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| **ESM701** | **Advanced Mathematics** | **3** | **0** | **3** | **8** |
| **Purpose and Content** | **Non linear ordinary differential equations. Quasi linearization, Picards iteration, perturbation methods. Fourier series. Special fourotians (Bessel, Legendre, error etc.) Boundary value problems and Sturm Liouville problems. Partial differential equations. Variational calculus. Complex variables theory. Residues and definite integrals. Integral transform techniques (Laplace and Fourier transforms, Convolution theorem, Finite Fourier transforms etc. Fourier integrals) and its applications to partial differential equations. Green’s functions and its applications** |
| **ESM702** | **Advanced Heat Transfer** | **3** | **0** | **3** | **8** |
| **Purpose and Content** | **Heat transfer forms with analytical and numerical solutionsThe importance of heat conduction, transmission types, conductivity coefficient, one-dimensional conduction in steady state and sample solutions, introduction to dimensional analysis and convection,heat conduction with radiation and sample solutions.** |
| **ESM703** | **Solar Energy Applications** | **3** | **0** | **3** | **8** |
| **Purpose and Content** | **Solar radiation and climate parameters, radiation calculations, types of solar collector, productivity test methods of solar collectors, thermal analysis for collectors, solar energy applications in thermal and optical fields.** |
| **ESM704** | **Numerical Analysis** | **3** | **0** | **3** | **8** |
| **Purpose and Content** | **Interpolation and polynomial approximation, Numerical differentiation, Numerical integration, Numerical solutions of differential equations, Boundary-value problems, initial-value problems** |
| **ESM705** | **Industrial Refrigeration and Air Conditioning** | **3** | **0** | **3** | **8** |
| **Purpose and Content** | **Ventilation types, changing of air pollution according to time and its regeneration, natural and forced applications, ambient air input in ventilation plants and its preparation, air channel elements and channel calculations, procurement of climate conditions inside the locus, their preparation and investigation, climate centrals and their various applications, measurement and control in climate centrals** |
| metin, yazı tipi, makbuz içeren bir resim  Açıklama otomatik olarak oluşturuldu |
| **ESM706** | **Heat Exchangers Technology** | **3** | **0** | **3** | **8** |
| **Purpose and Content** | **Two-phases flows, evaporation, condensation, heat transfer from the finned surfaces, heat exchangers with finned surfaces, evaporators, condensers, heat exchanger calculations, NTU method, body-tube type heat exchangers, plate heat exchangers, examples and applications.** |
| **ESM707** | **Engineering Thermodynamics** | **3** | **0** | **3** | **8** |
| **Purpose and Content** | **The first law of thermodynamics:closed systems,control volumes.The 2. Law of thermodynamics: entrophy, the second law analysis of engineering systems, Gas power cycles, steam power cycles, refrigeration cycles. Thermodynamics special relations; equations for du, dh, ds, cv and cp. Gas mixtures, the ideal gas laws and practices. Fuels and combustion. Enthalpy of formation and combustion.Calculation of chemically reacting systems by the first law of thermodynamics. Adiabatic flame temperature** |
| **ESM708** | **Advanced Fluid Mechanics** | **3** | **0** | **3** | **8** |
| **Purpose and Content** | **Analysis of scaler, vector and tensor. Fluids in continuum. Lagrangian an Eulerian analysis. Transport theorem. Kinematics of fluids; flow line, time line, path line, paths, turbulance, rotation, deformation. Main equations. Continuity equation, momentum equation, energy equation. İnfrasonic potential flows. Analysis of 2-D potential flows. Conformal Transormation. Surface waves. Application of hydrodinamic friction.** |
| **ESM709** | **Boiler Technology** | **3** | **0** | **3** | **8** |
| **Purpose and Content** | **Importance of heating and heaters, heating systems, local and central heating systems, efficient of boiler, boiler montage rules, piping, chimneys, dilating tanks, hot water heating systems, function of pumps, maintenance of pumps, floor heating systems, high temperature water heating systems.** |
| metin, yazı tipi, makbuz içeren bir resim  Açıklama otomatik olarak oluşturuldu |
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| **ESM710** | **Advanced Heat Pump and Applications** | **3** | **0** | **3** | **8** |
| **Purpose and Content** | **General concepts and definitions. Classification of heat pumps. Vapor compression, absorption, thermoelectric refrigeration systems. Fundamental design methods for heat pumps, analysis, design and control of systems, applications of heat pumps for buildings. Hot water, heating, cooling and dehumidifying processes. Industrial applications of heat pumps.** |
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| **ESM711** | **Heat Economy** | **3** | **0** | **3** | **8** |
| **Purpose and Content** | **Importance of heat energy economics,ideal isolation materials and specifications, cost analysis of isolation, economizers and other waste heat recovery systems** |
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| **ESM712** | **Advanced Alternative Cooling Techniques** |  |  |  |  |
| **Purpose and Content** | **General information on air conditioning and refrigeration systems. Calculation of heating and cooling loads. Components of acclimizaiton and cooling systems and determinaiton of the system propeties on a project.** |
| **ESM713** | **Applications of Advanced Cooling Techniques** | **3** | **0** | **3** | **8** |
| **Purpose and Content** | **Fundamentals of refrigeration, P-h diagrams, refrigeration cycles, refrigeration system components (compressors, condensers, cooling towers, expansion valves, and evaporators), insulation, refrigerants, refrigeration load calculations, application on a model** |
| **ESM714** | **Drying Technique** | **3** | **0** | **3** | **8** |
| **Purpose and Content** | **Drying theory, application of drying theory to dryers, examination of heat and mass transfer together, drying models, optimum dryer design.** |
|  |
| **ESM715** | **Hydrogen Energy and Fuelcell Systems** | **3** | **0** | **3** | **8** |
| **Purpose and Content** | **Engineering Thermodynamics, Basic applications, production of hydrogen, hydogen storage and hydrogen technologies. Low and medium temparatures fuel cells. High temparature fuel cells, solid oxide fule cells, melting carbon fuel cells, alkaline fuel cells, direct methanol fuel cells, efficiency of heat machine and fuel cells, chemical reactions, electrochemical kinetic.** |
| **ESM716** | **Freeze-Drying Technology** | **3** | **0** | **3** | **8** |
| **Purpose and Content** | **The definition and importance of drying, definition of Freeze-drying systems, The advantages of freeze-drying systems, Triple-point curve, definition of sublimation, calculation of water activity of dried product, Regression analysis of dried product and determination of the appropriate model using MATLAB program.** |
| **ESM717** | **Energy and Environment** | **3** | **0** | **3** | **8** |
| **Purpose and Content** | **Energy Production and Consumption, Energy Conservation, Energy Conservation in Buildings, Conservation of Energy in Industry and Transportation, Energy Sector in the World, Environmental Policy in Energy Production , Energy Policies of Developed and Developing Countries, Air Pollution from Energy Industry, Air Quality Protection Regulation, Pollution control, Effects of Pollutant from energy Sources, energy Sourced Greenhouse Gas Emissions Reduction, energy saving and facilities, energy generation from waste** |
| **ESM718** | **Energy Sectors and Environment** | **3** | **0** | **3** | **8** |
| **Purpose and Content** | **impact on energy production and usage on the environment, air pollution, water pollution, soil pollutionSolid wastes, Effects of pollutants on Society, the environmental impacts of geothermal systems, Environmental Effects of Hydropower Plants, Environmental Effects of Thermal Power Plants , Environmental Effects of Nuclear Power Stations,Environmental Impacts of Renewable Energy Sources, Environmental Impacts from warming-Purpose Usage, Environmental Impact Assessment Regulation, energy production methods to reduce environmental pollution** |
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| **ESM719** | **Thermal Energy and Applications** | **3** | **0** | **3** | **8** |
| **Purpose and Content** | .**İntroduction (formation and classification of the geothermal water, classification of the geothermal water), chemical, physical, gas and isotopic concentration of geothermal water, deposition and corrosive problems in geothermal water, geothermometry, geothermal areas of Turkey and their proporties** |
| **ESM720** | **Energy Conversion Systems** | **3** | **0** | **3** | **8** |
| **Purpose and Content** | **Energy sources and the general situation in the country, Energy Conversion Systems,Energy Production Systems , Basic Principles of Conversion,Fossil Origin Energy Resources, Poses and Thermal Power Plants, Thermal Energy Production Systems, Basic Thermodynamics Principles,Renewable Energy Resources, Solar energy and Principles of the Usage, Geothermal energy and principles of the energy production Wind energy and the basic principles of energy production, hydrogen energy and principles of the usage Wave energy, Nuclear Energy Magnetic Energy, Tidal Energy, Energy Cost and the general situation of the countries, efficiency of the energy production, The relationship between energy and the environment, Planning for the future of energy production.** |
| **ESM721** | **Waste Heat Recovery Systems** | **3** | **0** | **3** | **8** |
| **Purpose and Content** | **The importance of energy, waste heat from various systems, energy costs, waste heat recovery methods, methods of economic analysis, cost analysis** |
| **ESM722** | **Computational Fluid Dynamics** | **3** | **0** | **3** | **8** |
| **Purpose and Content** | **Introduction and Basic concepts, Energy-Mass-Momentum equations, Creating solid model, Creating mesh and mesh converged studies, Ansys Fluent Code, Exercises belong heat and fluid flow examples** |
| **ESM723** | **Air Conditioning** | **3** | **0** | **3** | **8** |
| **Purpose and Content** | **The thermodynamic properties of moist air, an analysis of the different conditioning methods, the summer air conditioning, winter air conditioning and psychometric explanation of all the years of practice, heaters, humidifiers calculation of capacity.** |
| **ESM724** | **Solar Panel Design and Applications** | **3** | **0** | **3** | **8** |
| **Purpose and Content** | **solar radiation received on horizontal surfaces, south yaw (azimuth), solar angle of arrival), denklination angle, solar incidence angle, collector slope making the calculations for solar geometry, such as the industrial organization or as may be necessary for domestic system panel surface area of the panel power calculation.** |
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| **ESM725** | **Economic Analysis of Thermal Systems** | **3** | **0** | **3** | **8** |
| **Purpose and Content** | **Introduction and basic concepts, Exergy Analysis, Cost Analysis, Formation of the cost equations, Making of Economic analysis of thermal systems by Specific Exergy Cost (SPECO) Method, Sample applications** |
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| **ESM726** | **Refrigerants and Environmental Effects** | **3** | **0** | **3** | **8** |
| **Purpose and Content** | **Students learn the refrigerant gases used in a cooling system. They learn the assembly and maintenance of the system equipment. They learn the hand tools used in a cooling system and also how to use them** |
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| **ESM727** | **Refrigerated or Frozen Storage of Foods** | **3** | **0** | **3** | **8** |
| **Purpose and Content** | **Methods for the processing and the conservation of nutrients. Conservation, freezing, irradiation, drying, preservation in cold, freeze-conservation, controlled atmosphere and modified atmosphere storage methods, nutrient additives, new nutrient processing techniques.** |
| **ESM728** | **Production of Biofuels** | **3** | **0** | **3** | **8** |
| **Purpose and Content** | **Biomass as energy source, photosynthesis of biomass, transformation properties, physical conversion process, thermal conversion, synthetic oxygen to liquid fuels.** |
| **ESM729** | **Bioenergy Technologies** | **3** | **0** | **3** | **8** |
| **Purpose and Content** | **Biomass as energy source, photosynthesis of biomass, transformation properties, physical conversion process, thermal conversion, synthetic oxygen to liquid fuels.** |
| **ESM730** | **Cold Storage and Project Studies** | **3** | **0** | **3** | **8** |
| **Purpose and Content** | **-** |
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| **ESM731** | **Installation Project Preparation Techniques** | **3** | **0** | **3** | **8** |
| **Purpose and Content** | **-** |
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| **ESM797** | **MSc Seminar** | **0** | **2** | **0** | **6** |
| **Purpose and Content** | **A comprehensive research and presentation about a subject assigned by student and supervisor.** |
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| **ESM799** | **MSc Thesis Research** | **0** | **1** | **0** | **26** |
| **Purpose and Content** | **Thesis topics and contemporary topics** |
| **LUEE701** | **Scientific Research Techniques and Scientific Ethics** | **3** | **0** | **0** | **8** |
| **Purpose and Content** | **Fundamental concepts and information about the science, the structure of scientific research, scientific methods and different ideas on these methods, data acquisition methods (quantitative and qualitative), registration, analysis, interpretation and reporting of datas.** |
|  | metin, yazı tipi, makbuz içeren bir resim  Açıklama otomatik olarak oluşturuldu |

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| **ESM7098D** | **Course Field of Specialization** | **4** | **0** | **0** | **4** |
| **Purpose and Content** | **The Thesis, related subjects and other current Subject** |
| **ESM7098T** | **Thesis Field of Specialization** | **4** | **0** | **0** | **4** |
| **Purpose and Content** | **The Thesis, related subjects and other current Subject** |

