

COURSE CONTENTS

First Year

TRD101 Turkish Language-I (2+0+0+2) ECTS:1

Basic features of written language and written communication, the main differences between written language and spoken language, Description: written and oral expression, subjective expression, objective narration, paragraph, paragraph types (introduction-development conclusion paragraphs), the definition of text and text types (informative texts, literary texts), conditions of text (cohesion, coherence, intentionality, acceptability, situated, informative, relationships between texts), written expression (written composition, free-write, the scheduled write), plan write phrases of writing (subject, topic, the limited of topic ,purpose, point of view, the main and supporting ideas, outlining. theoretical knowledge (petition, letter, notice, decision, advertisement, advertising, record, report, official texts, scientific texts) on informative texts; studies on examples and applications; summarizing and outlining of a text, correcting the mistakes in written work.

Text Book

1. Ergin, M., Üniversiteler İçin Türk Dili, Boğaziçi Yayınları, İstanbul, 1986.

Supplementary Books

1. Ağca H. ,Türkçe II Sözlü Anlatım, Gündüz Eğitim ve Yayıncılık, Ankara, 1999
- 2.Kavruk H. ,Salman R. ,Türk Dili (Yazılı ve Sözlü Anlatım), Uğurel Matbaası, Malatya, 2003.

TRD102 Turkish Language-II (2+0+0+2) ECTS:1

Basic features of oral language and verbal communication, oral expression, basic features of speaking ability (natural language and body language) the basic principles of a good conversation, basic properties of a good speaker (emphasis, intonation, pause, diction, etc.), prepared and unprepared speech, the stages of prepared speech (selecting and limiting of topic, purpose, point of view, determination of main and supporting ideas, planning, writing the text, presentation of the speech) Speaking types (dialog, conversation, introducing yourself, answering the questions, Christmas, birthday, holiday and so on. Celebration of an important event, giving directions, talking on the phone, asking for a job, meetings, interviews, radio and television speeches, various cultural and art programs to participate as a speaker and so on.), unprepared speech at various topics, studies on speech samples and oral expression applications, correcting errors in speech and expression.

Course objectives:

- 1.Oral presentation and speaking skills
2. Prepared and impromptu speaking skills

Text Book:

1. Ergin, M., Üniversiteler İçin Türk Dili, Boğaziçi Yayınları, İstanbul, 1986.

Supplementary Books

1. Ağca H. ,Türkçe II Sözlü Anlatım, Gündüz Eğitim ve Yayıncılık, Ankara, 1999.
2. Kavruk H. ,Salman R. Türk Dili (Yazılı ve Sözlü Anlatım), Uğurel Matbaası, Malatya, 2003.

YDİ103 Foreign Language I (3 +0 +0 +3) ECTS: 3

The course was contemplated for university students to be able to use reading, speaking, listening and writing skills with different academic activities at a specific facility in their fields. In this course, by creating interesting contexts, exercises that increase the functionality of the language, and using the language in real communication skills will develop students' linguistic and communicative skills and increase foreign language proficiency.

Text book:

1. Murhpy, R. ,Liz and John Soars Grammar in use, Grammar spectrum- Ken Paterson, 2000.

Supplementary Book

1. Murphy, R. ,Essential Grammar in Use, Second Edition, Cambridge University Press, USA, 1997

YDİ104 Foreign Language II (3 +0 +0 +3) ECTS: 3

The course was contemplated for university students to be able to use reading, speaking, listening and writing skills with different academic activities at a specific facility in their fields. In this course, knowledge and skills of students, gained with “Foreign Language I”, should be aimed to improve a higher level. The creation of interesting contexts, exercises that increase the functionality of the language, use the language in real communication skills should be taken to be improved students' linguistic and communicative competence and the foreign language proficiencies.

Course Objectives:

1. Skills of students in speaking, listening and writing
2. Increasing the competence of Foreign Language.

Text Book:

1. Soars, L, Soars, J. ,Elementary New Headway English Course, Oxford University Press, 2000.

Supplementary Books

1. Murphy, R. ,Essential Grammar in Use, Second Edition, Cambridge University Press, USA, 1997
2. Soars, L, Soars, J. ,Elementary New Headway English Course, Oxford University Pres, 2000.

TBF105 General Physics-I (3+0+2+4) ECTS:6

Vectors, forces and resultant forces, static equilibrium, center of gravity, Newton's law of motion, friction, and friction forces, horizontal, vertical and oblique shots. Conservation of impulse and momentum, the radial velocity and acceleration, simple harmonic motion, workforce and energy, the concept of heat, volume change of solids, liquids and gases, the general gas equation, the calorimeter, melting and evaporation, heat and specific heat.

Course Objectives:

1. Understand vector and scalar quantities.
2. Identify, formulate, and solve problems analytically that appear in physical systems.
3. Analyze and resolve natural phenomenon.
4. Associate the gained knowledge, analyze and interpret data.
5. Apply and link the gained knowledge of natural sciences to interdisciplinary fields.

Text book:

1. Halliday, D. ,Resnick, R. ,Çeviri Editörü: Yalçın, C. Fiziğin Temelleri Arkadaş Yayınevi, Ankara, 2002. Fen ve Mühendislik için Fizik, Palme Yayıncılık,
2. Serway, R.A. ,Çeviri Editörü: Çolakoğlu, K.,Ankara,1990.
3. Ohanian, H.C.,Physics, W.W. Norton & Compony, Inc, New York,1989.
4. Fishbane, P.M. ,Gasiorowicz, S. ,& Thornton, S.T Çeviri Editörü: Türkoğulları, Ü. ,Temel Fizik, Arkadaş Yayınevi, Ankara, 2003

TBF106 General Physics-II (3+0+2+4) ECTS:4

The structure of atom, coulomb's law, electric field, potential and electric field, capacitors. Ohm's law, resistance of a conductor and Kirchhoff law, magnetic field, electromagnetic induction, optics, refraction and reflection laws.

Course Objectives:

1. Know fundamental concepts and principles related to the electricity and magnetism.
2. Identify, formulate, and solve problems analytically that appear in physical systems.
3. Analyze and resolve natural phenomenon.
4. Associate the gained knowledge, analyze and interpret data.
5. Apply and link the gained knowledge of natural sciences to interdisciplinary fields.
6. Correlate and apply gained knowledge directly with technology and industry.

7. Use techniques and skills necessary for engineering practice

Text book:

1. Halliday, D, Resnick, R. ,Çeviri Editörü: Yalçın, C. ,Fiziğin Temelleri, Arkadaş Yayınevi , Ankara,. 2002.
2. Serway, R.A. Çeviri Editörü: Çolakoğlu, K. ,Fen ve Mühendislik için Fizik. Palme Yayıncılık, Ankara, 1990.
3. Ohanian, H.C. , Physics. New York: W.W. Norton & Compony, Inc, 1989.
4. Fishbane, P.M. ,Gasirowicz, S. ,& Thornton, S.T. Çeviri Editörü: Türkoğulları, Ü. Temel Fizik. Ankara: Arkadaş Yayınevi, 2003.

TBM107 Mathematics-I (3+2+0+4) ECTS:6

Definition of a function, continuity, derivatives, description, geometrical meaning and applications of differential, increasing and decreasing functions, turning point, maximum and minimum points, definitions and derivatives of exponential, logarithmic, hyperbolic and inverse trigonometric functions definite integrals and their usage.

Course Objective:

1. Basic college mathematics

Text Books :

1. Sherman K. Barcellos, A. ,Calculus ve Analitik Geometri, Cilt 1 ve 2. Türkçesi: Beno Kuryel ve Firuz Balkan. Literatür Yayıncılık San. Tic. Ltd. Şti, 2003.
2. Ayres, F. ,Diferansiyel ve İntegral Hesap, Çeviri: Dr. Güzin GÖKMEN, Güven Kitabevi Yayınları, Ankara,1997.
3. Matematik Formülleri ve Tabloları El Kitabı, Bilim ve Teknik Kitabevi. Eskişehir, 2000

TBM108 Mathematics-II (3+2+0+4) ECTS:6

Application fields of definite integrals; area, volume and center of gravity calculations, polar coordinates, vectors, matrices (recipes, types, addition and multiplication operations), the determinant rules and calculations, linear equation systems and solutions, spatial line and planes, transformation of coordinate axes, multiple integrals and their application fields.

Course Objective:

1. In addition to establish basis for other mathematical courses, to learn, to understand and to be able to solve basic engineering problems through the techniques and methods presented.

Text Books :

1. Sherman K. Barcellos, A. ,Calculus ve Analitik Geometri, Cilt 1 ve 2. Türkçesi: Beno Kuryel ve Firuz Balkan. Literatür Yayıncılık San. Tic. Ltd. Şti, 2003.
2. Ayres, F. ,Diferansiyel ve İntegral Hesap, Çeviri: Dr. Güzin GÖKMEN, Güven Kitabevi Yayınları, Ankara,1997.
3. Matematik Formülleri ve Tabloları El Kitabı, Bilim ve Teknik Kitabevi. Eskişehir, 2000.

MMU109 Technical Drawing (2+2+0+3) ECTS:4

Introduction to technical drawing, drawing instruments and their uses, geometrical constructions, ellipses, and non-circular curves, projections, read drawing, perspective drawing, isometric and oblique projection, sectional views, dimensioning. Surface quality, surface quality of parts of Objective symbols. According to TSE, surface qualities. Tolerance and exercises.

Course Objectives:

1. Ability to identify, formulate, and solve engineering problems.
2. Ability to use techniques, skills, and modern engineering tools such as computer and computer software necessary for engineering practice.
3. Get an understanding of professional and ethical responsibility.

4. Ability to incorporate in a team work.
5. Ability to function on multi-disciplinary teams
6. Ability to communicate written and oral effectively.
7. Ability to understand the broad education necessary to understand the impact of engineering solutions in a global and societal context.
8. Ability to engage in life-long learning.
9. Ability to gain knowledge of contemporary issues.

Text Books:

1. Kırac, N. ,Teknik Resim, Nobel Yayın Dağıtım, Ankara, 2005
2. Kırac, N. ,Çözümlü Teknik Resim Problemleri, Eskişehir, 1997
3. Şen, İ.Z. ,Özçilingir, N. ,Teknik Resim, İstanbul, 2002.

TBK111 General Chemistry (2+2+0+3) ECTS:4

Introduction (material, the metric system, chemical calculations), chemical equations and quantitative relationships (moles, formulas, chemical equations), gases (Boyle's law, Charles law, the perfect gas law, kinetic theory of gases, real gases), solids (crystals, metal crystal structure), liquids and solutions, chemical kinetic and chemical equilibrium, acids and bases (Arrhenius concept, hydrolysis, ionized of water, pH, acid-base). Electrochemistry, atomic structure, chemical bonding.

Course Objectives:

1. Ability to apply knowledge of basic sciences (mathematics, physics, chemistry).
2. Ability to design and conduct experiments as to analyze and interpret data.
3. Ability to identify, formulate, solve engineering problems.
4. Ability to understand the broad education necessary to understand the impact of engineering solutions in a global and societal context.
5. Get an understanding of professional and ethical responsibility.
6. Ability to engage in life-long learning.
7. Ability to gain knowledge of contemporary issues.

Text Books :

1. Bruce H.P. ,California State University, San Bernardino; Willam S.H, University Of Maryland, College Park, Çeviri Editörü Tahsin UYAR. Palme Yayıncılık, Ankara,1994.
2. Aras, N.K. , Tunalı, N.K. ,Kimya Temel Kavramlar, Daly News Web Ofset Tesisleri, Ankara, 2002.

MMÜ112 Engineering Mechanics –I (Statics) (4+0+0+4) ECTS: 5

Principles of mechanics, unit systems, vector quantities, point and axis to moments of a force, the force pair. equivalent force systems, and special cases, distributed loads, the geometric center and center of gravity, equilibrium, special equilibrium conditions , and special situations, mechanics of structure systems, rod and lattice systems, cables, friction force.

Course Objectives:

1. Ability to identify, formulate, solve engineering problems

Text Books:

1. Beer, F. P. ,Johston, E. R. ,Çeviri, Mühendisler için mekanik, Statik ve dinamik, Nobel Yayın Dağıtım, Ankara, 2002.
2. Kürkcüoğlu, N.,Çözümlü mekanik problemleri, 2004.
3. H. Shames. , Engineering Mechanics Static and Dynamics, 1999.

MMÜ114 Computer Aided Design -I (2+2+0+3) ECTS:4

Introduction to computer aided technical drawing, basic drawing functions, technical drawings of machine elements, assembly drawings (AutoCAD)

Course Objectives:

1. Ability to identify, formulate, and solve engineering problems.
2. Ability to use techniques, skills, and modern engineering tools such as computer and computer software necessary for engineering practice.
3. Get an understanding of professional and ethical responsibility.
4. Ability to incorporate in a team work.
5. Ability to function on multi-disciplinary teams
6. Ability to communicate written and oral effectively.
7. Ability to understand the broad education necessary to understand the impact of engineering solutions in a global and societal context.
8. Ability to engage in life-long learning.
9. Ability to gain knowledge of contemporary issues.

Text Books:

1. Kırar, N. ,Teknik Resim, Nobel Yayın Dağıtım, Ankara, 2005
2. Kırar, N. ,Çözümlü Teknik Resim Problemleri, Eskişehir, 1997
3. Şen, İ. ,Özçilingir, N. ,Teknik Resim, İstanbul, 2002.

MMÜ199 General WorkShop Practice (0 +0 +0 +0) ECTS: 2

This course enables students to integrate mechanical engineering and explains to students what it means. Information about the department laboratories and workshops within courses will be given students. The machinery in the workshop and laboratories will explain about how they work and why they use to students

MMÜ113 Basic Computer Technology and Programming (2+2+0+3) ECTS:3

Using Windows contents, introduction of interface and computer hardwares, Office programs (MS Word , MS Excel, MS Powerpoint) with applications.

Second Year

MMÜ201 Computer Aided Design-II (2+2+0+3) ;ECTS:4

Solidworks; general principles of solid modeling, existing part and solid modeling in 3D, converted of 3D parts to technical drawing, assembly parts and modeling. By using technical drawings, existing assembly modeling and moving virtually, animations, conflict analysis and technical drawing with exploded assembly in Solidworks.

Text book:

1. N. Singh, Systems Approach to Computer-Integrated Design and Manufacturing, JohnWiley & Sons
2. C. E. Wilson, Computer-Integrated Machine Design, Printice Hall, 1997, New Jersey.
ISBN: 0-13-591645
3. D. D Bedworth, M. R. Henderson, P. M. Wolfe, Computer-Integrated Design and Manufacturing, McGraw Hill, 1991
4. Solid Works 2006 ve Cosmos Works 2006 dökümanları

TBM203 Linear Algebra (3+0+0+3) ECTS:4

Normed spaces, Matrix norms, Linear transformations, linear functional, Dual spaces. Hermitian, unitary and normal transformations. Eigenvalues and eigenvectors. Diagonalization. Triangularization. Simplification of quadratic equations and surfaces. Bilinear forms. Groups preserving bilinear forms. Quadratic forms. Jordan canonical form. Polynomials.

Textbook

1. Taşcı, D. (1999), Lineer Cebir, Selün Vakfı.
2. Hadley,G. (1961), Linear Algebra, Addison Wesley.
3. Lang, S. (1966), Linear Algebra, Addison Wesley.

4. Morris, A.O. (1982), Linear Algebra, Chapman and Hall.

MMÜ205 Material Science- I (2+2+0+3) ECTS:4

Material properties, static properties, stress and strain, modulus of elasticity, resilience, ductility and brittleness, toughness, stiffness and hardness measurement methods, Brinell, Rockwell and Vickers hardness examinations, microhardness, dynamic properties, notch impact test, fatigue, creep.

Course Objectives

1. Learn the structures of materials,
2. Understand the properties of materials

Textbook

1. Vlack, L.H. V. ,Addison, W, Pub. Co.Elements of Materials Science and Engineering, Ankara, 1999.
2. Smith, W.F. ,Çev.Kınıkoğlu, N.G. ,Malzeme Bilimi ve Mühendisliği, Literatür Yay, Ankara, 2000.
3. Bargel, H.J. ,Schulze, G., Çev.Güleç, Ş. ,Aran, A. ,Malzeme Bilgisi I-II, Tübitak Yay,Ankara, 1998.

MMÜ206 Material Science -II (2+2+0+3) ECTS:4

Non-destructive examination, examination of internal defects, surface defects examination, the physical properties of materials, engineering materials, cast iron features and short screenings, plain carbon steels, alloy steels, alloy steels, classification, short-representation of steels, non-ferrous metals, refractory metals, corrosion.

Textbook:

1. Onaran K. ,Malzeme Bilimi, Çağlayan Basımevi, Ankara, 2001.
2. Moffat, W.G. ,Pearsall, G.W. ,Wulff, J. ,Çev. Onaran, K. ,Erman, B.,Malzemelerin Yapı ve Özellikleri, I-II-IIIIV, İTÜ Yay, İstanbul, 2002.

MMÜ207 Strength of Materials (4+0+0+4) ECTS:5

Basic principles of strength, stress, strain, axial load, Hooke's law, in case of an axially loaded statically indeterminate problems, Mohr's circle plane tensile, three- dimensional stress state, yield and fracture hypothesis, torsion, tension rods of circular cross-section distribution of the non-circular bending, compression containers, horizontal loading, shear force and bending moment diagrams. bending under general loads, axial load and bending. Bending, twisting, and the collapse of the beams, the elastic curve, integration, moment area and superposition by the method of calculating the effect of shear deformation of the elastic curve, energy methods, Castigliano theorem and practices. Betti-Maxwell theorem, the stability analysis of columns, Euler's formula.

Course Objectives:

1. Ability to apply knowledge of basic sciences
2. Ability to develop, design and choose the desired qualities (yield, cost etc.) for a machine
2. Ability to use techniques, skills, and modern engineering tools such as computer and computer software necessary for engineering practice.
3. Get an understanding of professional and ethical responsibility.
4. Ability to incorporate in a team work.
5. Ability to function on multi-disciplinary teams
6. Ability to communicate written and oral effectively.
7. Ability to understand the broad education necessary to understand the impact of engineering solutions in a global and societal context.
8. Ability to engage in life-long learning.
9. Ability to gain knowledge of contemporary issues.

Textbooks:

1. Par, B. ,Orak, S. ,Mukavemet Problemleri, Osmangazi Üniversitesi, Eskişehir, 1995.
2. Savcı, M., Arpacı, A. ,Çözümlü Mukavemet Problemleri, Birsan Yayınevi, Ankara, 1994.
3. Yayla, P. ,Cisimlerin Mukavemeti, Çağlayan Kitabevi, Ankara, 2001.

MMÜ209 Manufacturing Process-I (4+2+0+5) ECTS:6

Casting methods, sand casting, permanent mold casting, compressed casting, centrifugal casting and precision casting. Powder metallurgy, powder production, powder mixing and blending, pressing and sintering, plastic forming processes, cold and hot deformation, rolling, forging, extrusion, bending, pipe manufacturing, machining processes, machining techniques, cutting forces, energy and power requirement, cutting fluids, cutting tools, tool materials, tool life, tool geometry, turning and planing dragline.

Course Objectives:

1. To provide understanding of these methods, which are widely used in industry.

Textbooks:

1. Ersümer A. ,Uzunova T. ,Demir Döküm, İ.T.Ü. Makine Fakültesi, İstanbul, 1971.
2. Anık S. ,Kaynak Tekniği, Cilt I-II, İ.T.Ü. Makine Fakültesi, İstanbul, 1969.

MMÜ204 Manufacturing Process-II (4+2+0+5) ECTS:6

Milling, milling cutters, grinding, honing, lapping, welding processes, electric arc welding, electrodes, cover types, arc blow, arc length, flow control, gas metal arc welding methods, submerged arc welding, plasma arc welding, electric resistance welding, welding distortion , soldering and modern welding techniques

Course Objectives:

1. To provide understanding of these methods, which are widely used in industry.

Textbooks:

1. Anık, S. ,Dikicioğlu A. ,Vural M. , İmal Usulleri, İ.T.Ü. Makine Fakültesi, İstanbul, 1994.7

MMU211 Electro Technique and Electrical Machines (3+0+0+3) ECTS:4

Electrokinetic, electric charge, electric current, electricity transmission in different environments, resistance, Ohm's law, Kirchhoff's law, generators, circuit analysis, electromagnetism, Coulomb's law, magnetic field, R, L, C circuits, hysteresis losses, eddy current, iron losses, circuit solutions, direct current equipment, alternating current machines, transformers, structure and type of connection, power transmission lines, poles, grounding, circuit breaker (disjonktör), differential (break switch), conductors (copper, aluminum), Lightning, AG and Y.G. Principle schemes, active power, reactive power and reactive power in order to eliminate-operations (condenser), indoor and outdoor lighting, lighting fixtures, lamps, interior plumbing materials, the voltage drop and current control calculations.

Course Objectives

1. Ability to use electricity
2. Ability to use electrical machinery.
3. Interior plumbing materials; ability to calculate the voltage drop and current control.

Textbooks:

1. Boduroğlu, T. ,Elektrik makineleri Dersleri Döner Alternatif Akım makinalarına giriş, Nobel yay, Ankara,2001.

AIT213 Atatürk's Principles and Revolutionary History - I (2+0+0+2) ECTS:1

The Industrial Revolution, The French Revolution, Dismemberment of The Ottoman Empire (XIX. Century), The Tanzimat Decree, Islahat Decree, First and Second Constitutionalist Period, Tripoli and the Balkan Wars, I. World War, Treaty of Mondros, Wilson Principles, Paris Conference, Amasya Circular, National Congresses, Opening of the National Assembly, Law of Fundamental Organization, Establishment of the regular army, I. Inonu, II. Inonu, Kutahya-Eskisehir, Sakarya Wars, and The Great Raid, the War of Independence, treaties during the wars, the Treaty of Lausanne, Abolition of the Sultanate.

Textbook:

- 1.Eroğlu, H.,Türk İnkılap Tarihi, Savaş Yay. Ankara, 1990.
- 2.Alpargu, M., Atatürk İlkeleri ve Türk İnkılap Tarihi, Gündüz Yayıncılık, Ankara, 2001.

Supplementary Book

1. Mumcu, A. ,Atatürk ilkeleri ve İnkılâp Tarihi I. Eskişehir, Anadolu Üniversitesi Yayınları, 1998.

AIT214 Atatürk's Principles and Revolutionary History - II (2+0+0+2) ECTS:1

Turkish foreign policy between 1923 and 1938, Turkish foreign policy after Ataturk, Principles of Turkish Revolution (Republicanism, Populism, Secularism, Reformism, Statism, Nationalism)

Course Objectives

- 1.Learning Turkish foreign policy
- 2.Learning principles of Turk revolution

Text book:

1. Eroğlu, H. ,Türk İnkılâp Tarihi, Savaş Yayıncılık, Ankara, 1990.

Supplementary Books

1. Alpargu, M. Atatürk İlkeleri ve Türk İnkılâp Tarihi, Gündüz Yayıncılık, Ankara, 2001.

TBM 202 Differential Equations (3+0+0+3) ECTS:4

Sequences and series, arithmetic and geometric sequences, convergence and divergence of series, convergence tests, power series. Taylor and Maclaurin series, to determine convergence radius of power series, the use of power series, binomial series, Fourier series and surfaces, line integrals and account of the work done, gradient and divergence of a vector field theorem blind green, stoke's theorem.

Course Objectives

1. Identification and solving differential equations analytically.
2. Ability solving differential equations
3. Relate gained data, analyze and evaluate data.
4. To use the techniques and skills necessary for engineering practice
5. Identify, formulate and solve related field problems

Textbooks:

1. Bronson R. , Schaum's Outlines Diferensiyel Denklemler. McGraw Hill-Nobel,2003.
2. Karadeniz, A. , Yüksek Matematik Cilt 3: Çağlayan, Ankara, 2001.
3. Aydın, M., Diferansiyel Denklemler ve Uygulamaları Literatür Yayıncılık,Ankara, 2000.

MMU212 Thermodynamics -I (4+0+0+4) ECTS:6

Introduction, some concepts and definitions, first law of thermodynamics, analyzing of first law for volume control, non flow and flow systems, second law of thermodynamics, properties of matter, phase change, cycles, entropy and determination of entropy, temperature entropy diagram.

Course Objective

1. Ability to apply knowledge of basic sciences (mathematics, physics, chemistry).
2. Ability to design and conduct experiments as to analyze and interpret data.
3. Ability to develop, design and choose the desired qualities (yield, cost etc.) for a machine
4. Ability to identify, formulate, solve engineering problems.
5. Ability to understand the broad education necessary to understand the impact of engineering solutions in a global and societal context.
6. Ability to communicate written and oral effectively.
7. Get an understanding of professional and ethical responsibility.
8. Ability to engage in life-long learning.
9. Ability to gain knowledge of contemporary issues.

Textbook:

1. Van, W. ,Gordon J. And Sonntag, R. ,“Fundamentals of Classical Thermodynamics”, 2nd Ed. ,John Wiley & Sons, Inc, 1978
2. Çengel, Y.A. ve Boles, Michael A. ,Türkçesi: Derbentli, T. , "Mühendislik Yaklaşımıyla Termodinamik", 1. Basım, McGraw-Hill Literatür Yayıncılık, 1996.
3. Öztürk, A ve Kılıç, A. , "Termodinamik Problemler", Seç Kitap Dağıtım, Ankara, 1987.
4. Öztürk, A ve Kılıç, A, Hasbi, Y. , "Termodinamik ve Isı Geçişi Tabloları", Çağlayan Kitabevi, Ankara

MMU 208 Engineering Mechanics-II (Dynamic) (3+0+0+3) AKTS:4

Kinematics of particles, linear and curvilinear motion, kinetics of particles, Newton's second law, the linear momentum, D'Alembert principle, angular momentum, centrifugal force, energy and momentum conservation of energy, principle of work and energy in the spring and gravity forces potential energy, conservative and non-conservative forces, impulsive forces, the principle of impulse and momentum, kinematics of rigid bodies, plane motion, relative speed and acceleration, planar kinetics of rigid bodies moving.

Course Objectives

1. Ability to apply knowledge of basic sciences (mathematics, physics, chemistry).
2. Ability to design and conduct experiments as to analyze and interpret data.
3. Ability to develop, design and choose the desired qualities (yield, cost etc.) for a machine
4. Ability to identify, formulate, solve engineering problems.
5. Ability to understand the broad education necessary to understand the impact of engineering solutions in a global and societal context.
6. Ability to communicate written and oral effectively.
7. Get an understanding of professional and ethical responsibility.
8. Ability to engage in life-long learning.
9. Ability to gain knowledge of contemporary issues.

Textbook

F. Beer, R. Johnston. ,Dinamik, Çağlayan yay, Ankara, 2000.

MMU 299 Engineering Practice (0+0+0+0) ECTS:2

The other name of the training is engineering applications practice. The aim of that; to provide an application of courses for students, which studied in department of mechanical engineering. Students undergo the training about their interesting fields and must complete in thirty (30) work days. The training will make after fourth semester finished.

Third Year

MMU311 Thermodynamics -II (4+0+0+4) ECTS:6

The second law analysis of engineering systems, gas power cycles, vapour power systems, refrigeration cycles, thermodynamic property relations, gas mixtures.

Course Objectives

1. Ability to know gas power cycles,.
2. Ability to know the refrigeration cycles.
3. Ability to know the thermodynamic property correlations

Textbook:

1. Sonntag, R.E, Borgnakke, C. , Van Wylen, G.J. ,Fundamentals of Thermodynamics”, Wiley; 6th ed.
2. Moran M.J., Shapiro H.N., ”Fundamentals of Engineering Thermodynamics” Wiley, 5th ed. ,2003.

MMU 307 Fluid Mechanics-I (4+0+0+4) ECTS:6

Introduction to Fluid mechanics, hydrostatics, fluid kinematics, the principle of conservation of matter, motion equations, Bernoulli equation and applications.

Course Objective

Students should learn the basic laws of fluid mechanics and apply these laws for complex real flows

Textbook:

1. Kırkköprü, K. ,Ayder.E. ,Akışkanlar Mekaniği (Çeviri) Literatür Yayıncılık, Ankara, 2000.

MMU 308 Fluid Mechanics-II (4+0+0+4) ECTS:6

Momentum equation, dimensional analysis and similarity, pipes and ducts, viscous flows, boundary-layer theory, the theory of potential flow, compressible flow, open channel flow

Course Objective

Students should learn the basic laws of fluid mechanics and apply these laws for complex real flows

Textbook:

1. Kırkköprü, K. ,Ayder, E. , Akışkanlar Mekaniği, Literatür Yayıncılık 2000.

MMU305 Mechanism Technique (4+0+0+4) ECTS:6

Basic concepts of kinematics, motion kinematics types and diagrams, the mechanism structure, the joints and chains, degree of freedom, forced mobility, Grübler equality, structural transformations, and the determination of instantaneous centers of rotation methods, velocity and acceleration studies, sliding, rolling states, Coriolis acceleration, motion curves, cams, gears.

Course Objectives:

1. To be able to analysis kinematic systems consisting of limbs and gears
2. To be able to analysis, the position, velocity and acceleration in a system
- 3.To be able to synthesis the system consisting of the of limbs.
- 4.To be able to analyze the movement of the system that produces the desired gear.

Text book:

1. Erdman, A.G. ,Sandor, G.N. ,Mechanism Design: Analysis and Synthesis, Prentice Hall, 2000.
2. Söylemez E. ,Mekanizma Tekniği, Nobel yayıncılık, Ankara, 2000

MMU 303 Machine Elements-I (4+0+0+4)ECTS:6

Significance and steps of design, static loading, stress concentration, flow theory, variable loading, fatigue strength, continuous strength value, design factor , dimensioning of shafts, welding, soldering and bonding connections, bolts and rivets, sizing, wedge and pin connections, pressing and squeezing joints, springs.

Course Objectives

1. Ability to know flowing theories ,static loading, stress Concentrations.
2. Welding : Solder and Bonding Connections. Ability to design of bolts and rivets

Text book:

1. Akkurt, M., Makine Elemanları Cilt I-II, Birsen Yayınları. ,2004.

MMU304 Machine Elements-II (4 +0 +0 +4) ECTS: 6

Friction and lubrication theory, plain bearings, roller bearings selection. Belt and pulley connections, threaded wheels.

Course Objectives :

- 1 The ability to know the gear wheels.
- 2 The ability to choose the bearing deposits.

Textbook:

- 1 . Akkurt, M., Makine Elemanları Cilt I-II, Birsen Yayınları, Ankara,2003

TBM301 Applied Mathematics for Mechanical Engineering (3+0+0+3) ECTS:4

The place of mathematics in engineering, engineering problems and theoretical study of physical variables, differential equations and applications to engineering problems, and their solutions, the use of initial and boundary conditions, solutions, physical interpretation, ordinary differential equations, and engineering applications, differential equation systems and engineering applications, and engineering applications of partial differential equations, finite difference and finite element techniques for mechanical engineering applications.

Courses Objectives:

1. Ability to do engineering calculations.
2. Ability to know differential equations with engineering applications

Textbook:

1. Yaşar, İ. ,Uygulamalı Matematik, Siyasal Kitap Evi, Ankara,2005.

MMU306 Energy Conversion Principles (3+0+0+3) AKTS:3

Principles of electromechanical energy conversion, electrical machinery fundamentals, generalized acceptance of electric machine, a different reference planes transformations, dynamic equations of electric machines and solutions, numerical calculations. Electromechanical energy conversion principles and the basics of electrical machines, generalized adoption of the electric machine, the reference planes of different transformations, the dynamic equations of electric machines, solutions, and teach numerical calculations.

Textbook:

1. P. C. Krause, O. Wasynczuk, S. D. Sudhoff. Analysis of Electric Machinery, The Institute Of Electrical and Electronics Engineers, Inc. New York. (Wiley, NY), 2002.
2. Chee-Mun Ong, Dynamic Simulation of Electric Machinery, Prentice Hall, 1998,
3. D.P. Sen Gupta & J.W. Lynn, Electrical Machine Dynamics, Macmillan Press. London, 1980

MMU302 Machine Dynamics (4+0+0+4) ECTS:6

Static forces on machines, the principle of superposition, mechanism forces, friction forces, the dynamic force studies, and D'Alembert principle of the motion equations, static and dynamic load studies, mass balance systems, rotary, single degree of freedom vibrations, balancing machines, cam-and gear dynamics, flywheels, the machines gyroscopic effects, yaw shaft.

Courses Objectives:

1. Create a motion equations of a dynamic system
2. Calculate the forces acting on the machine parts and arising from the movement
3. Calculate the forces and torques in joints
4. Analyze inverse kinematics and dynamics the problems.
5. Understand the principles of rotor dynamics.
6. Learn about balancing and isolation techniques.
7. To understand the dynamics of gear systems.

Textbook:

1. Norton R.L. Design of Machinery: An introduction to synthesis and analysis of mechanisms and machines, Mcgraw-Hill, 2003.

MMU312 Heat Transfer (4+0+0+4) ECTS:6

Fourier law of heat conduction equation for situations where continuous and non-continuous, continuous analytical solutions for some situations, fins and fin efficiencies for various flaps, non-continuous systems, heat conduction, the heating and cooling of the analytical calculation of the various shapes of objects, numerical solution of heat transfer problems. Forced convection heat transfer pipes and flow around objects, objects and empty spaces around the free convection heat

transfer, film and droplet condensation in stagnant and forced convection boiling, gas and solid radiation, convection and radiation heat transfer. Heat exchangers and their design techniques, mass transfer.

Course Objective

1. Ability to analyze and evaluate data.

Text book:

1. Incropera, F. P. ,ve Dewitt, D. P.. , “Isı ve Kütle Geçişinin Temelleri,” Türkçe Çevirisi, Literatür Yayıncılık, Ankara, 1996.

MMU399 Organization Practice(0+0+0+0) ECTS:2

The internship is called "business-organization internship". The student to recognize the plant, production-related installation, maintenance, and practical information on issues related to the organization with the aim of gaining thirty (30) working day consists of the following sections.

- a) Business: Business supply, production lines, assembly, maintenance, quality control, raw material and product storage and includes topics such as marketing and is twenty (20) work days.
- b) Organization: work preparation, management and organization, office management, document preparation, document flow, filing, and includes topics such as archives and is ten (10) work days.

Fourth Year

MMU 475 Machinery Laboratory (3+2+0+4) ECTS:5

For machine experiments involve heat transfer, fluid mechanics, materials and internal combustion engines. In our experiments, were aimed to analysis and observation of the various factors and magnitudes affected on mechanical engineering. Material testing laboratory casting, molding and core sand tests, tensile and applications, hydraulic laboratory pressure gauges calibration, determination of the center of pressure, orifice flow experiment, water-jet test, axial and radial turbine blower test, determination of tank emptying test, demonstration of cooling and condensation heat lab - evaporation temperature measurement and calculation. Lab machine tools, CNC lathes, milling machines, grinding machine tool applications, laboratory performance characteristics of the engine, the indicator diagrams, energy losses, and exhaust gas analysis and monitoring aimed to examine.

Course Objectives

1. Ability to apply knowledge of basic sciences (mathematics, physics, chemistry).
2. Ability to design and conduct experiments as to analyze and interpret data.
3. Ability to develop, design and choose the desired qualities (yield, cost etc.) for a machine
4. Ability to identify, formulate, solve engineering problems.
5. Ability to understand the broad education necessary to understand the impact of engineering solutions in a global and societal context.
6. Ability to communicate written and oral effectively.
7. Get an understanding of professional and ethical responsibility.
8. Ability to engage in life-long learning.
9. Ability to gain knowledge of contemporary issues.

Text book:

1. Pancar, Y. , Hidrolik Makineler Laboratuar Deneyleri, Seç yayıncılık, Ankara, 1987.

MMU499 Graduation Project (4+0+0+4) ECTS:5

Under supervision of advisor undergraduate students must prepare final project on a topic related to selected in mechanical engineering.

FOURTH YEAR ELECTIVE COURSES

YD401 Foreign Language I (3+0+0+3) ECTS:5

Both students study the technical reading passages about their field (Iron and Steel, Steel Heat Treatment, Bearing lubrication, Production tools, Source, Steam Boilers, Steam Locomotives, Condensation and Condensers, Centrifuges, Turbines, Internal Combustion Engines, Carburetor System, Jet Engine) and provide exercises with regard to English language.

Textbook:

1. Özdağ, N. ,Mesleki İngilizce, Kök yayıncılık, Ankara, 2000.

YD402 Foreign Language II (3+0+0+3) ECTS:5

Both students study the technical reading passages about their field (Turbo Engines, Wings, Radioactivity, Chain Reaction, Reactor Coolant System, Conductors and Conductivity, Induction Motors, Electrolysis, Fluid Flow and Measurement, Liquid Pumps, Oil) and provide exercises with regard to English language.

Textbook:

1. 1. Özdağ, N. ,Mesleki İngilizce, Kök yayıncılık, Ankara, 2000

MMU403 Numerical Analysis (3+0+0+3) ECTS:5

Introduction to Numerical Analysis, calculation of the roots of equations (graph bisection, the placement of a simple point iteration, Newton-Raphson and Secant methods), multiple roots and non-linear systems of equations. matrices and systems of linear equations, linear algebraic equations, Gaussian elimination, matrix inversion, Gauss-Seidel and Jacobi iterative method.

Course Objectives

1. Learning solution of various mathematical problems numerically.

Textbook

1. Altaç, Z. ,Basic Program Örnekli Nümerik Analiz, Osmangazi Üniversitesi, Müh. Mim. Fakültesi Yayını, Eskişehir, 1993.

MMU404 Heating and Ventilation (3+0+0+3) ECTS:5

Thermal comfort and design requirements, heating principles, hot water, low pressure steam, hot water and air heating systems, the calculation of heat loss in buildings, to determine the diameters on pipe networks, principles of air conditioning, examination of the air conditioning in the psychometric diagram, calculation of heat gain.

Course Objectives

1. Ability to know principles of heating.
2. Ability to calculate heat losses in buildings.
3. Ability to determinate air conditioning in the psychometric diagram

Textbook:

1. Heating, Ventilating and Air Conditioning: Anly. And des. ,Faye C McQuiston, Jeffrey D Spitler, Jerald D Parker, John Wiley. ,USA.2000.

MMU405 Internal Combustion Engines(3+0+0+3) ECTS:5

Ideal cycles, reciprocating engines and operating principles, fuels, parameters of the engine of ideal cycles, characteristics of engine cycles, heat distribution and mixing process in engines, diesel engines, fuel systems, ignition systems and electrical equipment in engines.

Course Objectives

1. Knowing utilization fields and types of internal combustion engines.
2. Understanding yield and thermodynamics of Otto and diesel engines.
3. Understanding operating principles of Otto and diesel engines

4. Understanding the effect of the combustion process and knocking to the engine performance
5. Recognition of fuel injection systems on Otto and Diesel engines.
6. Knowing calculation principles of engines
7. Understanding the importance of alternative fuels and exhaust emissions

Text book:

1. Grohe, G. ,Çev.Kuşhan, B. ,Oto ve Dizel Motorları. , Bilim Teknik Yayınevi , İstanbul, 1999.
2. Taylor ,C.F. &Taylor, E.S. ,The Internal Combustion Engines International Textbook Company. Pennsylvania, 1986.

MMU406 Manufacturing Engineering (3+0+0+3) ECTS:5

Machine tool systems, chipless production methods, numerical and CNC machine tools, CAD-CAM systems, preparation of business plans, machining methods, general examination of manufacturing process .

Textbook:

1. Danilevsky V. ,İmalat Mühendisliği, MMO yayınları, Ankara, 1987.

MMU407 Heat and mass Transfer (3+0+0+3) ECTS:5

Analysis of heat conduction problems, steady-state heat conduction problems in one dimensional, steady-state heat conduction problems in two-dimensional , unsteady heat conduction problems, of analysis of heat convection problems, penstock flows inside channel, penstock flows outside channel, natural convection, heat exchangers analysis, heat transfer through boiling and condensation, mass transfer, the similarities between mass and heat transfer, mass transfer by diffusion, analysis of systems involving mass transfer, time dependent mass transfer problems.

Textbook :

1. Lienhard J. H. ,A Heat Transfer Textbook, 3rd Edition, Phlogistan Pres, Cambridge/MA, USA, 2001.

MMÜ408 Thermal Power Plants (3+0+0+3) ECTS:5

Energy Conversion, Power Cycles, power generation based on fossil fuels, Thermal Power Plants, Environmental Effects of Thermal Power Plants , Hydraulic Plants, Solar Energy Power Generation, Wind Energy Power Generation, Geothermal Energy Power Generation, Nuclear Energy Power Generation, Wave Energy Power Generation, Biomass and biogas Power Generation, Hydrogen Energy and Fuel Cells

Text book:

1. Wood, A.J. ,Wollenberg, B.F. ,Power Generation, Operation andControl, Jojn Wiley and Sons, 1984.

MMÜ409 Solar Energy (3+0+0+3) ECTS:5

Heat transfer mechanisms, steady heat conduction by one-dimensional, thermal resistance, analytical and numerical solution of steady-state heat conduction systems in two-dimensional, unsteady heat conduction, forced and natural convection heat transfer, heat transfer by radiation.

Text book:

- 1.Öztürk, A. ,Isı Geçişi, Çağlayan Kitabevi, Ankara,1996

MMU410 Welding Technology (3+0+0+3) ECTS:5

Gas metal arc fusion welding techniques, shielding gases, submerged arc welding method TIG (Tungsten Inert Gas) MAG (Metal Active Gas) method, plasma welding method, electron beam welding, laser welding, electro welding, solid state welding techniques, friction welding, friction stir welding, diffusion welding, ultrasonic welding, welding of dissimilar metals, metal-ceramic joints, special cutting techniques.

Text book:

1. Ertürk, İ. , Oksi asetilen kaynağı, Başbakanlık basımevi, Ankara, 1989.

MMU411 Measurement and Quality Control (3+0+0+3) ECTS:5

Basic concepts, purpose, scope and benefits of quality control. Tolerance, measurement and production relations. Destructive and non-destructive examinations. Default numbers. Quality control techniques and costs, frequency distributions, probability, statistical quality control. Control chart method. Acceptance sampling and sample size, product reliability. Organization and management of quality control. Quality assurance system, ISO 9000 series and standards.

Textbook:

1. Akkurt, M. , Kalite Kontrol, Birsen Yayınevi, İstanbul, 2002.

MMU412 Power Transmission (3+0+0+3) ECTS:5

Properties of compressed air and basic pneumatic circuit elements explain within the scope of the course. System components (compressors, valves, cylinder) discusses about calculations for the selection and dimensioning. Pneumatic system elements and the establishment of basic pneumatic circuits are explained with examples.

Textbook:

1. Özcan, F. , Pnömatik Akışkan Gücü, Mert Eğitim Yayınları, Ankara, 1986.

MMU413 Plant Organization (3+0+0+3) ECTS:5

Factory analysis and planning techniques. Process and process analysis, method and time study. Determination of production and production standards. Workplace organization, facility renovation and maintenance problems. Fees and methods of job evaluation Quantitative planning and control techniques. Some of the modern mathematical and statistical models. Operating organization and management structure. Cost, budgeting, personnel, sales and planning techniques

Textbook:

1. Ünüvar, A., Üretim Yönetimi ve Organizasyonu, Seçkin Yayınları, Konya, 2003

MMU414 Engineering Economy (3+0+0+3) ECTS:5

Decision-making in engineering, the concept of equivalence, the equivalent of the interest cost and the role of the calculation of returns. The criteria used in the evaluation of investment alternatives, the net present value criterion, the annual equivalent cost of the measure, by the repayment period. Rate of return analysis, tear and depreciation, equipment replacement analysis, cost of capital, capital resources, investment opportunities, the opportunity cost.

Course Objectives

1. Ability to decision in engineering Mühendislikte Karar Verme becerisi
2. Ability to analysis for equipment renewal

Textbook:

1. Işık, A. , Mühendislik Ekonomisi, Birsen Yayın Evi, Ankara 2002.

MMU415 Automatic Control (3+0+0+3) ECTS:5

Basic concepts. MATLAB and Simulink block diagrams, , classification of control systems, the establishment of mathematical models of physical systems, numerical simulation, Laplace transform, transfer functions, frequency response systems, industrial control bodies and setting the control loop stability, the roots and the curve.

Course Objectives

1. Ability to establish mathematical models of physical systems.
2. Ability to make Industrial Organs Control and Settings

Textbook:

1. Benjamin C.K. ,Otomatik Kontrol Sistemleri, Literatür Yayıncılık, Ankara,1999.

MMU416 Transport Technique (3+0+0+3) ECTS:5

Hoisting and conveying machinery elements: ropes, chains, hooks, belts and pulleys, brakes and electric motors, Bridge cranes calculation of full and truss systems, execution mechanism: Cars, rails and wheels, console, Cranes column.

Textbook

1. Kurbanoglu, C. ,Transport tekniği, Atlas yayın dağıtım, İstanbul, 2001.

MMU417 Hydraulic Machines (3+0+0+3) ECTS:5

Classification of Hydraulic current machines, wheel energy conversion, similar to cavitation determination of the pump duty point, calculation and drawing of low specific speed gears, principles of design Pelton, Francis and Kaplan turbines. Design of centrifugal and axial pumps, Design principles axial impellers. Connection of pumps in parallel and series.

Course Objectives

1. Ability to classify Hydraulic Power Machinery
2. Ability to know design principles Pelton Turbines.

Textbook

1. Karagöz, İ., Hidrolik makineleri, Uludağ Üniv Yay, Bursa 2002.

MMU418 Robotic Systems (3+0+0+3) ECTS:5

Robots, classification, characteristics of the robot, robot kinematics, rotational movements, the inverse kinematic transformations, work space analysis, differential movement of the robots and the static, state equations, fixed solutions of linear feedback systems, single-axis PID control.

Textbook:

1. P.J.McKerrow, Introduction to Robotics, Addison-Wesley Publish. Company, 1995
2. M.P.Groover, M.Weiss, R.N.Nagel, N.G.Odrey, Industrial Robotics, McGraw Hill, 1986
3. D.M.Auslander, C.J.Kempf, Mechatronics, Prentice Hall Inc, 1996

MMU419 Business Law (3+0+0+3) ECTS:5

Introduction, the individual labor law, general information, the basic concepts of business law, labor law and the scope of the service contract, the service arising from debts, service termination, severance and paid annual leave, collective labor law, trade unions, general information, types of union, trade unions, organization, the organization of trade unions, trade unions and confederations activities, income and expenses of the trade unions, to collective bargaining, conflict, strikes and lockouts, job security.

Textbook:

1. Çelik, N. ,İş hukuku dersleri, Beta basın yayın dağıtım, İstanbul, 2005.

MMU420 Hydraulic and Pneumatic Systems (3+0+0+3) ECTS:5

Basic principles of hydraulics: continuity, Bernoulli's equation, flow types, Reynolds number, laminar flow, turbulent flow, hydraulic components and circuits: Gear pumps, screw pumps, vane pumps, pumps, Piston pumps, Directional control valves, flow control valves, pressure control valves, Cylinders, Basic principles of Pneumatics: The absolute temperature, absolute pressure, constant temperature, Isothermal, adiabatic, Compression, Pneumatic Components and Circuits: Compressor, air lubricator, Directional control valves, flow control valves.

Textbook:

1. Michael J. Pınches, John G. Ashby Güç Hidroliği, Milli Eğitim Bakanlığı, Ankara, 1994

MMU421 Air-conditioning Systems (3+0+0+3) ECTS:5

Heat, Temperature, Measurement, Specific heat, Phase change, boiling point, melting point, enthalpy curve, heat transfer, Effective pressure, absolute pressure, Cooling System: Cooling, Cooling systems, conversion chart, Compressor, Condenser, Evaporator, Heat Exchanger, Cooling Electricity: materials used in electrical circuit and the principles of operation; Climate Systems: Air, Cooling, Electrical, Heat pump.

Textbook:

1. Demir, E. ,İklimlendirme Sistemleri, Ankara Üniversitesi yayını, Ankara, 2002

MMU422 Boilers-Heat Exchangers (3+0+0+3) ECTS:5

The definition and the importance of Heat exchanger. Classifications of heat exchangers. Heat exchangers account. Operating characteristics of the heat exchangers. Determination of overall heat transfer coefficient of heat exchangers. Variety of heat exchangers and their features. Cooling towers, regenerators, recuperators . Design principles of Heat exchangers.

Textbook:

1. Bird R.B. ,Stewart, W. E. and Lightfoot, E. N. ,Transport Phenomena, 2nd Ed. ,John Wiley&Sons, Inc.
2. Incropera, F.P. ,DeWitt, D. P. ,Fundamentals of Heat and Mass Transfer , 4th Ed. ,JohnWiley&Sons
3. Mills, A. F. ,Mass Transfer, Prentice Hall, 2001.

MMU423 Alternative Energy Sources (3+0+0+3) ECTS:5

Definitions alternative sources and theoretical foundations of alternative energy input. Implementation of basic engineering sciences to design of Alternative energy systems. Hydraulic energy, solar energy, geothermal energy and wind energy systems. Bio-energy systems. Integrated modeling of energy systems. Energy production, distribution, storage andconsumption relations interaction with the environment.

Textbook:

1. Mac Donald, B. ,Kuetemeyer, F. ,Energy, Power and Transportation Technology. Bennet and Knight Publishing Company, USA, 1986.

MMU424 CNC Machine Tools-I (3+0+0+3) ECTS:5

Fundamentals of CNC Control and CNC machine tools / Control Systems / Structure and Portion Control Circuits, CNC Machine Tools Construction Specifications

Textbook:

1. Ergün,M. ,Nümerik kontrollü takım tezgahları ve programlama prensipleri, Makine müh odası, Ankara

MMU425 CNC Machine Tools-II(3+0+0+3) ECTS:5

Manual Programming / Computer Programming Using / High Speed CNC Machines Properties.

Textbook:

1. Ergün, M. Nümerik kontrollü takım tezgahları ve programlama prensipleri, Makine müh odası, Ankara

MMU426 Gas Turbines (3+0+0+3) ECTS:5

Introduction to gas turbines and gas turbine engines, introduction to gas turbines thermodynamics and the ideal gas cycle for inter cooling & inter heating, simple Brayton cycle, Brayton cycle with regenerators, gas turbine cycle for aircraft (jet) engines.

Textbook:

1.Öztürk, E.,Türbin Motorların Aerotermodinamiği ve Mekaniği, Birsen Yayınevi, Ankara,1997.

MMU427 Cooling Technique (3+0+0+3) ECTS:5

Introduction to cooling and basic concepts, requirement reasons for cooling, relationship between cooling and air conditioning. The use of psychometric diagram, recycled air systems, refrigeration cycles, refrigeration systems, coefficient of performance (COP), net cooling effect, the compression work, the use of the pressure-enthalpy diagram for refrigeration cycles, vapor compression refrigeration cycles, components for the cooling system, condenser, evaporator the expansion valve and refrigerant compressor, cooling load calculations.

Textbook:

1. Douglas J.F. ,Gasiorek, J.M. Swaffield J.A. ,Fluid Mechanics, Longman Ltd. Singapore, 1996.

MMU428 Natural Gas Systems (3+0+0+3) ECTS:5

Natural gas and properties, compared with other fuels. Use of natural gas for houses, determination of natural gas requirements, diversity factor, natural gas safety systems. Industrial use of natural gas calculation of installation and safety measures for natural gas in the industrial. Conversion of natural gas in houses and industries.

Textbook: Course notes

MMU429 Hydraulic-Technical Systems in Industry (3+0+0+3) ECTS:5

Basic principles of hydraulics, standard symbols in hydraulics, hydraulic pumps and motors, hydraulic cylinders, hydraulic valves, hydraulic pipes and hoses, seals, filters, oil reservoir, hydraulic accumulators, pressure gauges, hydraulic fluids, hydraulic system failures and determinations, hydraulic circuits, introduction to pneumatics , physical principles of pneumatics, production of air, maintenance and distribution of standard symbols pneumatics, pneumatic cylinders, pneumatic motors, pneumatic valves, pneumatic circuits and drawings.

Textbook:

1. Söylemez E. ,Mechanisms, ODTÜ, No:64, Ankara,1999

MMU430 Mechanical Behaviour of Materials (3+0+0+3) ECTS:5

Crystal structure, crystal defects, dislocations and mechanical properties, effects, plastic deformation mechanisms of change, mechanisms to increase resistance of materials, principles and applications of elastic fracture mechanics, fatigue and fracture in engineering materials, material selection against fatigue, selection of materials for high temperature, damage analysis.

Textbook:

1. Anık, S. ,Malzeme Bilgisi ve Muayenesi, Birsen Yayınevi, İstanbul, 2000.

MMU431 Engine Construction (3+0+0+3) ECTS:5

Design criteria for engines, calculation of engine volume and the cylinder diameter / stroke length ratio. Volumetric efficiency, the highest temperature and pressure in engine. Cylinder block and boot design, the cylinder head design. Engine pistons, rings, pins and crankshaft design.

Textbook:

1.Palavan, S. ,Pistonlu Makinalar Dinamiği, İTÜ Sayı: 899,2000

MMU432 Design of Mechanisms (3+0+0+3) ECTS:5

Introduction to kinematic synthesis. Basic linkage mechanisms: Grashof's theorem, the optimum angle, crank-rocker and slider-crank mechanisms. Two-, three-, and four-position synthesis: graphical and analytical methods, complex numbers, modeling. Correlation of crank angles. Current application examples.

Textbook:

1. Söylemez E. ,Mechanisms, ODTÜ, No:64, Ankara,1999.

MMU433 Sanitary Installation Technique (3+0+0+3) ECTS:5

The onset and development of sanitary facilities, drinking water features, water consumptions, plumbing facilities, clean water facility, precipitation, surface and ground water, city water facilities and transmission methods, the building clean water facilities, building hot water, calculation of pipe diameter, calculation of pipe diameters for dirty water facilities.

Textbook:

- 1.Sait, E. ,Yapıda sıhhi tesisat, Birsen yayınevi, Ankara,1998.

MMU434 Composite Material Design (3+0+0+3) ECTS:5

Introduction to composite materials, fibers, polymer matrix composites, ceramic matrix composites, metal matrix composite materials, mechanics of composite fiber-term, short fiber composite mechanics, particle-reinforced composite mechanics, the concept of Interfacial strength, usage of composite materials, composite materials applied to the test methods.

Textbook:

1. Şahin, Y. ,Kompozit Malzemelere giriş, Seçkin Yayın, Ankara, 2006.

MMU435 Machine Design-I (3+0+0+3) ECTS:5

To understand the general characteristics of the design of a part or machine. To make preliminary research of necessary parts for production of a machine. Examining on similar parts and machines. to Evaluating relevant comments and suggestions about design. Draw a schematic picture of the part and the machine. Choosing the appropriate material for your design specifications.

Textbook:

1. Mechanical Engineering Design ,Joseph Edward Shigley, McGRAW HILL,Singapur,1986

MMU436 Machine Design-II (3+0+0+3) ECTS:5

Calculating dynamic and static strength of the material selected for the design and choosing appropriate strength of material. Drawing sketch of assembly. Ordering material, is the appropriate size and strength , according to the design. Order to determine the production process. Choosing appropriate welding, soldering, bolt connections for the produced parts. Selecting the engine, gearbox and electrical power supply and other components in appropriate features.. To understand the aesthetics and ergonomics. Choose the appropriate method for dyeing and finishing. Order operation process for produced parts and machine. Designing for conversion of the raw state to finished for a product.

Textbook:

1. L. Janovsky, Elevator Mechanical Design, Ellis Horwood Ltd., 1993.
2. R.Kulwiec, Materials Handling Handbook, John Wiley & Sons. NewYork, 1985
2. R. Robinson, Handbook of Materials Handling, Ellis Horward ltd.,1986

MMU437 Insulation (3+0+0+3) ECTS:5

Basic concepts, and properties of thermal insulation materials, variety applications of insulation materials, insulation calculations, buildings, water vapor condensation, thermal insulation of buildings, cold room insulation, sound insulation, TSE 825 and applications.

Textbook:

1. Cevdet Emin Ekinci Atlas Yayınları; İstanbul, 2003, 19,5 x 24 cm. ,353 sayfa, Türkçe., ISBN No: 9.756.574.208

MMU438 Corrosion and Surface Treatments (3+0+0+3) ECTS:5

Definition and importance of corrosion, electrochemical fundamentals of corrosion, chemical thermodynamics and electrochemical of corrosion, electrochemical and chemical reactions on corrosion, corrosion potential and corrosion current in the presence of oxide film, applied corrosion current and corrosion control, corrosion types, the potential-pH (Pourbaix) diagrams, corrosion rate measurement, the mechanism of passivation film formation mechanism, corrosion prevention, various surface treatment, corrosion inhibitors, the basic protection principles of cathodic-anodic, water and soil corrosion, corrosion in industry

Textbooks:

1. J.O'M. BOCKRIS/A.K.N: REDDY 'Modern Electrochemistry
2. 2', Saadet Üneri "Korozyon ve önlenmesi". (1998) Korozyon Derneği
3. J.O'M. BOCKRIS/A.K.N: REDDY 'Modern Electrochemistry 2',

MMU439 Powder Metallurgy (3+0+0+3) ECTS:5

Steps of Powder metallurgy, powder production; atomization, metallurgy production methods, condensation processes, fiber production, liquid swivel and breakdown rolling, mechanical method, powder synthesis, pre-processing of powders, , testing, and inspection of powder, powder mixing and blending, pressing, injection molding, pre-sintering, sintering, hot, cold isostatic pressing, secondary operations, high-density, other methods used in the manufacture of powder, powder metallurgy products characteristics, design of powder metallurgy products, properties of powder metallurgy products, powder systems and applications, advantages and disadvantages of powder metallurgy.

Textbooks:

1. Randall M. German. (1984). Powder Metallurgy Science. Metal Powder Industries Federation. (MPIF). 2nd Edition. New Jersey. USA.
2. Leander F. Pease III and William G. West. (2002) Fundamentals of Powder Metallurgy. MPIF. New Jersey. USA
- Werner Schatt, Klaus-Peter Wieters. (1997) Powder Metallurgy. Processing and Materials. EPMA. (European Powder Metallurgy Association). UK.

MMU440 Casting Technology (3+0+0+3) ECTS:5

Casting methods, cast iron part of the design, Runner, feeder design, sand casting, plaster and ceramic mold casting, precision casting, low pressure die casting, pressure die casting, foam model casting, wax casting, continuous casting, the casting of non-ferrous metal melt reactions, bulk casting molten iron reactions, reactions of molten iron and steel casting, casting defects, foundry equipment.

Textbooks:

- 1-Döküm Teknolojisi Ergin Çavuşoğlu
- 2-Metals Handbook ASM
- 3-Foundry Technology, P.R. Beeley
- 4-Metallurgical Principles of Founding V.Kondic
- 5-Principles of Metal Casting R.W. Heine

MMU441 Plastic Forming of Metals (3+0+0+3) ECTS:5

Laws of plastic deformation, rolling, forging, extruding, cutting sheet material, sheet material deep drawing dies, energy calculations, the selection criteria of process parameters.

Textbook:

1. Kayalı, E. ,Plastik Şekil Verme Teknikleri, Nobel yayınları, Ankara, 2003.