regression, Polynomial Regression, Interpolation, Newton's Divided-Difference Interpolating Polynomials, Lagrange Interpolating Polynomials, Cubic Spline Interpolation, Numerical Integration, Newton-Cotes Integral Formulations (Trapezoidal Rule, Simpson's Rules) Romberg Integration, Gauss Quadrature, Numerical Differentiation, High Accuracy Differentiation Formulas, Richardson Extrapolation,

MILITARY (PROFESSIONAL) SCIENCES

MS-111 SEAMANSHIP
Introduction to ship handling,ship structural elements, hatches and bulls eye, anchorage rigs, accomodation ladders, fenders, ropes, mariner knots, visual and voice signals, davits and boat handling, ship's bill organisation, navigation preperation, safety at sea, docking procedures and safety precautions.

MS-121 SHIP MANEUVERING AND HANDLING
Ship's maneuvering characteristics, rudder system, tactical chracteristics of the ship, shallow water and channel effects, preperation and execution for harbouring and sailing, anchoring, mooring – tug using procedures, mediterranean mooring, effects of wind and water stream and navigation under high seas, abandoning ship, surviving precautions at sea.

MS-211 WATCHKEEPING STANDARTS
COLREG, watch at sea and standart procedures, watch organisation, responsibilities and the duties of OOW, bill organisation (man over board, lightweight transfer at sea, personnel and equipment transfer at sea, replenisment at sea, towing, helicopter landing/take off and replenishment procedures, sailing at narrow waters, sailing at low visibility, steering gear failure procedures), National and international regulations/conventions for preventing of marine pollution and education of seafearers (STCW 78/95, MARPOL73/78)

MS-311 TERRESTRIAL AND COASTAL NAVIGATION
Definitions, navigational mathematics, chart projection systems, charts , notice to mariners, position, distance, course, true and relative bearings, plotting and dead reckoning, plane sailing, traverse sailing, parallel sailing, mid latitude sailing, mercator sailing, great circle sailing

MS-411 ELECTRONIC NAVIGATION
Ploting exercises, lights, buoys, publications, tides & tidal currents, keeping a log, electronic aids to navigation, basic principles of hyperbolic navigation systems, loran, satellite navigation systems, GPS, DGPS, GLONASS, GNSS, GALILEO, radio direction finders, ECDIS, VECDIS, AIS, VDR, VTS, echo-sounders, speed logs, Radar and ARPA Radar.

MS-421 CELESTIAL NAVIGATION
Navigational Astronomy, Solar system, apparent motion, time, equation of time and time diagram, celestial sphere, celestial coordinates, horizon system of coordinates, navigational triangle, sextant and altitude corrections, amplitude, nautical almanac, latitude by meridian altitude, polar star observations, lines of position from celestial observations, side reduction, methods of side reduction, identification of celestial bodies, position fixing.

MH-312 COMMUNICATION AT SEA
Basic Definitions for GMDSS, Maritime Communication Consept, İnternational Agreements, Maritime Mobile Service, Maritime Mobile Satellite Systems, GMDSS routine communication procedures, GMDSS routine Communication Systems, Radio and İts Equipments, Types of Distress Communications, Distress Communication Procedures, SAR Operations, Maritime Safety Information and Procedures.

MH-421 MARITIME ENGLISH
General Introductory Information and Terminology, Maritime Terminology, Sides of a Ship, External Communication Phrases, (Urgency Traffic, Safety Communications, Ship Structural Items, Pilotage,

(Specials, Helicopter, Ice-Break) Parts of a Ship, Standard Communication Phrases Used in Communication with VTS, Rigging, External Communication Phrases, Standard GMDSS (Global Maritime Distress Safety Sytem) Messages, On-Board Communication Phrases (A) Standard Wheel Orders and Engine Orders, Manoeuvring Orders in case of no Pilotage, Anchoring Rigging and Cable, Anchoring and Standard Phrases used in Anchoring, On-Board Communication Phrases (B)Operative Shiphandling, Maritime Terminology, Ship Maintenance, Dyes, Scraping, Drydocking, Security On-Board (everday works, Working Security, Officer On-Duty, Navigation and Harboring Watches, Roll Call, Organization On-Board the Ship, Fire Protection and Fire Fighting, Damage Control, Grounding, Search and Rescure Operations, Ship Manoeuvring Orders, Wheel Orders, Cargo and Cargo Handling, Ship Tactics Characteristics, Propeller, Paddle Effect, Engine Orders, Ropes, Stream, Wind Directions, Shoving off, Aboarding, Connecting to the Buoy, Caring for the Passengers(Instructing and Briefing, Lifeboat Drilling, Attending to Passengers in an Emergency, Special and Emergency Roll-Call, Underway Replenishment, Navigation in Restricted Conditions, Wheel Breakdown, Tugging, Mail Bag and Transfering Underway.

MM-321 NAVAL ENGINEERING-1
Basic concepts of thermodynamics. energy, heat thermodynamic operations, thermodynamic properties of steam. Rankine cycle main steam cycle of a ship. Turbines, nozzles, propulsion turbine systems, condenser and feed systems, boilers, distilling plants, Valves and steam traps.

MM-322 MARINE ENGINE OPERATING SYSTEM-1
Otto, Diesel Sabathe and brayton cycles. Schedule of events in actual cycles, engine performance indices. Fixed and moving parts in engines. Inlet and exhaust system in engines. Starting.

MM-323 INTRODUCTION TO MARINE ENGINES (For Marine Corps Midshipments Only)
Introduction to Diesel engines, Comparison of Diesel engines with gas turbines and external combustion engines, Operation principle of Diesel engines, Clasification of Diesel engines, Fixed parts of the Diesel engines, Moving parts of the Diesel engines, Suction and exhaust systems, Fuel systems, Lubricating systems, Cooling systems, Starting systems, Speed control systems, Power transmission systems, Trouble-Maintanence Application, Trouble shooting in Diesel systems, Common troubles and indications, Engine room welding management

MM-411 NAVAL ENGINEERING-2
Otto, Diesel Sabathe and brayton cycles. Schedule of events in actual cycles, engine performance indices. Fixed and moving parts in engines. Inlet and exhaust system in engines. Starting. Fuel, firing ,lubricating ,cooling engine control and power transmission systems of internal combustion engines. Principles of gas turbines and marine applications.

MM-412 MARINE ENGINE OPERATING SYSTEM-2
Fuel, firing,lubricating ,cooling engine control and power transmission systems of internal combustion engines. Basic concepts of steam cycle. Thermodynamics. energy, heat thermodynamic operations, thermodynamic properties of steam. Steam turbines, nozzles, propulsion turbine systems.

MH-411 NAVAL WEAPONS SYSTEMS
Military explosives, warheads, fusing, guidance and control, weapon propulsion, ballistics and the fire control, launching systems, radar principles and systems, computational systems, principles of UW sound, UW detecting and tracking systems, the classification of missiles, the parts of missiles, electro optics, gunnery systems and parts.

MH-412 MANAGEMENT OF MILITARY OPERATION (MARINE)
In order to provide bridge watch officers who graduated from the Naval Academy, visible communication rules and procedures, International sign code book introduction, Tactical communication rules and procedures, ATP/MTP-1 Vol-II introduction, Usage of ATP/MTP-1 Vol-II, Orders, Screens, Position and movement, Relative movement term, Maneuver problems and propagation/sidle subjects are teached.

MA-311 METEOROLOGY
In accordance with STCW-78, understanding fundemantel meteorological conditions, using temperature, pressure and moisture measurement devices, weather forecast, fundamentals of oceanographic knowledge for introduction to Marine meteorology, Earth motions, Atmosphere, Heat, Tempreture, water vapour, meteorological devices, condensation and moisture, Visibility, Fog and clouds, Precipitation, meteors, air pressure and density, general circulation of atmosphere, global wind systems and local winds, air masses, fronts, synoptic code forms, weather maps and weather forecast, cyclone and anti-cyclone, sea surface weather observations,symbols and station models, map analysis, code process.

MP-411 THE MANAGEMENT OF MILITARY OPERATION-1 (For Marine Corps Midshipments Only)
The purpose of this course is to teach important broadcast in military and Turkish Military Forces, concepts related with war and battle, modern war concepts, organization structure of Turkish Military Forces (from squad to brigade) and terms and concepts related with organization, organizationn of the headquarters, concepts related with the weather and field, subjects about intelligence, counter intelligence, protective security in a way to provide an infrastructure to the courses of Management of Military Operation.

MP-412 MILITARY GEOGRAPHY (For Marine Corps Midshipmen Only)
General purpose of the course is to teach basic concepts and theories about Geostrategical, Geopolitical, Military Geography and National Security Policy. To examine the location of Turkey, neighboring countries to Turkey both from the sea and land, and Turkic Republics of the Middle Asia; and the state of their economical , political, social and physical conditions; and their positive and negative effects to military operations and activities in a Military Geography Research Form and to reach some results to direct Military Operations and Activities.

MP-413 ARMY WEAPONS AND DEVİCES (For Marine Corps Midshipmen Only)
Introduce army weapons and devices, specifications and principles of usage of this weapons, information about the equipment staff in army, light weapons, mortars, saggers, air defense weapons, enemy mobility interception systems, anti-personnel and anti-tank mine systems, self mobility boosting systems, armoured vehicles and tanks.

MP- 414 THE MANAGEMENT OF MILITARY OPERATION-2 (For Marine Corps Midshipmen Only)
To teach basic military signs and symbols, working styles in headquarters and the terms used, basic operation types, fire support systems, battle service support systems and the tactics of classes in army in principal and in recognition level.

MP-415 TOPOGRAPHY (For Marine Corps Midshipmen Only)

To support the Military Operation courses given in the third and fourth grades and teach how to use topographic maps, aerial photographs and photographic maps. To improve the skills to obtain the information needed by establishing relations among field, map, aerial photograph and numeric maps and to make the learners able to make decisions on time and correctly and to equip them with skills to draw tactical pictures. To teach topography by a method supported by Military Applications Backed by Numeric Maps (SAHADASU) program, to make them able to see and recognize groun patterns of various dimensions, to teach comparatively to apply them to various phases of the operation conduct and to reinforce the courses taught by practising them in the field.

SOCIAL SCIENCES

SO-111 TURKISH LANGUAGE-1
The aim of the course lectured to grab the functional and structural characteristics of Turkish language, to help them gain the proficiency of using their own languge efficiently and correcty from the aspect of language and thought and also give them the conscious of mother tongue which keeps the integrity in education.

In this context, during the education year basic core concepts within the scope of Turkish language will be introduced to midshipmen. What is language? and What is culture? will be the introductory themes of the course. Developments in Turkish languge and historical phases, phonetics, suffixes, intonation, inflectional endings, usage of adverbs and prepositions, sentence types, elements of sentences and sentence analysis will be other issues to be addressed.

SO-121 TURKISH LANGUAGE-2
The aim of the course lectured at Turkish Naval Academy is to enable the midshipmen of International Relations and Maritime Security to grab the functional and structural characteristics of Turkish language, to help them gain the proficiency of using their own languge efficiently and correcty from the aspect of language and thought and also give them the conscious of mother tongue which keeps the integrity in education.

In this context, during the education year basic core concepts within the scope of Turkish language will be introduced to midshipmen. Spelling and punctuation will form the introductory themes of the course. Spelling rules of composition, composition writing rules, incoherency, types of compositions and techniques for preparing academic papers will be the other issues to be dealt with.

SO-221 HISTORY OF TURKISH REVOLUTION-1
The aim of the course lectured at Turkish Naval Academy is to educate prospective naval officers of the future who are equipped with Atatürk's thought system, who can analyse this system and compare it with other ideologies and also reveals/exhibits its differences and superior aspects, who sense every kind of problem with the help of Atatürk's thought system, who are educated/knowledgeable, patriot and also is to graduate midshipmen as the followers of Atatürk.

In this context, during the education year basic core concepts within the scope of history of Turkish revolution will be introduced to midshipmen. The reasons of why they are reading the history of Turkish revolution and concept of revolution will be the introductory themes of the course. Preliminary reasons for Turkish revolution, Amasya, Erzurum and Sivas Congresses prior to independence war, inauguration process of Turkish parliament, battles of independence war and their results, Mudanya and Lozan cease-fire agreements will be the other issues to be addressed

SO-311 HISTORY OF TURKISH REVOLUTION-2
The aim of the course lectured at Turkish Naval Academy is to educate prospective naval officers of the future who are equipped with Atatürk's thought system, who can analyse this system and compare it with other ideologies and also reveals/exhibits its differences and superior aspects, who sense every kind of problem with the help of Atatürk's thought system, who are educated/knowledgeable, patriot and also is to graduate midshipmen as the followers of Atatürk.

In this context, during the education year basic core concepts within the scope of revolution history and Kemalizm will be introduced to midshipmen. Definition of Kemalism will form the introductory themes of the course. Factors that play a role in the formation of Kemalist Thought System, Atatürk's life and the state, the main characteristics of of the Turkish state, Atatürk's ideas, Atatürk and Economy will be the other issues to be addressed.

SO-411 HISTORY OF NAVAL WARFARE
This course is designed to provide an insight for the students on concepts and theories of National Naval Power along with the Balkan war and related subjects pertaining to Turkey's political interests in the Aegean Sea presented within the duration of history of diplomacy.

SO-421 MILITARY STRATEGY
The aim of the course lectured at Turkish Naval Academy is to equip midshipmen with the concepts of sea power and its relation with national power.

In this context, during the education year basic core concepts within the scope of military strategy. Definition of military strategy will form the introductory theme of the course. National power, military geography, national strategy, the strategic leve, strategic offence and strategic defense, maritime strategy and sea power will be the other issues to be addressed.

SO-422 LAW OF SEA
The main objective of this course is, to provide the students with the knowledge of principles, concepts and fundamentals of Maritime Law and also with the ability to assess concrete cases and samples.

SO-423 POLITICAL HISTORY
The aim of political history lectured the cultural consciousness or awareness of having different cultural medium around them so that they could question the learned ideas, grasp the concept of relativity, gain the spirit of criticism and improve the abilitiy to grab the universal,and also it is to provide the opportunity to recognize the world better and play a responsiblie role in a society with a certain of knowledge and new research methods gained through the course

In this context, during whole year, basic core concepts within the scope of political history will be introduced to midshipmen. Europe at The Early Stages of Modern Age will be the introductory themes of the course. XIX. Century Developments in The Ottomon Empire, Foundation of Italian and German Unity, The First World War, Peace Period After The War and Vital Changes and Developments in World Politics will be the other issues to be addressed.

FOREIGN LANGUAGES

YD-110 FOREIGN LANGUAGE-I
This course covers YD-111 Elementary English-I, YD-112 Advanced English –I

YD-111 ELEMENTARY ENGLISH-I
Prime Time 1 is used as the course book. Within the scope of Natural Approach application, the students are aimed to improve themselves by silent reading and individual listening activities. As the students are in their "Silent Period", less writing and speaking activities are performed. Listening activities are supported with laboratory activities of the course book. Within the framework of language levels indicated in European Language Portfolio, the aim of the course is to bring the students to A1 level.

YD-112 ADVANCED ENGLISH-I
Upstream Upper Intermediate B2+ is used as the course book. Language learning is carried out actively through a variety of interesting topics and exercises presented in themed units of the book. Within the framework of language levels indicated in European Language Portfolio and Common European Framework of Reference for Language (CEFR), the aim of the course is to bring the students to B2+ level.

YD-120 FOREIGN LANGUAGE-II
This course covers YD-121 Elementary English-II, YD-122 Advanced English -II

YD-121 ELEMENTARY ENGLISH-II
Prime Time 2 is used as the course book. Besides new vocabulary related to daily topics, the course also covers basic writing and speaking activities. Silent reading and listening studies continue as they did in the previous term. Within the framework of language levels indicated in European Language Portfolio and Common European Framework of Reference for Language (CEFR), the aim of the course is to bring the students to A2 level.

YD-122 ADVANCED ENGLISH-II
Upstream Advanced C1 is used as the course book. The course presents both new vocabulary and idioms related to the topics as business life, legal order and education, and grammar topics. Within the framework of language levels indicated in European Language Portfolio and Common European Framework of Reference for Language (CEFR), the aim of the course is to bring the students to B2 + level in writing and speaking; and C1 level in reading and listening.

YD-210 FOREIGN LANGUAGE-III
This course covers YD-211 Elementary English-III and YD-212 Advanced English –III

YD-211 ELEMENTARY ENGLISH-III

Prime Time 3 is used as the course book. The course both covers new vocabulary used in daily speech through reading texts in the book, and presents silent reading and individual listening activities. Within the framework of language levels indicated in European Language Portfolio and Common European Framework of Reference for Language (CEFR), the aim of the course is to bring the students to B1 level.

YD-212 ADVANCED ENGLISH-III
Thomson's TOEFL IBT is used as the course book. Listening, writing, reading and speaking skills of the students are improved by the analysis and application of TOEFL exam questions. Within the framework of language levels indicated in European Language Portfolio and Common European Framework of Reference for Language (CEFR), the aim of the course is to bring the students to C1 level.

YD-220 FOREIGN LANGUAGE-IV
This course covers YD-221 Elementary English-IV, YD-222 Advanced English –IV

YD-221 ELEMENTARY ENGLISH-IV
Prime Time 4 is used as the course book. The students are aimed to develop their vocabulary through the course book units, and improve themselves by reading and listening studies. Within the framework of language levels indicated in European Language Portfolio and Common European Framework of Reference for Language (CEFR), the aim of the course is to bring the students to B2 level.

YD-222 ADVANCED ENGLISH-IV
The Complete Guide to the TOEFL Test is continued to be used as the course book. Besides the course book, authentic materials such as news, magazines, articles and conversations with academicians are also presented to the students. Within the framework of language levels indicated in European Language Portfolio and Common European Framework of Reference for Language (CEFR), the aim of the course is to bring the students to C1 level.

TURKISH NAVAL ACADEMY ACADEMIC PROGRAMS (2016-2017)

INDUSTRIAL ENGINEERING

FIRST GRADE

	COURSE CODE	COURSES	CREDIT HOURS			CREDIT	ECTS
			HOURS A WEEK	THEORY+APPLICATION	TOTAL		
FIRST SEMESTER	YD-110	FOREIGN LANGUAGE-1	9	2+7	135	5,5	9
	MS-111	SEAMANSHIP	2	1+1	30	1,5	3
	FM-111	MATHEMATICS-1	5	5+0	75	5	6
	FF-111	PHYSICS-1	5	3+2	75	4	6
	SO-111	CHEMISTRY-1	2	2+0	30	2	3
	FK-111	TURKISH LANGUAGE-1	2	2+0	30	2	3
	TOTAL (6 Courses)		**25**	**-**	**375**	**20**	**30**
SECOND SEMESTER	YD-120	FOREIGN LANGUAGE-2	7	7 (2+5)	112	4,5	7
	MS-121	SHIP MANEUVERING AND HANDLING	2	2 (2+0)	32	2	2
	FM-121	MATHEMATICS-2	5	5 (5+0)	80	5	6
	FF-121	PHYSICS-2	5	5 (3+2)	80	4	6
	FK-121	CHEMISTRY-2	2	2 (1+1)	32	1,5	3
	SO-121	TURKISH LANGUAGE-2	2	2 (2+0)	32	2	3
	MK-121	TECHNICAL DRAWING	2	2 (1+1)	32	1,5	3
	TOTAL (7 Courses)		**25**	**-**	**400**	**20,5**	**30**
	TOTAL: 13 Courses		**50**	**-**	**775**	**40,5**	**60**

SECOND GRADE

	COURSE CODE	COURSES	CREDIT HOURS			CREDIT	ECTS
			HOURS A WEEK	THEORY+APPLICATION	TOTAL		
FIRST SEMESTER	YD-210	FOREIGN LANGUAGE-3	6	2+4	90	4	5
	FM-211	LINEAR ALGEBRA	3	3+0	45	3	4
	MS-211	WATCHKEEPING STANDARTS	2	1+1	30	1,5	2
	Gİ-212	NAVAL ARCHITECTURE	2	2+0	30	2	5
	EN-211	INTRODUCTION TO INDUSTRIAL ENGINEERING	3	3+0	45	3	5
	EN-212	PROBABILITY	4	4+0	60	4	6
	BG-213	PROGRAMMING	4	2+2	60	3	2
	TOTAL (7 Courses)		**24**	**-**	**360**	**20,5**	**29**
SECOND SEMESTER	YD-220	FOREIGN LANGUAGE-4	5	1+4	80	3	5
	SO-221	HISTORY OF TURKISH REVOLUTION-1	2	2+0	32	2	2
	FM-221	DIFFERENTIAL EQUATIONS	4	4+0	64	4	5
	EN-221	STATISTICAL METHODS	4	3+1	64	3,5	6
	EE-223	ELECTRICITY	2	2+0	32	2	3
	EN-222	STOCHASTIC PROCESSES	4	4+0	64	4	6
	TOTAL (6 Courses)		**21**	**-**	**336**	**18,5**	**27**
	TOTAL: 13 Courses		**45**	**-**	**696**	**39**	**56**

THIRD GRADE							
	COURSE CODE	COURSES	CREDIT HOURS			CREDIT	ECTS
			HOURS A WEEK	THEORY+APPLICATION	TOTAL		
FIRST SEMESTER	MH-312	COMMUNICATION AT SEA	2	1+1	30	1,5	2
	MA-311	METEOROLOGY	2	2+0	30	2	1
	EN-311	OPERATIONAL RESEARCH-1	4	4+0	60	4	6
	EN-312	ALGO. FOR OPERATIONAL RESEARCH	3	2+1	45	2,5	5
	EN-314	ERGONOMICS	3	3+0	45	3	4
	EN-313	ENGINEERING ECONOMICS	3	2+1	45	3	4
	EN-315	PRINCIPLES OF ACCOUNTİNG	2	2+0	30	2	4
	S0-311	HISTORY OF TURKISH REVOLUTION-2	2	2+0	30	2	2
	MS-311	TERRESTRIAL AND COASTAL NAVIGATION	4	2+2	60	3,5	6
	TOTAL (9 Courses)		**25**	**-**	**375**	**23,5**	**34**
SECOND SEMESTER	MM-321	NAVAL MACHINES-1	3	2+1	48	2,5	4
	FM-322	NUMERICAL METHODS FOR INDUSTRIAL ENGINEERING	4	4+0	64	4	6
	EN-321	OPERATION RESEARCH-2	4	4+0	64	4	6
	EN-322	MATHEMATICAL MODELLING AND PROGRAMMING	3	3+0	48	3	5
	EN-325	SYSTEM SIMULATION	4	3+1	64	3,5	5
	EN-326	PROJECT-1	2	0+2	32	1	2
	TOTAL (6 Courses)		**20**	**-**	**320**	**18**	**28**
	TOTAL: 15 COURSES		**45**	**-**	**695**	**41,5**	**62**

FOURTH GRADE							
	COURSE CODE	COURSES	CREDIT HOURS			CREDIT	ECTS
			HOURS A WEEK	THEORY+APPLICATION	TOTAL		
FIRST SEMESTER	MM-411	NAVAL MACHINES-2	3	2+1	45	2,5	3
	SO-411	HISTORY OF WARFARE	2	2+0	30	2	2
	MH-411	NAVAL WEAPONS SYSTEMS AND BALLISTICS	2	2+0	30	2	3
	MH-412	MANAGEMENT OF MILITARY OPERATON (MARINE)	4	2+2	60	3	4
	EE-414	ELECTRONICS	3	3+0	45	3	3
	EN-411	PRODUCTION PLANNING AND CONTROL	4	4+0	60	4	5
	EN-412	STATISTICAL QUALITY CONTROL	3	3+0	45	3	5
	EN-413	NETWORK MODELS	3	3+0	45	3	5
	EN-415	ELECTIVE COURSE (GAME THEORY /LOGICSTICAL CHAIN MANAGEMENT)	2	2+0	30	2	3
	MS-411	ELECTRONIC NAVIGATION	4	2+2	60	3	4
	EN-414	PROJECT-2	2	0+2	30	1	2
	TOTAL (11 Courses)		**32**	**-**	**480**	**28,5**	**39**
SECOND SEMESTER	SO-421	MILITARY STRATEGY	2	2+0	32	2	2
	SO-422	MARITIME LAW	2	2+0	32	2	3
	SO-423	POLITICAL HISTORY	2	2+0	32	2	3
	EN-421	PROJECT MANAGEMENT	3	3+0	48	3	4
	EN-422	OPERATIONAL RESEARCH-3	3	3+0	48	3	4

	EN-423	SCHEDULING	3	3+0	48	3	4
	EN-424	FACILITIES PLANNING	3	3+0	48	3	4
	EE-429	ELECTRICAL MACHINERY	2	2+0	32	2	3
	MK-426	MECHATRONIC	2	2+0	32	2	3
	MH-421	MARITIME ENGLISH	2	2+0	32	2	2
	MS-421	CELESTIAL NAVIGATION	3	2+1	48	2,5	3
	BG-428	COMPUTER SECURITY	2	1+1	32	1,5	3
	EN-426	PROJECT-3	4	0+4	64	2	4
	TOTAL (13 Courses)		**33**	**-**	**528**	**30**	**42**
	TOTAL: 24 Courses		**65**	**-**	**1008**	**58,5**	**81**
	GRADUATION(65 COURSES)		**205**	**-**	**3174**	**179,5**	**259**

MECHANICAL ENGINEERING

FIRST GRADE

	COURSE CODE	COURSES	CREDIT HOURS			CREDIT	ECTS
			HOURS A WEEK	THEORY+APPLICATION	TOTAL		
FIRST SEMESTER	YD-110	FOREIGN LANGUAGE-1	9	2+7	135	5,5	9
	MS-111	SEAMANSHIP	2	1+1	30	1,5	3
	FM-111	MATHEMATICS-1	5	5+0	75	5	6
	FF-111	PHYSICS-1	5	3+2	75	4	6
	FK-111	CHEMISTRY-1	2	2+0	30	2	3
	SO-111	TURKISH LANGUAGE-1	2	2+0	30	2	3
	TOTAL (6 Courses)		**25**	**-**	**375**	**20**	**30**
SECOND SEMESTER	YD-120	FOREIGN LANGUAGE-2	7	2+5	112	4,5	7
	MS-121	SHIP MANEUVERING AND HANDLING	2	2+0	32	2	2
	FM-121	MATHEMATICS-2	5	5+0	80	5	6
	FF-121	PHYSICS-2	5	3+2	80	4	6
	FK-121	CHEMISTRY-2	2	1+1	32	1,5	3
	SO-121	TURKISH LANGUAGE-2	2	2+0	32	2	3
	MK-121	TECHNICAL DRAWING	2	1+1	32	1,5	3
	TOTAL (7 Courses)		**25**	**-**	**400**	**20,5**	**30**
	TOTAL: 13 COURSES		**50**	**-**	**775**	**40,5**	**60**

SECOND GRADE

	COURSE CODE	COURSES	CREDIT HOURS			CREDIT	ECTS
			HOURS A WEEK	THEORY+APPLICATION	TOTAL		
FIRST SEMESTER	YD-210	FOREIGN LANGUAGE-3	6	2+4	90	4	5
	FM-211	LINEAR ALGEBRA	3	3+0	45	3	4
	MS-211	WATCHKEEPING STANDARTS	2	1+1	30	1,5	2
	MK-211	INTRODUCTİON TO MECH. ENGINEERING	1	1+0	15	1	1
	MK-212	STATICS	3	3+0	45	3	5
	MK-213	MATERIAL SCIENCE	4	3+1	60	3,5	6
	MK-214	THERMODYNAMICS-1	3	3+0	45	3	5
	MK-215	MACHINE DRAWINGS	3	1+2	45	2	4
	TOTAL (8 Courses)		**25**	-	**375**	**21**	**32**
ST ER	YD-220	FOREIGN LANGUAGE-4	5	1+4	80	3	5

	SO-221	HISTORY OF TURKISH REVOLUTION-1	2	2+0	32	2	2
	FM-221	DIFFERENTIAL EQUATIONS	4	4+0	64	4	5
	EE-223	ELECTRICITY	2	2+0	32	2	3
	MK-221	DYNAMICS	3	2+1	48	2,5	4
	MK-222	THERMODYNAMICS-2	3	3+0	48	3	4
	TOTAL (6 Courses)		**19**	-	**304**	**16,5**	**23**
	TOTAL: 14 COURSES		**44**	-	**679**	**37,5**	**55**

THIRD GRADE							
	COURSE CODE	**COURSES**	**CREDIT HOURS**			**CREDIT**	**ECTS**
			HOURS A WEEK	**THEORY+APPLICATION**	**TOTAL**		
FIRST SEMESTER	MH-312	COMMUNICATION AT SEA	2	1+1	30	1,5	2
	MA-311	METEOROLOGY	2	2+0	30	2	1
	MK-311	STRENGTH OF MATERIALS	4	4+0	60	4	6
	MK-312	FLUID MECHANICS	4	3+1	60	3,5	6
	MK-314	MANUFACTURING TECHNIQUES	3	2+1	45	2,5	6
	FM-312	NUMERICAL METHODS	2	2+0	30	2	2
	MK-315	REFRIGERATION AND AIR CONDITIONING	2	2+0	30	2	3
	SO-311	HISTORY OF TURKISH REVOLUTION-2	2	2+0	30	2	2
	MS-311	TERRESTRIAL AND COASTAL NAVIGATION	4	2+2	60	3,5	6
	EE-315	PROGRAMMING WITH MATLAB	2	2+0	30	2	2
	TOTAL (10 Courses)		**27**	-	**405**	**25**	**36**
SECOND SEMESTER	MM-322	MARINE ENGINE OPERATING SYSTEM-1	3	2+1	48	2,5	4
	MK-321	MACHINE ELEMENTS	4	4+0	64	4	5
	MK-322	HEAT TRANSFER	4	4+0	64	4	5
	MK-324	COMPUTER-AIDED DESIGN	3	1+2	48	2	4
	FM-321	PROBABILITY AND STATISTICS	2	2+0	32	2	2
	EE-322	ELECTRICAL MACHINERY	2	2+0	32	2	3
	MK-325	PROJECT-1	2	0+2	32	1	2
	TOTAL (7 Courses)		**20**	-	**320**	**17,5**	**25**
	TOTAL: 17 COURSES		**47**	-	**725**	**42,5**	**61**

FOURTH GRADE							
	COURSE CODE	**COURSES**	**CREDIT HOURS**			**CREDIT**	**ECTS**
			HOURS A WEEK	**THEORY+APPLICATION**	**TOTAL**		
FIRST SEMESTER	SO-411	HISTORY OF WARFARE	2	2+0	30	2	2
	MH-411	NAVAL WEAPONS SYSTEMS AND BALLISTICS	2	2+0	30	2	3
	EE-414	ELECTRONICS	3	3+0	45	3	3
	MM-412	MARINE ENGINE OPERATING SYSTEM-2	3	2+1	45	2,5	3
	Gİ-417	NAVAL ARCHITECTURE	3	3+0	45	3	3
	MH-412	MANAGEMENT OF MILITARY OPERATON (MARINE)	4	2+2	60	3	4
	MK-415	MACHINE THEORY	2	2+0	30	2	3
	MK-411	HYDRAULICS AND PNEUMATICS POWER CONTROL	3	3+0	45	3	5

	MK-413	CONTROL AND MODELLING OF DYNAMIC SYSTEMS	3	3+0	45	3	4
	MS-411	ELECTRONIC NAVIGATION	4	2+2	60	3	4
	MK-416	THERMAL SYSTEM DESIGN	3	1+2	45	2	3
	MK-414	PROJECT-2	2	0+2	30	1	2
	TOTAL (12 Courses)		**34**	-	**510**	**29,5**	**39**
SECOND SEMESTER	SO-421	MILITARY STRATEGY AND SECURITY	2	2+0	32	2	2
	SO-422	MARITIME LAW	2	2+0	32	2	3
	SO-423	POLITICAL HISTORY	2	2+0	32	2	3
	MK-421	MECHATRONICS	4	3+1	64	3,5	4
	MK-422	EXPERIMENTAL METHODS IN MECHANICAL ENGINEERING	2	1+1	32	1,5	2
	MK-423	MECHANICAL VIBRATIONS	3	3+0	48	3	4
	MK-424	ELECTIVE COURSE (GAS TURBINE / INTERNAL COMBUSTION ENGINES)	3	3+0	48	3	4
	MH-421	MARITIME ENGLISH	2	2+0	32	2	2
	MS-421	CELESTIAL NAVIGATION	3	2+1	48	2,5	3
	BG-428	COMPUTER SECURITY	2	1+1	32	1,5	3
	MK-427	MECHANICAL SYSTEM DESIGN	3	1+2	48	2	4
	MK-425	PROJECT-3	4	0+4	64	2	4
	TOTAL (12 Courses)		**32**	-	**512**	**27**	**38**
	TOTAL: 24 COURSES		**66**	-	**1022**	**56,5**	**77**
	GRADUATION (68 COURSES)		**207**	-	**3201**	**177**	**253**

NAVAL ARCHITECTURE ENGINEERING

FIRST GRADE

	COURSE CODE	**COURSES**	**CREDIT HOURS**			**CREDIT**	**ECTS**
			HOURS A WEEK	**THEORY+APPLICATION**	**TOTAL**		
FIRST SEMESTER	YD-110	FOREIGN LANGUAGE-1	9	2+7	135	5,5	9
	MS-111	SEAMANSHIP	2	1+1	30	1,5	3
	FM-111	MATHEMATICS-1	5	5+0	75	5	6
	FF-111	PHYSICS-1	5	3+2	75	4	6
	SO-111	CHEMISTRY-1	2	2+0	30	2	3
	FK-111	TURKISH LANGUAGE-1	2	2+0	30	2	3
	TOTAL (6 Courses)		**25**	-	**375**	**20**	**30**
SECOND SEMESTER	YD-120	FOREIGN LANGUAGE-2	7	2+5	112	4,5	7
	MS-121	SHIP MANEUVERING AND HANDLING	2	2+0	32	2	2
	FM-121	MATHEMATICS-2	5	5+0	80	5	6
	FF-121	PHYSICS-2	5	3+2	80	4	6
	FK-121	CHEMISTRY-2	2	1+1	32	1,5	3
	SO-121	TURKISH LANGUAGE-2	2	2+0	32	2	3
	MK-121	TECHNICAL DRAWING	2	1+1	32	1,5	3
	TOTAL (7 Courses)		**25**	-	**400**	**20,5**	**30**
	TOTAL (13 Courses)		**50**	-	**775**	**40,5**	**60**

SECOND GRADE							
	COURSE CODE	COURSES	CREDIT HOURS			CREDIT	ECTS
			HOURS A WEEK	THEORY+APPLICATION	TOTAL		
FIRST SEMESTER	YD-210	FOREIGN LANGUAGE-3	6	2+4	90	4	5
	FM-211	LINEAR ALGEBRA	3	3+0	45	3	4
	MS-211	WATCHKEEPING STANDARTS	2	1+1	30	1,5	2
	Gİ-211	INTRODUCTION TO NAVAL ARCHITECTURE	2	2+0	30	2	2
	FM-213	NUMERICAL METHODS	2	2+0	30	2	2
	MK-212	STATICS	3	3+0	45	3	5
	MK-213	MATERIAL SCIENCE	4	3+1	60	3,5	6
	MK-214	THERMODYNAMICS-1	3	3+0	45	3	5
	TOTAL (8 Courses)		**25**	-	**375**	**22**	**31**
SECOND SEMESTER	YD-220	FOREIGN LANGUAGE-4	5	1+4	80	3	5
	SO-221	HISTORY OF TURKISH REVOLUTION-1	2	2+0	32	2	2
	FM-221	DIFFERENTIAL EQUATIONS	4	4+0	64	4	5
	EE-223	ELECTRICITY	2	2+0	32	2	3
	MK-221	DYNAMICS	3	2+1	48	2,5	4
	MK-222	THERMODYNAMICS-2	3	3+0	48	3	4
	TOTAL (6 Courses)		**19**	-	**304**	**16,5**	**23**
	TOTAL (14 COURSES)		**44**	-	**679**	**38,5**	**54**

THIRD GRADE							
	COURSE CODE	COURSES	CREDIT HOURS			CREDIT	ECTS
			HOURS A WEEK	THEORY+APPLICATION	TOTAL		
FIRST SEMESTER	MS-311	TERRESTRIAL AND COASTAL NAVIGATION	4	2+2	60	3,5	6
	MH-312	COMMUNICATION AT SEA	2	1+1	30	1,5	2
	Gİ-311	NAVAL GEOMETRY	3	1+2	45	2	4
	MK-311	STRENGTH OF MATERIALS	4	4+0	60	4	6
	MK-312	FLUID MECHANICS	4	3+1	60	3,5	6
	MK-314	MANUFACTURING TECHNIQUES	3	2+1	45	2,5	6
	MA-311	METEOROLOGY	2	2+0	30	2	1
	SO-311	HISTORY OF TURKISH REVOLUTION-2	2	2+0	30	2	2
	EE-315	PROGRAMMING WITH MATLAB	2	2+0	30	2	2
	TOTAL (9 Courses)		**26**	-	**390**	**23**	**35**
	Gİ-321	SHIP STRUCTURES AND CONSTRUCTION	3	3+0	48	3	3
	Gİ-322	SHIP THEORY	3	3+0	48	3	4
	Gİ-323	SHIP RESISTANCE	3	3+0	48	3	5
	MM-322	MARINE ENGINE OPERATING SYSTEM-1	3	2+1	48	2,5	4
	MK-321	MACHINE ELEMENTS	4	4+0	64	4	4
	FM-321	PROBABILITY AND STATISTICS	2	2+0	32	2	2
	Gİ-324	PROJECT-1	2	0+2	32	1	2
	TOTAL (7 Courses)		**20**	-	**320**	**18,5**	**24**
	TOTAL (16 COURSES)		**46**	-	**710**	**41,5**	**59**

FOURTH GRADE							
	COURSE CODE	COURSES	CREDIT HOURS			CREDIT	ECTS
			HOURS A WEEK	THEORY+APPLICATION	TOTAL		
FIRST SEMESTER	MM-412	MARINE ENGINE OPERATING SYSTEM-2	3	2+1	45	2,5	3
	SO-411	HISTORY OF WARFARE	2	2+0	30	2	2
	MH-411	NAVAL WEAPONS SYSTEMS AND BALLISTICS	2	2+0	30	2	3
	EE-414	ELECTRONICS	3	3+0	45	3	3
	Gİ-411	THE AUXILIARY MACHINERY OF THE SHIP	2	2+0	30	2	5
	Gİ-414	COMPUTER APPLICATIONS IN NAVAL ARCHITECTURE	3	1+2	45	2	5
	MH-412	MANAGEMENT OF MILITARY OPERATON (MARINE)	4	2+2	60	3	4
	Gİ-412	SHIP STRENGTH	3	3+0	45	3	4
	Gİ-413	NAVAL DESIGN	3	3+0	45	3	5
	Gİ-415	NAVAL SHIPMENT	3	3+0	45	3	3
	MS-411	ELECTRONIC NAVIGATION	4	2+2	60	3	4
	Gİ-416	PROJECT-2	2	0+2	30	1	2
	TOTAL (12 Courses)		**34**	-	**510**	**29,5**	**43**
SECOND SEMESTER	SO-421	MILITARY STRATEGY AND SECURITY	2	2+0	32	2	2
	SO-422	MARITIME LAW	2	2+0	32	2	3
	SO-423	POLITICAL HISTORY	2	2+0	32	2	3
	Gİ-421	SHIP HYDRODYNAMICS	3	3+0	48	3	5
	Gİ-422	SHIPYARD ORGANIZATION AND MANAGEMENT	2	2+0	32	2	5
	Gİ-423	NAVAL ARCHITECTURE PROJECT	5	2+3	80	3,5	5
	Gİ-426	ELECTIVE COURSE (COMPUTER AIDED DESIGN / OCCUPATINAL HEALTH AND SAFETY)	3	1+2	48	2	3
	MH-421	MARITIME ENGLISH	2	2+0	32	2	2
	MS-421	CELESTIAL NAVIGATION	3	2+1	48	2,5	3
	BG-428	COMPUTER SECURITY	2	1+1	32	1,5	3
	MK-426	MECHATRONIC	2	2+0	32	2	3
	EE-429	ELECTRICAL MACHINERY	2	2+0	32	2	3
	Gİ-424	PROJECT-3	4	0+4	64	2	4
	TOTAL (13 Courses)		**34**	-	**544**	**28,5**	**44**
	TOTAL: 25 COURSES		**68**	-	**1054**	**58**	**87**
	GRADUATION (68 COURSES)		**208**	-	**3218**	**178,5**	**260**

ELECTRIC AND ELECTRONIC ENGINEERING (ELECTRONIC, COMMUNICATION , CONTROL SYSTEMS OPTIONAL)							
FIRST GRADE							
	COURSE CODE	**COURSES**	**CREDIT HOURS**			**CREDIT**	**ECTS**
			HOURS A WEEK	**THEORY+APPLICATION**	**TOTAL**		
FIRST SEMESTER	YD-110	FOREIGN LANGUAGE-1	9	2+7	135	5,5	9
	MS-111	SEAMANSHIP	2	1+1	30	1,5	3
	FM-111	MATHEMATICS-1	5	5+0	75	5	6
	FF-111	PHYSICS-1	5	3+2	75	4	6
	SO-111	CHEMISTRY-1	2	2+0	30	2	3
	FK-111	TURKISH LANGUAGE-1	2	2+0	30	2	3
	TOTAL (6 Courses)		**25**	-	**375**	**20**	**30**
SECOND SEMESTER	YD-120	FOREIGN LANGUAGE-2	7	2+5	112	4,5	7
	MS-121	SHIP MANEUVERING AND HANDLING	2	2+0	32	2	2
	FM-121	MATHEMATICS-2	5	5+0	80	5	6
	FF-121	PHYSICS-2	5	3+2	80	4	6
	FK-121	CHEMISTRY-2	2	1+1	32	1,5	3
	SO-121	TURKISH LANGUAGE-2	2	2+0	32	2	3
	MK-121	TECHNICAL DRAWING	2	1+1	32	1,5	3
	TOTAL (7 Courses)		**25**	-	**400**	**20,5**	**30**
	TOTAL (13 Courses)		**50**	-	**775**	**40,5**	**60**

SECOND GRADE							
	COURSE CODE	**COURSES**	**CREDIT HOURS**			**CREDIT**	**ECTS**
			HOURS A WEEK	**THEORY+APPLICATION**	**TOTAL**		
FIRST SEMESTER	YD-210	FOREIGN LANGUAGE-3	6	2+4	90	4	5
	FM-213	LINEAR ALGEBRA	3	3+0	45	3	4
	MS-211	WATCHKEEPING STANDARTS	2	1+1	30	1,5	2
	FM-212	PROBABILITY/ STATISTICS	3	3+0	45	3	4
	Gİ-212	NAVAL ARCHITECTURE	2	2+0	30	2	5
	EE-211	CIRCUIT ANALYSIS-1	4	3+1	60	3,5	7
	BG-213	PROGRAMMING	4	2+2	60	3	2
	TOTAL (7 Courses)		**24**	-	**360**	**20**	**29**
SECOND SEMESTER	YD-220	FOREIGN LANGUAGE-4	5	1+4	80	3	5
	SO-221	HISTORY OF TURKISH REVOLUTION-1	2	2+0	32	2	2
	FM-221	DIFFERENTIAL EQUATIONS	4	4+0	64	4	5
	EE-221	ELECTRONICS-1	4	3+1	64	3,5	5
	EE-222	CIRCUIT ANALYSIS-2	3	2+1	48	2,5	4
	EE-224	PROGRAMMING WITH MATLAB	3	1+2	48	2	6
	TOTAL (6 Courses)		**21**	-	**336**	**17**	**27**
	TOTAL: 13 COURSES		**45**	-	**696**	**37**	**56**

THIRD GRADE							
	COURSE CODE	COURSES	CREDIT HOURS			CREDIT	ECTS
			HOURS A WEEK	THEORY+APPLICATION	TOTAL		
FIRST SEMESTER	SO-311	HISTORY OF TURKISH REVOLUTION-2	2	2+0	30	2	2
	MH-312	COMMUNICATION AT SEA	2	1+1	30	1,5	2
	MA-311	METEOROLOGY	2	2+0	30	2	1
	FM-311	COMPLEX ANALYSIS	2	2+0	30	2	4
	EE-311	ELECTRONICS-2	4	3+1	60	3,5	6
	EE-312	DIGITAL SYSTEMS	4	3+1	60	3,5	5
	EE-313	SIGNALS AND SYSTEMS	4	2+2	60	3	6
	MS-311	TERRESTRIAL AND COASTAL NAVIGATION	4	2+2	60	3,5	6
	TOTAL (8 Courses)		**24**	-	**360**	**21**	**32**
SECOND SEMESTER	MM-321	NAVAL MACHINES-1	3	2+1	48	2,5	4
	EE-321	MODERN COMMUNICATION SYSTEMS	4	3+1	64	3,5	5
	EE-324	ELECTRICAL MACHINERY	3	2+1	48	2,5	5
	EE-323	CONTROL SYSTEMS	4	3+1	64	3,5	6
	EE-325	ELECTROMAGNATIC ENGINEERING	4	3+1	64	3,5	3
	EE-327	PROJECT-1	2	0+2	32	1	2
	TOTAL (6 Courses)		**20**	-	**320**	**16,5**	**25**
	TOTAL: 14 COURSES		**44**	-	**680**	**37,5**	**57**

FOURTH GRADE (ELECTRONIC OPTIONAL)							
	COURSE CODE	COURSES	CREDIT HOURS			CREDIT	ECTS
			HOURS A WEEK	THEORY+APPLICATION	TOTAL		
FIRST SEMESTER	MM-411	NAVAL MACHINES-2	3	2+1	45	2,5	3
	SO-411	HISTORY OF WARFARE	2	2+0	30	2	2
	MH-412	MANAGEMENT OF MILITARY OPERATON (MARINE)	4	2+2	60	3	4
	BG-413	MICROPROCESSORS	3	3+0	45	3	5
	EE-416	POWER ELECTRONICS	5	3+2	75	4	7
	EE-418	ELECTRONICS NAVAL WARFARE SYSTEMS	4	4+0	60	4	6
	EE-432	ELECTIVE COURSE (IMAGE PROCESSING / ELECTROMAGNETIC APPLICATIONS / INTRODUCTION TO ROBOTIC SYSTEMS)	4	2+2	60	3	3
	MS-411	ELECTRONIC NAVIGATION	4	2+2	60	3	4
	EE-411	PROJECT-2	2	0+2	30	1	2
	TOTAL (9 Courses)		**31**	-	**465**	**25,5**	**36**
SECOND SEMESTER	SO-421	MILITARY STRATEGY AND SECURITY	2	2+0	32	2	2
	SO-422	MARITIME LAW	2	2+0	32	2	3
	SO-423	POLITICAL HISTORY	2	2+0	32	2	3
	EE-421	RADAR AND SONAR SYSTEMS	4	4+0	64	4	6
	BG-424	MICROPROCESSORS LAB.	2	0+2	32	1	4
	EE-424	COMMUNICATION ELECTRONICS	5	3+2	80	4	6
	EE-426	ELECTRONICAL MEASUREMENT AND MEASURING DEVICES	4	2+2	64	3	6
	MH-421	MARITIME ENGLISH	2	2+0	32	2	2

	MS-421	CELESTIAL NAVIGATION	3	2+1	48	2,5	3
	MK-426	MECHATRONIC	2	2+0	32	2	3
	BG-428	COMPUTER SECURITY	2	1+1	32	1,5	3
	EE-425	PROJECT-3	4	0+4	64	2	4
	TOTAL (12 Courses)		**34**	-	**544**	**28**	**45**
	TOTAL: 21 COURSES		**65**	-	**1009**	**53,5**	**81**
	GRADUATION (61 COURSES)		**204**	-	**3160**	**168,5**	**254**

FOURTH GRADE (COMMUNICATION OPTIONAL)

	COURSE CODE	COURSES	CREDIT HOURS			CREDIT	ECTS
			HOURS A WEEK	THEORY+APPLICATION	TOTAL		
FIRST SEMESTER	MM-411	NAVAL MACHINES-2	3	2+1	45	2,5	3
	SO-411	HISTORY OF WARFARE	2	2+0	30	2	2
	MH-412	MANAGEMENT OF MILITARY OPERATON (MARINE)	4	2+2	60	3	4
	BG-413	MICROPROCESSORS	3	3+0	45	3	5
	EE-415	DIGITAL SIGNAL PROCESSING	5	3+2	75	4	7
	EE-418	ELECTRONICS NAVAL WARFARE SYSTEMS	4	4+0	60	4	6
	MS-411	ELECTRONIC NAVIGATION	4	2+2	60	3	4
	EE-432	ELECTIVE COURSE (IMAGE PROCESSING / ELECTROMAGNETIC APPLICATIONS / INTRODUCTION TO ROBOTIC SYSTEMS)	4	2+2	60	3	3
	EE-419	PROJECT-2	2	0+2	30	1	2
	TOTAL (9 Courses)		**31**	-	**465**	**25,5**	**36**
SECOND SEMESTER	SO-421	MILITARY STRATEGY AND SECURITY	2	2+0	32	2	2
	SO-422	MARITIME LAW	2	2+0	32	2	3
	SO-423	POLITICAL HISTORY	2	2+0	32	2	3
	EE-421	RADAR AND SONAR SYSTEMS	4	4+0	64	4	6
	BG-424	MICROPROCESSORS LAB.	2	0+2	32	1	4
	EE-423	ELECTROMAGNATIC WAVE THEORY	5	3+2	80	4	7
	EE-427	ADVANCED COMMUNICATION ENGINEERING	4	3+1	64	3,5	6
	MK-426	MECHATRONIC	2	2+0	32	2	2
	MH-421	MARITIME ENGLISH	2	2+0	32	2	2
	MS-421	CELESTIAL NAVIGATION	3	2+1	48	2,5	3
	BG-428	COMPUTER SECURITY	2	1+1	32	1,5	3
	EE-425	PROJECT-3	4	0+4	64	2	4
	TOTAL (12 Courses)		**34**	-	**544**	**28,5**	**45**
	TOTAL: 21 COURSES		**65**	-	**1009**	**54**	**81**
	GRADUATION (61 COURSES)		**204**	-	**3160**	**169**	**254**

FOURTH GRADE (CONTROL SYSTEMS OPTIONAL)

	COURSE CODE	COURSES	CREDIT HOURS			CREDIT	ECTS
			HOURS A WEEK	THEORY+APPLICATION	TOTAL		
FIRST SEMESTER	MM-411	NAVAL MACHINES-2	3	2+1	45	2,5	3
	SO-411	HISTORY OF WARFARE	2	2+0	30	2	2

	MH-412	MANAGEMENT OF MILITARY OPERATON (MARINE)	4	2+2	60	3	4
	EE-418	NAVAL COMBAT SYSTEM ELECTRONICS	4	4+0	60	4	6
	EE-413	MODERN CONTROL SYSTEMS	3	3+0	45	3	6
	BG-413	MICROPROCESSORS	3	3+0	45	3	5
	EE-432	ELECTIVE COURSE (IMAGE PROCESSING / ELECTROMAGNETIC APPLICATIONS / INTRODUCTION TO ROBOTIC SYSTEMS)	4	2+2	60	3	3
	MS-411	ELECTRONIC NAVIGATION	4	2+2	60	3	4
	EE-419	PROJECT-2	2	0+2	30	1	2
	TOTAL (9 Courses)		**29**	-	**435**	**24,5**	**35**
SECOND SEMESTER	SO-421	MILITARY STRATEGY AND SECURITY	2	2+0	32	2	2
	SO-422	MARITIME LAW	2	2+0	32	2	3
	SO-423	POLITICAL HISTORY	2	2+0	32	2	3
	EE-421	RADAR AND SONAR SYSTEMS	4	4+0	64	4	6
	BG-424	MICROPROCESSORS LAB.	2	0+2	32	1	4
	EE-422	NUMERICAL CONTROL SYSTEMS	4	2+2	64	3	7
	MK-426	MECHATRONIC	2	2+0	32	2	2
	EE-428	CONTROL TECHNOLOGIES AND DESIGN	5	3+2	80	4	7
	MH-421	MARITIME ENGLISH	2	2+0	32	2	2
	MS-421	CELESTIAL NAVIGATION	3	2+1	48	2,5	3
	BG-428	COMPUTER SECURITY	2	1+1	32	1,5	3
	EE-425	PROJECT-3	4	0+4	64	2	4
	TOTAL (12 Courses)		**34**	-	**544**	**28**	**46**
	TOTAL: 21 COURSES		**63**	-	**979**	**52,5**	**81**
	GRADUATION (61 COURSES)		**202**	-	**3130**	**167,5**	**254**

COMPUTER ENGINEERING

FIRST GRADE

	COURSE CODE	**COURSES**	**CREDIT HOURS**			**CREDIT**	**ECTS**
			HOURS A WEEK	**THEORY+APPLICATION**	**TOTAL**		
FIRST SEMESTER	YD-110	FOREIGN LANGUAGE-1	9	2+7	135	5,5	9
	MS-111	SEAMANSHIP	2	1+1	30	1,5	3
	FM-111	MATHEMATICS-1	5	5+0	75	5	6
	FF-111	PHYSICS-1	5	3+2	75	4	6
	SO-111	CHEMISTRY-1	2	2+0	30	2	3
	FK-111	TURKISH LANGUAGE-1	2	2+0	30	2	3
	TOTAL (6 Courses)		**25**	-	**375**	**20**	**30**
SECOND SEMESTER	YD-120	FOREIGN LANGUAGE-2	7	2+5	112	4,5	7
	MS-121	SHIP MANEUVERING AND HANDLING	2	2+0	32	2	2
	FM-121	MATHEMATICS-2	5	5+0	80	5	6
	FF-121	PHYSICS-2	5	3+2	80	4	6
	FK-121	CHEMISTRY-2	2	1+1	32	1,5	3
	SO-121	TURKISH LANGUAGE-2	2	2+0	32	2	3
	MK-121	TECHNICAL DRAWING	2	1+1	32	1,5	3
	TOTAL (7 Courses)		**25**	-	**400**	**20,5**	**30**
	TOTAL (13 Courses)		**50**	-	**775**	**40,5**	**60**

SECOND GRADE							
	COURSE CODE	COURSES	CREDIT HOURS			CREDIT	ECTS
			HOURS A WEEK	THEORY+APPLICATION	TOTAL		
FIRST SEMESTER	YD-210	FOREIGN LANGUAGE-3	6	2+4	90	4	5
	FM-211	LINEAR ALGEBRA	3	3+0	45	3	4
	MS-211	WATCHKEEPING STANDARTS	2	1+1	30	1,5	2
	Gİ-212	NAVAL ARCHITECTURE	2	2+0	30	2	5
	EE-212	NUMERICAL SYSTEMS	4	3+1	60	3,5	4
	BG-211	ADVANCED PROGRAMMING	4	2+2	60	3	6
	BG-212	DISCRETE MATHEMATICS	3	2+1	45	2,5	3
	TOTAL (7 Courses)		**24**	-	**360**	**19,5**	**29**
SECOND SEMESTER	YD-220	FOREIGN LANGUAGE-4	5	1+4	80	3	5
	SO-221	HISTORY OF TURKISH REVOLUTION-1	2	2+0	32	2	2
	FM-221	DIFFERENTIAL EQUATIONS	4	4+0	64	4	5
	EE-223	ELECTRICITY	2	2+0	32	2	3
	BG-222	COMPUTER ARCHITECTURE	3	2+1	48	2,5	4
	BG-223	OBJECT ORIENTED PROGRAMMING	3	2+1	48	2,5	4
	TOTAL (6 Courses)		**19**	-	**304**	**16**	**23**
	TOTAL: 13 COURSES		**43**	-	**664**	**35,5**	**52**

THIRD GRADE							
	COURSE CODE	COURSES	CREDIT HOURS			CREDIT	ECTS
			HOURS A WEEK	THEORY+APPLICATION	TOTAL		
FIRST SEMESTER	MH-312	COMMUNICATION AT SEA	2	1+1	30	1,5	2
	MA-311	METEOROLOGY	2	2+0	30	2	1
	BG-312	OPERATING SYSTEMS	3	3+0	45	3	5
	BG-313	DATABASE	4	3+1	60	3,5	5
	BG-314	FORMAL LANGUAGES AND AUTOMATA	3	3+0	45	3	6
	FM-312	NUMERICAL METHODS	2	2+0	30	2	2
	BG-311	DATA STRUCTURES AND ALGORITHMS	3	3+0	45	3	4
	S0-311	HISTORY OF TURKISH REVOLUTION-2	2	2+0	30	2	2
	MS-311	TERRESTRIAL AND COASTAL NAVIGATION	4	2+2	60	3,5	6
	TOTAL (9 Courses)		**25**	-	**375**	**23,5**	**33**
	MM-321	NAVAL MACHINES-1	3	2+1	48	2,5	4
	BG-321	COMPUTER NETWORKS	4	3+1	64	3,5	6
	BG-323	PROGRAMMING LANGUAGES	3	3+0	48	3	5
	FM-321	PROBABILITY AND STATISTICS	2	2+0	32	2	2
	BG-322	ALGORITHM DESIGN AND ANALYSIS	3	3+0	48	3	5
	BG-324	PROJECT-1	2	0+2	32	1	2
	TOTAL (6 Courses)		**17**	-	**272**	**15**	**24**
	TOTAL: 15 COURSES		**42**	-	**647**	**38,5**	**57**

FOURTH GRADE							
	COURSE CODE	COURSES	CREDIT HOURS			CREDIT	ECTS
			HOURS A WEEK	THEORY+APPLICATION	TOTAL		
FIRST SEMESTER	MM-411	NAVAL MACHINES-2	3	2+1	45	2,5	3
	SO-411	HISTORY OF WARFARE	2	2+0	30	2	2
	MH-411	NAVAL WEAPONS SYSTEMS AND BALLISTICS	2	2+0	30	2	3
	EE-414	ELECTRONICS	3	3+0	45	3	3
	BG-411	FUNDAMENTALS OF SOFTWARE ENGINEERING	2	2+0	30	2	4
	BG-413	MICROPROCESSORS	3	3+0	45	3	5
	BG-414	PROJECT-2	2	0+2	30	1	2
	MH-412	MANAGEMENT OF MILITARY OPERATON (MARINE)	4	2+2	60	3	4
	MS-411	ELECTRONIC NAVIGATION	4	2+2	60	3	4
	BG-415	GRAPHICS	4	2+2	60	3	6
	BG-416	ELECTIVE COURSE (ARTIFICIAL INTELLIGENCE / DISTRIBUTED SYSTEMS)	4	2+2	60	3	3
	TOTAL (11 Courses)		**33**	-	**495**	**27,5**	**39**
SECOND SEMESTER	SO-421	MILITARY STRATEGY AND SECURITY	2	2+0	32	2	2
	SO-422	MARITIME LAW	2	2+0	32	2	3
	SO-423	POLITICAL HISTORY	2	2+0	32	2	3
	MH-421	MARITIME ENGLISH	2	2+0	32	2	2
	MS-421	CELESTIAL NAVIGATION	3	2+1	48	2,5	3
	BG-423	INFORMATION SYSTEMS SECURITY	4	2+2	64	3	4
	BG-424	MICROPROCESSORS LAB.	2	0+2	32	1	4
	MK-426	MECHATRONIC	2	2+0	32	2	3
	EE-429	ELECTRICAL MACHINERY	2	2+0	32	2	3
	BG-426	PROJECT DESIGN IN SOFTWARE ENGINEERING	3	1+2	48	2	4
	BG-427	INTERNET TECHNOLOGIES	4	2+2	64	3	6
	BG-425	PROJECT-3	4	0+4	64	2	4
	TOTAL (12 Courses)		**32**	-	**512**	**25,5**	**41**
	TOTAL: 23 COURSES		**65**	-	**1007**	**53**	**80**
	GRADUATION (64 COURSES)		**200**	-	**3093**	**167,5**	**249**