GAZİ UNIVERSITY
FACULTY OF TECHNOLOGY
MANUFACTURING ENGINEERING
ECTS FORM

GAZİ UNIVERSITY FACULTY OF TECHNOLOGY ECTS FORM								
Course Code and Title	TAR-101 History of Turkish Revolution-I							
Credits	2							
ECTS	2							
Name of Lecturer and e-mail address								
Department/Program	Department of Manufacturing Engineering							
Course Type	Obligatory							
Course Language	Turkish							
Course Semester	Fall							
Prerequisites	None							
Course Objectives	To teach stages of establishment in modern Turkey							
Course Contents	Modernization process of Turkey							
Course Learning Outcomes	Having knowledge about the establishment of Turkish Republic and Ataturk							
References **(References must be up to date)**	**Books**	1. Mustafa Kemal, Nutuk, Ankara, 1997. 2. Aybars, E., Türkiye Cumhuriyeti Tarihi 1-2, İzmir, 2005. 3. Komisyon, Türkiye Cumhuriyeti 1-2, Atatürk Araş. Mer. Yay. 4. Komisyon, Atatürk İlkeleri ve İnkılap Tarihi I/1-2, II, YÖK Yayını						
	Journals, Articles, Papers, Symposiums							

Planned learning activities and teaching methods	**Theor**	**Pract**	**Lab.**	**Projects**	**Assign.**	**Other**	**Total**	**ECTS**
	30					20	50	2

Assessment Methods and Criteria	**Quantity (mark with "X")**	**Percentage (%)**
Midterm Exam	X	40
Quiz		
Assignment		
Projects		
Laboratory		
Practice		
Other		
Final Exam	X	60

WEEKLY COURSE PLAN	
Week	**Contents and topics**

1. Week	Conceptions revolution and etc
2. Week	Regression causations of Ottoman Empire (internal and external causations)
3. Week	Modernization activities in Ottoman Empire (Periods of the Mahmud I and Selim III)
4. Week	Innovations at the period of Mahmud II
5. Week	Political position and dismemberment of Ottoman Empire during 19th century
6. Week	Period of Tanzimat
7. Week	Period of Constitutional Monarchy
8. Week	Midterm exam
9. Week	Panslavism
10. Week	Wars of Trablusgarp and I.-II. Balkan
11. Week	Causes and results of the First World War
12. Week	Mustafa Kemal Pasha, Congresses of Erzurum and Sivas
13. Week	The national oath and establishment of TBMM
14. Week	Conceptions revolution and etc.
15. Week	Conceptions revolution and etc.

GAZİ UNIVERSITY FACULTY OF TECHNOLOGY ECTS FORM								
Course Code and Title	FIZ-101 Physics-I							
Credits	3							
ECTS	4							
Name of Lecturer and e-mail address								
Department/Program	Department of Manufacturing Engineering							
Course Type	Obligatory							
Course Language	Turkish							
Course Semester	Fall							
Prerequisites	None							
Course Objectives	Teaching the fundamental concepts and principles of physics in detail. Giving general knowledge to students about the laws of motion, Preparing the students to their own field courses by teaching the applications of physical principles to their field.							
Course Contents	Units and vectors, Motion in one dimension, Motion in two dimensions, Basic forces of universe and Newton's laws of motion, Work and energy, Circular motion, Applications of Newton's laws, Potential energy, Energy conservation, Linear momentum and collisions, Rotation of a rigid body about an axis, Rolling motion and angular momentum, Torque, Static equilibrium, oscillatory motion, Law of universal gravitation, Pressure and basics of fluid mechanics							
Course Learning Outcomes	It is provided students with improvement in capability of solving basic concept of physics problem and analysing them.							
References **(References must be up to date)**	**Books**	1. Serway, R.A., Çeviri Ed. K. Çolakoğlu (5. baskıdan çeviri), Fen ve Mühendislik için Fizik I (Mekanik), Palme Yay., 2002 2. Keller, F.J., Gettys, W.E. ve Skove, M.J., Çeviri Editörü: R. Ömür Akyüz, Fizik I (Mekanik), Literatür Yay., 2006						
	Journals, Articles, Papers, Symposiums							

Planned learning activities and teaching methods	**Theor**	**Pract**	**Lab.**	**Projects**	**Assign.**	**Other**	**Total**	**ECTS**
	45		15	15		50	125	4

Assessment Methods and Criteria	**Quantity (mark with "X")**	**Percentage (%)**
Midterm Exam	X	40
Quiz		
Assignment		
Projects		
Laboratory		
Practice		
Other		
Final Exam	X	60

WEEKLY COURSE PLAN

Week	Contents and topics
1. Week	Unit systems and vectors
2. Week	Motion in one dimension
3. Week	Motion in two dimensions
4. Week	Fundamental forces of universe and the Newton's laws of motion
5. Week	Applications of Newton's laws and force of universal gravitation
6. Week	Concepts of work-energy and their applications
7. Week	Potential energy and conservation of energy
8. Week	Midterm exam
9. Week	Linear momentum and collisions
10. Week	Circular motion
11. Week	Rotation of a rigid body about an axis
12. Week	Torque and static equilibrium
13. Week	Rolling motion and angular momentum
14. Week	Oscillatory motion and its applications
15. Week	Fundamentals of fluid mechanics

GAZİ UNIVERSITY FACULTY OF TECHNOLOGY ECTS FORM								
Course Code and Title	MAT-101 Mathematics-I							
Credits	4							
ECTS	6							
Name of Lecturer and e-mail address								
Department/Program	Department of Manufacturing Engineering							
Course Type	Obligatory							
Course Language	Turkish							
Course Semester	Fall							
Prerequisites	None							
Course Objectives	To learn some basic concepts of Mathematics.							
Course Contents	Real and complex numbers, polynomials, second order one variable equations. Equations having root and fractional equations. Solutions of equations which are can be transform to second order equations. Some properties of second order equations and solutions of inequalities. Determinants and solutions of linear equations. Line equations on a surface. Vectors. Logarithm.							
Course Learning Outcomes	To have some basic notions of numbers, one variable equations, solutions of linear algebraic equations, determinant, vectors and logarithm.							
References **(References must be up to date)**	**Books**	1. Hacısalihoğlu, H., Temel ve Genel Matematik 1, Seldem Yay., Ankara, 2000 2. Halilov, H., Hasanoğlu, A. ve Can, M., Yüksek Matematik 1-2 3. Balcı, M., Hacısalihoğlu H. ve Gökdal F., Temel ve Genel Matematik 4. Arıkan, H., Özgür, İ. ve. Gözükızıl, Ö.F, Genel Matematik I-II						
	Journals, Articles, Papers, Symposiums							

Planned learning activities and teaching methods	**Theor**	**Pract**	**Lab.**	**Projects**	**Assign.**	**Other**	**Total**	**ECTS**
	60					90	150	5

Assessment Methods and Criteria	**Quantity (mark with "X")**	**Percentage (%)**
Midterm Exam	X	40
Quiz		
Assignment		
Projects		
Laboratory		
Practice		
Other		
Final Exam	X	60

WEEKLY COURSE PLAN	
Week	**Contents and topics**

1. Week	Real and complex numbers
2. Week	Complex Numbers
3. Week	Complex Numbers
4. Week	Polinomials
5. Week	Second order one variable equations.
6. Week	Equations having root and fractional equations.
7. Week	Solutions of equations which are can be transform to second order equations
8. Week	Midterm exam
9. Week	Some properties of second order equations and solutions of inequalities.
10. Week	Determinants
11. Week	Solutions of linear equations
12. Week	Solutions of linear equations
13. Week	Line equations on a surface
14. Week	Vectors
15. Week	Logarithm

GAZİ UNIVERSITY FACULTY OF TECHNOLOGY ECTS FORM								
Course Code and Title	TUR-101 Turkish Language-I							
Credits	2							
ECTS	2							
Name of Lecturer And e-mail address								
Department/Program	Department of Manufacturing Engineering							
Course Type	Obligatory							
Course Language	Turkish							
Course Semester	Fall							
Prerequisites	None							
Course Objectives	Recognition of evolution of language, culture and civilization concepts, recognition of historic background and features of Turkish Language, recognition of how orthography and punctuation marks shall be used; gaining and improvement of scientific, questioning, critical commenting, creative and constructive thinking habits.							
Course Contents	Notice, Language & Features of the Language, Language – Thought Relation, Mother Tongue, Context, Language and Expression, Symbol – Image, Culture and Types, Civilization, Petition Writing, Languages around the World and Place of Turkish Language among them, Historical Periods and Progress of Turkish Language, Current Status and Spreading Areas of the Turkish Language, Grammar and Sections, Elements in Turkish Language from Foreign Language, Orthography and Application, Punctuation Marks and Usage Related Applications.							
Course Learning Outcomes	To let students to sense the features and operational rules of Turkish language and illustrate; to improve vocabulary of the students via written and oral texts; to let students to gain compliance with spelling rules and appropriate usage of punctuation marks habits; to let students to gain book reading habits; to let students to gain scientific, questioning, critical commenting, creative and constructive thinking habits.							
References **(References must be up to date)**	**Books**	1. Yakıcı, A., Yücel, M., Doğan, M. ve Yelok, V. S., Üniversiteler İçin Türk Dili ve Kompozisyon Bilgileri (Editör: V. S. Yelok), Bilge Yayınları, Ankara, 2005. 2. Eker, S., Çağdaş Türk Dili, Grafiker Yay., İstanbul, 2006. 3. Parlatır, İ., Gülensoy, T. ve Birinci, N., Yüksek Öğretim Öğrencileri İçin Türk Dili Kompozisyon Bilgileri, Yargı Yayınevi, Ankara, 2003. 4. Bilgin, M., Anlamdan Anlatıma Türkçemiz, Anı Yayıncılık, Ankara, 2005						
	Journals, Articles, Papers, Symposiums							

Planned learning activities and teaching methods	**Theor**	**Pract**	**Lab.**	**Projects**	**Assign.**	**Other**	**Total**	**ECTS**
	30					20	50	2

Assessment Methods and Criteria	**Quantity (mark with "X")**	**Percentage (%)**
Midterm Exam	X	40
Quiz		
Assignment		

Projects		
Laboratory		
Practice		
Other		
Final Exam	X	60

WEEKLY COURSE PLAN	
Week	**Contents and topics**
1. Week	Notice, Language & Features of the Language,
2. Week	Language – Thought Relation,
3. Week	Mother Tongue, Context, Language and Expression, Symbol – Image,
4. Week	Culture (Language – Culture Relation, Culture Types),
5. Week	Civilization, Petition Writing,
6. Week	Languages around the World (Formation of Languages, Types of Languages, Classifications of the Languages)
7. Week	Place of Turkish Language among World Languages,
8. Week	Midterm exam
9. Week	Historical Periods and Progress of Turkish Language,
10. Week	Current Status and Spreading Areas of the Turkish Language,
11. Week	Midterm Exam
12. Week	Grammar and Sections (Phonetics, Formatting),
13. Week	Elements in Turkish Language from Foreign Language,
14. Week	Orthography and Application,
15. Week	Punctuation Marks and Usage Related Applications.
15. Hafta	Şimdiki zamanda kullanılan zaman zarfları

GAZİ UNIVERSITY FACULTY OF TECHNOLOGY ECTS FORM								
Course Code and Title	ING-101 English-I							
Credits	3							
ECTS	3							
Name of Lecturer and e-mail address								
Department/Program	Department of Manufacturing Engineering							
Course Type	Obligatory							
Course Language	Turkish							
Course Semester	Fall							
Prerequisites	None							
Course Objectives	The aim is to teach the students some basic grammar rules at the elementary level.							
Course Contents	Personal pronouns, possessive adjectives, nouns, and their plural forms, demonstrative, adjectives, this/that and these/those, some adverbs, Simple Present Tense, Simple Present forms of Be in positive, negative statements and in questions and answers. Conjunctions, demonstrative pronouns, definite, indefinite articles, verbal nouns personal pronouns as objects, modal verbs can, must and their usage with the examples.							
Course Learning Outcomes	The student learns to introduce himself, ask for and give names, greet people at different times of the day, say numbers, say what nationality he is, ask about people's nationality, ask where people from, ask about and identify objects, ask and talk about likes and dislikes, ask and talk about routines ask and talk about present activities ask and tell the time, ask and talk about ability.							
References **(References must be up to date)**	**Books**	1. Elementary Course books 2. Essential Grammar in Use 3. Oxford Dictionary 4. Passport to English						
	Journals, Articles, Papers, Symposiums							
Planned learning activities and teaching methods	**Theor**	**Pract**	**Lab.**	**Projects**	**Assign.**	**Other**	**Total**	**ECTS**
	45				15	15	75	3
Assessment Methods and Criteria	**Quantity (mark with "X")**					**Percentage (%)**		
Midterm Exam	X					40		
Quiz								
Assignment								
Projects								
Laboratory								
Practice								
Other								
Final Exam	X					60		
WEEKLY COURSE PLAN								

Week	Contents and topics
1. Week	Verb to be (positive, negative and question forms), subject pronouns, possessive adjectives, question word (what) and exercises
2. Week	Nouns and their plural forms , numbers (ordinal and cardinal) days, months, seasons, question words (who, how, how old, where)
3. Week	Present continuous tense (positive, negative and question forms) exercises
4. Week	Verbal nouns examples and exercises
5. Week	Simple present tense (positive, negative and question forms), some adverbs of time (always, usually, often, sometimes, never)
6. Week	Examples and exercises, question word what time, prepositions of time (in, on, at)
7. Week	General review
8. Week	Midterm exam
9. Week	Modal verb (can) positive, negative and question forms, examples and exercises, family members
10. Week	Must and Have to (positive, negative, question forms), the difference between must and have to
11. Week	Exercises with can, must, have to
12. Week	Subject pronouns, object pronouns, possessive adjectives, possessive pronouns
13. Week	Text studies with the related grammar points
14. Week	Vocabulary study
15. Week	General review

GAZİ UNIVERSITY FACULTY OF TECHNOLOGY ECTS FORM								
Course Code and Title	KIM-101 Chemistry-I							
Credits	3							
ECTS	4							
Name of Lecturer and e-mail address								
Department/Program	Department of Manufacturing Engineering							
Course Type	Obligatory							
Course Language	Turkish							
Course Semester	Spring							
Prerequisites	None							
Course Objectives	In order to teach the basic General Chemistry concepts, laws and phenomena with the scientific approaches.							
Course Contents	Fundamental concepts in Chemistry: Matter, element, compound, mole, mixture and some chemical concepts. Basic chemistry laws: Law of conservation of mass, law of constant composition, law of multiple proportions etc. Atomic and mole mass. Symbols, formulas, equations and compounds. Determination of empirical and molecular formulas. The oxidation state concept, describing and naming of chemical compounds. Chemical reactions and chemical equations, stoichiometry. Oxidation-reduction reactions (redox). The periodic table and some atomic properties. Electronegativity, ionization energy, electron affinity, quantum numbers and electron orbitals. Gases: The simple gas laws, the ideal gas equation, kinetic theory of gases, non-ideal (real) gases. Thermochemistry: Heat, heats of reaction and calorimetry. Chemical bonding: Basic concepts: Covalent and ionic bonding. Liquids, solids, and intermolecular forces. Solutions and their physical properties. Chemical equilibrium. Acids, bases and aqueous solution equilibrium. Thermodynamics: Some terminology, the laws of thermodynamics, Hess's law, Gibbs free energy. Electrochemistry: Faraday Laws, electrolysis, battery potential, Nernst equation. Organic Chemistry: Classification of organic compounds. Hydrocarbons (alkanes, alkenes and alkynes), alcohols, phenols, ethers, aldehydes and ketones. Carboxylic acids and their derivatives.							
Course Learning Outcomes	On the basis of general chemistry concepts and models thought during the course, the students will gain the problem solving abilities, to discuss them and to apply their knowledge to various chemical reactions.							
References **(References must be up to date)**	**Books**	1. Aydın, A.O., Sevinç, V. ve Şengil, İ.A, Temel Kimya, Aşiyan Yayınları, Adapazarı, 2003 2. Mortimer, C.E., Modern Üniversite Kimyası, Çağlayan Basım Evi, İstanbul, 1997. 3. Sienko, M.J. ve Plane, R.A., Temel Kimya, Savaş Yayınları, Ankara, 1983. 4. Tunalı, N.K. ve Aras, N.K., Kimya Temel Kavramları, Başarı Yayın., Ankara, 1995						
	Journals, Articles, Papers, Symposiums							

Planned learning activities and teaching methods	**Theor**	**Pract**	**Lab.**	**Projects**	**Assign.**	**Other**	**Total**	**ECTS**
	45	15	15	-		25	100	4

Assessment Methods and Criteria	**Quantity (mark with "X")**	**Percentage (%)**
Midterm Exam	X	40

Quiz		
Assignment		
Projects		
Laboratory		
Practice		
Other		
Final Exam	X	60

WEEKLY COURSE PLAN	
Week	**Contents and topics**
1. Week	Fundamental concepts in chemistry: Matter, element, compound, mole, mixture and some chemical concepts.
2. Week	Basic chemistry laws: Law of conservation of mass, law of constant composition, law of multiple proportions etc. Atomic and mole mass.
3. Week	Symbols, formulas, equations and compounds. Determination of empirical and molecular formulas.
4. Week	The oxidation state concept, describing and naming of chemical compounds. Chemical reactions and chemical equations,
5. Week	Stoichiometry. Oxidation-reduction reactions (redox).
6. Week	The periodic table and some atomic properties. Electronegativity, ionization energy, electron affinity, quantum numbers and electron orbitals.
7. Week	Gases: The simple gas laws, the ideal gas equation, kinetic theory of gases, nonideal (real) gases.
8. Week	Midterm exam
9. Week	Thermochemistry: Heat, heats of reaction and calorimetry. Chemical bonding: Basic concepts: Covalent and ionic bonding.
10. Week	Liquids, solids, and intermolecular forces.
11. Week	Solutions and their physical properties. Chemical equilibrium. Acids, bases and aqueous solution equilibrium.
12. Week	Thermodynamics: Some terminology, the laws of thermodynamics, Hess's law, Gibbs free energy.
13. Week	Electrochemistry: Faraday Laws, electrolysis, battery potential, Nernst equation.
14. Week	Organic Chemistry: Classification of organic compounds. Hydrocarbons (alkanes, alkenes and alkynes),
15. Week	Alcohols, phenols, ethers, aldehydes and ketones. Carboxylic acids and their derivatives.

GAZİ UNIVERSITY FACULTY OF TECHNOLOGY ECTS FORM								
Course Code and Title	**İMM-121 COMPUTER AIDED TECHNICAL DRAWINGS**							
Credits	3							
ECTS	3							
Name of Lecturer and e-mail address	hdilipak@gazi.edu.tr, ikorkut@gazi.edu.tr, gulesin@gazi.edu.tr, agullu@gazi.edu.tr							
Department/Program	Department of Manufacturing Engineering							
Course Type	Obligatory							
Course Language	Turkish							
Course Semester	Fall							
Prerequisites	None							
Course Objectives	Students can be draw the technical drawing of fundamental perspective and manufacturing of machine parts, dimensioning and add surface markings and tolerances.							
Course Contents	Basic geometric drawings. Perspective drawing methods. Scale and dimensioning types. View extraction techniques, auxiliary view techniques and application. Section and section of the special machine parts. Tolerances, surface roughness and surface symbols. Presentation of a current CAD program. Drawing line, circle, arc, ellipse, polygon using CAD program. Dimensioning, hatching, layers, scaling, mirror, copy, move, erase and other copy techniques. 2D technical drawings can be drawn in the computer and this drawing can be printed. 2D technical drawings applications. Entering 3D modeling.							
Course Learning Outcomes	Learn the concepts of technical drawing. Parts of the machine may draw two and three dimensional images. Create three views from the perspective. Draw the perspective from the three views. Draw and understand shop drawings. Learn the tolerance and surface machining marks Use a CAD program. Draw and diemension the basic machine components.							
References **(References must be up to date)**	**Books**	1.Gülesin, M., Güllü, A.,Avcı, Ö., Akdoğan, G. "AutoCAD ile Çizim ve Modelleme", ASİL Yayın Dağıtım,Ankara, Temmuz – 2004 2.Gülesin, M., "AutoCAD 2007 ile Tasarım ve Modelleme", Asil Yayın Dağıtım, Ankara, 2007. 3. Nalbant, M., "AutoCAD 2007 ile Çizim ve Tasarım". Alfa Basım Yayım Dağıtım Ltd.Şti. Alfa Yayınları 1738. 964 s. İstanbul, 2006						
	Journals, Articles, Papers, Symposiums							

Planned learning activities and teaching methods	**Theor**	**Pract**	**Lab.**	**Projects**	**Assign.**	**Other**	**Total**	**ECTS**
	45	15	15				75	3

Assessment Methods and Criteria	**Quantity (mark with "X")**	**Percentage (%)**
Midterm Exam	X	30
Quiz		
Assignment		

Projects		
Laboratory	X	10
Practice		
Other		
Final Exam	X	60

WEEKLY COURSE PLAN	
Week	**Contents and topics**
1. Week	Technical Drawing concepts, tools and supplies, paper types, letterheads.
2. Week	Introduction and use of a CAD program.
3. Week	Geometric drawings and CAD program applications
4. Week	Obtaining 3 views that is given the projection and perspective view of a machine part.
5. Week	Apllications for obtain three views in computer
6. Week	Drawing of third main view from given the two views, free hand drawing techniques.
7. Week	Three-dimensional drawing techniques, isometric perspective, oblique perspective applications.
8. Week	Sectioning principles: Full and half-section.
9. Week	Dimensioning
10. Week	Midterm Exam
11. Week	Sectioning principles: traditional application partial, profile, rotated. etc. types of cross-sections of these.
12. Week	Surface machining marks
13. Week	Tolerances
14. Week	Drawing shop drawings of machine parts
15. Week	Sample Applications
12. Hafta	Yüzey pürüzlülüğünün tanıtılması, Yüzey pürüzlülük ölçme aleti
13. Hafta	Basınç, sıcaklık, sertlik ölçme teknikleri
14. Hafta	Gerinim ölçer (Strain gage)
15. Hafta	Takım tezgahlarında kesme kuvvetlerinin ölçülmesi

GAZİ UNIVERSITY FACULTY OF TECHNOLOGY ECTS FORM								
Course Code and Title	IMM 123 Industrial Measuring							
Credits	2							
ECTS	2							
Name of Lecturer and e-mail address	Prof. Dr. İhsan KORKUT ikorkut@gazi.edu.tr							
Department/Program	Manufacturing Engineering							
Course Type	Obligatory							
Course Language	Turkish							
Course Semester	Fall							
Prerequisites	None							
Course Objectives	Introduction of measuring and control equipments necessary for machine manufacturing, teaching of methods related to measuring and teaching of tolerance concept.							
Course Contents	Basic principles of measuring and control. Methods of measuring. Instruments of measuring and control: Callipers, micrometers, height gauge, dial gauge, dial and digital indicators. Gauge blocks and gauges. Coordinate measuring machines. Surface roughness and surface roughness measuring device. Pressure, temperature, hardness measuring techniques. Strain gages. Measuring of cutting forces on machine tools.							
Course Learning Outcomes	Being able to use basic tools and devices straight used in machine manufacturing, evaluation of data and being able to make analysis.							
References **(References must be up to date)**	**Books**	Ölçme Bilgisi ve Kontrol, M., Bağcı, Y., Erişkin, M.E.B. Devlet Kitapları, 3. Baskı, Anadolu Üniversitesi Basım Evi, Eskişehir, 1998.						
	Journals, Articles, Papers, Symposiums							

Planned learning activities and teaching methods	**Theor**	**Pract**	**Lab.**	**Projects**	**Assign.**	**Other**	**Total**	**ECTS**
	28		20		22		70	2

Assessment Methods and Criteria	**Quantity (mark with "X")**	**Percentage (%)**
Midterm Exam	X	30
Quiz		
Assignment		
Projects		
Laboratory	X	10
Practice		
Other		
Final Exam	X	60

WEEKLY COURSE PLAN

Week	Contents and topics
1. Week	Basic principles of measuring, Basic principles of control
2. Week	Methods of measuring
3. Week	Instruments of measuring
4. Week	Instruments of control
5. Week	Calipers and principles of measurement
6. Week	Micrometers and principles of measurement
7. Week	Applications measurement by calipers and micrometers
8. Week	Midterm exam
9. Week	Height gauge and dial gauge, dial and digital indicators. Gauge blocks and gauges.
10. Week	Coordinate measuring machines
11. Week	Introduction of surface roughness
12. Week	Surface roughness measuring device
13. Week	Pressure, temperature, hardness measuring techniques
14. Week	Strain gages
15. Week	Measuring of cutting forces on machine tools

GAZİ UNIVERSITY FACULTY OF TECHNOLOGY ECTS FORM								
Course Code and Title	İMM-125 MANUFACTURING TECHNOLOGIES-I							
Credits	4							
ECTS	4							
Name of Lecturer and e-mail address	Doç.Dr. Hakan DİLİPAK, hdilipak@gazi.edu.tr Y.Doç.Dr. Abdullah DURAN, aduran@gazi.edu.tr							
Department/Program	Manufacturing Engineering							
Course Type	Compulsory							
Course Language	Turkish							
Course Semester	Fall/Spring							
Prerequisites	None							
Course Objectives	The use of hand tools in manufacturing, to teach turning and welding applications							
Course Contents	Removing metal and metal forming by using hand tools. Heat treatments. Threading by dies and taps. Reaming. Using measuring tools. Marking. Manufacturing tools and equipment. Turning with the chuck and turning between the chuck and tailstock. Application of turning operations.							
Course Learning Outcomes	Students learn removing metal and metal forming by using hand tools, heat treatments, cutting tools for lathes and setting							
References (References must be up to date)	**Books**	1. S. Kalpakjian and S.R. Schmid, Manufacturing Engineering and Technology, 2009. 2. Handbook of Manufacturing Engineering and Technology, Nee**,** Andrew (Ed.), Springer, 2014. 3. Talaş Kaldırma Yöntemleri ve Takım Tezgahları, M.Akkurt, Birsen Yayınevi, İstanbul, 1992. 4. Takım Tezgahları teori ve hesaplamaları, F., Mendi, Gazi Kitabevi, Ankara, 1999.						
	Journals, Articles, Papers, Symposiums							

Planned learning activities and teaching methods	**Theor**	**Pract**	**Lab.**	**Projects**	**Assign.**	**Other**	**Total**	**ECTS**
	42	42				3	114	5

Assessment Methods and Criteria	**Quantity (mark with "X")**	**Percentage (%)**
Midterm Exam	X	20
Quiz		
Assignment		
Projects		
Laboratory		
Practice	X	20
Other		
Final Exam	X	60

WEEKLY COURSE PLAN	
Week	**Contents and topics**
1. Week	Job safety in Manufacturing, Removing metal and metal forming by using hand tools
2. Week	Heat treatment processes, hardening, tempering, annealing
3. Week	Threading by dies and taps. Reaming.
4. Week	Screwed, riveted, wedge and welded construction
5. Week	Manual arc and oxy-gas welding, to be considered in the manufacture of welded, soldering
6. Week	Use of control and measuring tools in turning. Marking for Manufacturing
7. Week	Lathe and turning methods. Turning cutter and cutting tool selection
8. Week	Midterm exam
9. Week	In turning the cutting tool and the workpiece clamping, in turning cutting parameters
10. Week	Application of turning operations
11. Week	Application of turning operations
12. Week	Outside turning operations
13. Week	Taper turning, eccentric turning, spherical turning
14. Week	Threading in lathe
15. Week	Knurling, making springs and special turning operations

GAZİ UNIVERSITY FACULTY OF TECHNOLOGY ECTS FORM								
Course Code and Title	İMM-127 INTRODUCTION TO MANUFACTURING ENGINEERING							
Credits	2							
ECTS	1							
Name of Lecturer and e-mail address	Yrd.Doç.Dr. Yakup TURGUT, yturgut@gazi.edu.tr Prof.Dr. İhsan KORKUT, ikorkut@gazi.edu.tr							
Department/Program	Manufacturing Engineering							
Course Type	Compulsory							
Course Language	Turkish							
Course Semester	Fall							
Prerequisites	None							
Course Objectives	To introduce the basic engineering sciences, to provide information about manufacturing engineering requirements, specifications and work areas, to provide information about manufacturing engineering education program, statutory powers and responsibilities of manufacturing engineers							
Course Contents	Recognition of the profession of engineering, engineering ethics and view it, manufacturing engineering in different engineering fields and their location, historical development and the future of manufacturing engineering, the role and importance of manufacturing engineering in the social life, basic engineering and manufacturing themes, The main application areas of manufacturing engineering and related laws, rules and regulations							
Course Learning Outcomes	Know the basic engineering sciences, Manufacturing engineering profession, its history, issues, present, future, job opportunities and will have information about their place in society, Gazi University program content and Manufacturing Engineering department recognizes the possibilities , Teaching and learning activities that would motivate , After graduating knowledge about authority and responsibility.							
References (References must be up to date)	**Books**	1.Manufacturing Engineering, Tanner J.P., Marcel Dekker inc., Newyork, 1991. 2.İmalat Mühendisliği ,Danilevsky, çev:Emin Bahadır Kantaroğlu, TMMOB : 1987 3.Manufacturing Engineering Handbook, Hwaiyu Geng, McGRAW-HILL, 2004.						
	Journals, Articles, Papers, Symposiums							
Planned learning activities and teaching methods	**Theor**	**Pract**	**Lab.**	**Projects**	**Assign.**	**Other**	**Total**	**ECTS**
	28					10	38	1
Assessment Methods and Criteria	**Quantity (mark with "X")**					**Percentage (%)**		
Midterm Exam	X					40		
Quiz								
Assignment								
Projects								

Laboratory		
Practice		
Other		
Final Exam	X	60

WEEKLY COURSE PLAN	
Week	**Contents and topics**
1. Week	Introduction, Syllabus, Campus, faculty and department orientation
2. Week	Basic engineering sciences, engineer and engineering description, Manufacturing Engineering as a profession
3. Week	The historical development of Manufacturing Engineering
4. Week	Today, the engineering education and engineering ethics
5. Week	Gazi University Manufacturing Engineering introduction of training programs
6. Week	Introducing basic hand tools and functions
7. Week	The introduction of basic manufacturing machinery and components
8. Week	Midterm exam
9. Week	Conventional and modern manufacturing methods
10. Week	Conventional and modern manufacturing methods
11. Week	The role and importance of manufacturing engineering in the social life
12. Week	Standard and quality concepts
13. Week	The introduction of national and international standards and quality organizations
14. Week	Engineering and manufacturing engineering related laws, rules and regulations
15. Week	The future of Manufacturing Engineering

GAZİ UNIVERSITY FACULTY OF TECHNOLOGY ECTS FORM								
Course Code and Title	TAR 102 History of Turkish Revolution-II							
Credits	2							
ECTS	2							
Name of Lecturer and e-mail address								
Department/Program	Department of Manufacturing Engineering							
Course Type	Obligatory							
Course Language	Turkish							
Course Semester	Spring							
Prerequisites	None							
Course Objectives	Modernization process of Turkey							
Course Contents	National forces and fronts of Adana, Antep, Marash, Urfa, Establishment of uniform army and western front, War of Sakarya and its results, War of Commander chief domain and its results, Agreement of Mudanya and Conference of Lozan, Enduring reign, Establishment of Republic of Turkey, Establishment of Republic of Turkey, Progressive-mind Republican Party and Free Party, Rebellion of Sheyh Sait and its results, Revolutions, Establishment of Institution of Turkish History and Turkish Language, Principles of Ataturk							
Course Learning Outcomes	Having knowledge about establishment of Turkish Republic and Ataturk							
References **(References must be up to date)**	**Books**	1. Mustafa Kemal, Nutuk, Ankara, 1997. 2. Aybars, E., Türkiye Cumhuriyeti Tarihi 1-2, İzmir, 2005. 3. Komisyon, Türkiye Cumhuriyeti 1-2, Atatürk Araştırma Merkezi Yayını 4. Komisyon, Atatürk İlkeleri ve İnkılap Tarihi I/1-2, II, YÖK Yayını						
	Journals, Articles, Papers, Symposiums							

Planned learning activities and teaching methods	**Theor**	**Pract**	**Lab.**	**Projects**	**Assign.**	**Other**	**Total**	**ECTS**
	30					20	50	2

Assessment Methods and Criteria	**Quantity (mark with "X")**	**Percentage (%)**
Midterm Exam	X	40
Quiz		
Assignment		
Projects		
Laboratory		
Practice		
Other		
Final Exam	X	60

WEEKLY COURSE PLAN

Week	Contents and topics
1. Week	National forces and fronts of Adana, Antep, Marash, Urfa
2. Week	Establishment of uniform army and western front
3. Week	War of Sakarya and its results
4. Week	War of Commander chief domain and its results
5. Week	Agreement of Mudanya and Conference of Lozan
6. Week	Enduring reign
7. Week	Establishment of Republic of Turkey
8. Week	Midterm exam
9. Week	Establishment of Republic of Turkey
10. Week	Progressive-mind Republican Party and Free Party
11. Week	Rebellion of Sheyh Sait and its results
12. Week	Revolutions
13. Week	Establishment of Institution of Turkish History and Turkish Language
14. Week	Principles of Ataturk
15. Week	Principles of Ataturk

GAZİ UNIVERSITY FACULTY OF TECHNOLOGY ECTS FORM								
Course Code and Title	FIZ 102 Physics-II							
Credits	3							
ECTS	4							
Name of Lecturer And e-mail address								
Department/Program	Department of Manufacturing Engineering							
Course Type	Obligatory							
Course Language	Turkish							
Course Semester	Spring							
Prerequisites	None							
Course Objectives	To learn some basic concepts of advanced mathematics							
Course Contents	Matter, element, compound, mixtures and some chemical concepts, important chemistry laws, Lavoisler's, Proust's, Dalton's, Avagadro's law, etc. Weight of an atom and molecule, atom-gr, molfram. Symbols, formulas, equations and compounds: Symbols, formulas, equations, weight, composition , % composition, simple formula, determining molecule formula. Degree of elements, ion and molecule structure, degree concept. Writing and named of compound formulas. Making equal of Redoks equations, Stokiyometer. Structure of atom and periodic table: Atom nucleus, isotope, element, electron structure of current, quantum numbers and orbit, periodik system, energy of being ion, electron affinity. Organic chemistry: Classifying of organic compounds, hydrocarbons, heteroalifatics (Alcohols, Ether, Ketone, Acids, Esters), aromatic compounds.							
Course Learning Outcomes	On the basis of General Chemistry concepts and models thought during the course, the students will gain the problem solving abilities, to discuss them and to apply their knowledge to various chemical reactions.							
References **(References must be up to date)**	**Books**	1. Fiziğin Temelleri, David Halliday-Robert Resnick, Çeviri:Cengiz Yalçın, ArkadaĢ Yayıncılık 2. Fizik, 2.Cilt, Frederick J.Keller, W.Edward Gettys, Malcolm J. Skove, Çeviri, Literatür Yayıncılık 3.Fen ve Mühendislik için Fizik, Serway-Beichner, Çeviri:Kemal Çolakoğlu, Palme Yayıncılık						
	Journals, Articles, Papers, Symposiums							

Planned learning activities and teaching methods	**Theor**	**Pract**	**Lab.**	**Projects**	**Assign.**	**Other**	**Total**	**ECTS**
	42		14	19			75	4

Assessment Methods and Criteria	**Quantity (mark with "X")**	**Percentage (%)**
Midterm Exam	X	30
Quiz		
Assignment		
Projects	X	10
Laboratory		
Practice		
Other		

Final Exam	X	60

WEEKLY COURSE PLAN	
Week	**Contents and topics**
1. Week	Fundamental concepts in Chemistry: Matter, element, compound, mole, mixture and some chemical concepts.
2. Week	Law of conservation of mass, law of constant composition, law of multiple proportions etc.
3. Week	Atomic and mole mass. Symbols, formulas, equations and compounds.
4. Week	Atomic and mole mass. Symbols, formulas, equations and compounds
5. Week	Derivative of trigonometric functions.
6. Week	Describing and naming of chemical compounds. Chemical reactions and chemical equations, Stoichiometry.
7. Week	Oxidation-reduction reactions (redox). The periodic table and some atomic properties.
8. Week	Electronegativity, ionization energy, electron affinity, quantum numbers and electron orbitals.
9. Week	Gases: The simple gas laws, the ideal gas equation, kinetic theory of gases, nonideal (real) gases
10. Week	Thermochemistry: Heat, heats of reaction and calorimetry. Chemical bonding: Covalent and ionic bonding.
11. Week	Liquids, solids, and intermolecular forces. Solutions and their physical properties.
12. Week	Chemical equilibrium. Acids, bases and aqueous solution equilibrium.
13. Week	Thermodynamics: Some terminology, the laws of thermodynamics, Hess's law, Gibbs free energy.
14. Week	Organic Chemistry: Classification of organic compounds.
15. Week	Hydrocarbons, alcohols, phenols, ethers, aldehydes and ketones. Carboxylic acids and their derivatives.

GAZİ UNIVERSITY FACULTY OF TECHNOLOGY ECTS FORM								
Course Code and Title	MAT102 Mathematics-II							
Credits	4							
ECTS	6							
Name of Lecturer And e-mail address								
Department/Program	Department of Manufacturing Engineering							
Course Type	Obligatory							
Course Language	Turkish							
Course Semester	Spring							
Prerequisites	None							
Course Objectives	To learn some basic concepts of advanced mathematics							
Course Contents	Definitions of one variable functions and different kinds of one variable functions. Limit. Continuity of functions. Definitions of derivative. Derivative of some kinds of functions. Applications of derivative. Definitions of differential and integral. Some rules of indefinite integral. Definite integral. Calculations of surface area and volume with the help of integral.							
Course Learning Outcomes	To learn one variable functions, limit and continuity, derivative and its applications, indefinite and definite integral, their applications.							
References **(References must be up to date)**	**Books**	1. Hacısalihoğlu, H., Temel ve Genel Matematik 1, Seldem Yay., Ankara, 2000 2. Halilov, H., Hasanoğlu, A. ve Can, M., Yüksek Matematik 1-2 3. Balcı, M., Hacısalihoğlu H. ve Gökdal F., Temel ve Genel Matematik 4. Arıkan, H., Özgür, İ. ve. Gözükızıl, Ö.F, Genel Matematik I-II						
	Journals, Articles, Papers, Symposiums							

Planned learning activities and teaching methods	**Theor**	**Pract**	**Lab.**	**Projects**	**Assign.**	**Other**	**Total**	**ECTS**
	60					90	150	6

Assessment Methods and Criteria	**Quantity (mark with "X")**	**Percentage (%)**
Midterm Exam	X	40
Quiz		
Assignment		
Projects		
Laboratory		
Practice		
Other		
Final Exam	X	60

WEEKLY COURSE PLAN	
Week	**Contents and topics**

1. Week	Definitions of one variable functions and different kinds of one variable functions.
2. Week	Limit, continuity of functions.
3. Week	Limit, continuity of functions
4. Week	Definition of derivative. Implicit differentiation
5. Week	Derivative of trigonometric functions.
6. Week	Derivative of Inverse trigonometric functions and logarithmic functions.
7. Week	Application to limit of derivative.
8. Week	Midterm exam
9. Week	Increasing and decreasing functions and maximum minimum problems.
10. Week	Drawing graph
11. Week	Differential and integral. Rules of indefinite integral.
12. Week	Rules of indefinite integral.
13. Week	Definite integral.
14. Week	Calculations of surface area and volume by the help of integral.
15. Week	Calculations of surface area and volume by the help of integral.

GAZİ UNIVERSITY FACULTY OF TECHNOLOGY ECTS FORM								
Course Code and Title	TUR 102 Turkish Language-II							
Credits	2							
ECTS	2							
Name of Lecturer and e-mail address								
Department/Program	Department of Manufacturing Engineering							
Course Type	Obligatory							
Course Language	Turkish							
Course Semester	Spring							
Prerequisites	None							
Course Objectives	To let students to gain usage skill of Turkish language, complying with its rules; best expression of feelings and thoughts in writing and oral; gaining and improvement of scientific, questioning, creative and constructive thinking habits.							
Course Contents	Sentence Structure, Wordings, Sentence and Sentence Composing Elements, Sentence Types, Sentence Analysis, Sentence Inspection Examples, Composition (Subject, Note and Keynote, Theme, Imagination, Paragraph), Narration Types, Creative, Fictional Writings, Thought and Idea Transmitting Writings, Formal Writings (Minutes, Announcements, Reports, Business Letters and CV), Linguistic Faults (Writing and Punctuation Mark Faults, Expression Failures, Voice Based Faults), Conference, Scientific Research.							
Course Learning Outcomes	To determine elements of the sentence and importance of these in order to establish an accurate, good and nice sentences; to be able to read and inspect writings related with literature and thoughts world and perform rhetoric applications; to identify written composition types and to perform applications related with these; realization of linguistic faults and to be able to correct these, to know and apply the rules, to be complied during issuance scientific writings. To improve accurate and better speaking, writing skills of the student on the basis of selected texts from Turkish and world literatures and thought history.							
References **(References must be up to date)**	**Books**	1. Yakıcı, A., Yücel, M., Doğan, M. ve Yelok, V. S., Üniversiteler İçin Türk Dili ve Kompozisyon Bilgileri (Editör: V. S. Yelok), Bilge Yayınları, Ankara, 2005. 2. Eker, S., Çağdaş Türk Dili, Grafiker Yay., İstanbul, 2006. 3. Parlatır, İ., Gülensoy, T. ve Birinci, N., Yüksek Öğretim Öğrencileri İçin Türk Dili Kompozisyon Bilgileri, Yargı Yayınevi, Ankara, 2003. 4. Bilgin, M., Anlamdan Anlatıma Türkçemiz, Anı Yayıncılık, Ankara, 2005						
	Journals, Articles, Papers, Symposiums							

Planned learning activities and teaching methods	**Theor**	**Pract**	**Lab.**	**Projects**	**Assign.**	**Other**	**Total**	**ECTS**
	30					20	50	2

Assessment Methods and Criteria	**Quantity (mark with "X")**	**Percentage (%)**
Midterm Exam	X	40
Quiz		
Assignment		

Projects		
Laboratory		
Practice		
Other		
Final Exam	X	60

WEEKLY COURSE PLAN	
Week	**Contents and topics**
1. Week	Sentence Structure, Wordings, Sentence and Sentence Composing Elements
2. Week	Sentence Types
3. Week	Sentence Analysis, Sentence Inspection Examples
4. Week	Composition (In the Composition; Subject, Note and Keynote)
5. Week	Theme, Imagination, Paragraph
6. Week	Narration Types
7. Week	Creative, Fictional Writings
8. Week	Midterm exam
9. Week	Creative, Fictional Writings
10. Week	Thought and Idea Transmitting Writings
11. Week	Formal Writings (Minutes, Announcements, Reports, Business Letters and CV)
12. Week	Linguistic Faults (Writing and Punctuation Mark Faults)
13. Week	Linguistic Faults (Expression Failures, Voice Based Faults)
14. Week	Conference
15. Week	Scientific Research

GAZİ UNIVERSITY FACULTY OF TECHNOLOGY ECTS FORM								
Course Code and Title	ING 102 English-II							
Credits	3							
ECTS	3							
Name of Lecturer and e-mail address								
Department/Program	Department of Manufacturing Engineering							
Course Type	Obligatory							
Course Language	Turkish							
Course Semester	Spring							
Prerequisites	None							
Course Objectives	Aim of the course is to teach the students English at the elementary level.							
Course Contents	Countable and uncountable nouns, determiners, prepositions of place, adverbs of frequency, question words (how many, how much, how often), modal verb 'would', past tense forms of the verb to be, past time adverbials, regular and irregular verbs, the verb 'have got'							
Course Learning Outcomes	Express what they have got, what there is /there are, how often they do something, preference, ask for help, and what they did in the past.							
References **(References must be up to date)**	**Books**	1. Bonamy, D., English For Technical Students 2, Longman, Malaysia, 1990 2. Çakılır, C., English For Technical Schools II, 1975						
	Journals, Articles, Papers, Symposiums							
Planned learning activities and teaching methods	**Theor**	**Pract**	**Lab.**	**Projects**	**Assign.**	**Other**	**Total**	**ECTS**
	45				15	15	75	3

Assessment Methods and Criteria	Quantity (mark with "X")	Percentage (%)
Midterm Exam	X	40
Quiz		
Assignment		
Projects		
Laboratory		
Practice		
Other		
Final Exam	X	60

WEEKLY COURSE PLAN	
Week	**Contents and topics**
1. Week	Verb (have got) positive, negative and question forms, countable and uncountable nouns, much, many, a lot, question words (how much, how many)
2. Week	Exercises with have got, much, many, a lot, and how many, how much

3. Week	Prepositions of place (under, near, on, next to, above, below, into, at, between, out of, in front of
4. Week	Making suggestions, ask for help, preference
5. Week	There is, there are, a lot of, some, any, a few, few, a little, little
6. Week	General review
7. Week	Adverbs of frequency (always, usually, generally, often, sometimes, rarely, hardly ever, seldom, never) examples and exercises
8. Week	Midterm exam
9. Week	Question Word (How often), once, twice, three times
10. Week	Simple past tense: verb be (singular and plural)-positive, negative, and interrogative, past time adverbials
11. Week	Regular and irregular verbs, simple past tense: regular verbs (paint, work, study, walk, watch, listen...); irregular verbs (eat, buy, bring, take)
12. Week	Exercises with the simple past tense
13. Week	The text studies in the student's book
14. Week	The text studies in the student's book
15. Week	General review

GAZİ UNIVERSITY FACULTY OF TECHNOLOGY ECTS FORM								
Course Code and Title	ENF 104 Computer Programming							
Credits	3							
ECTS	3							
Name of Lecturer and e-mail address	Assist. Prof. Dr. İbrahim KARAAĞAÇ, ibrahimkaraagac@gazi.edu.tr							
Department/Program	Department of Manufacturing Engineering							
Course Type	Obligatory							
Course Language	Turkish							
Course Semester	Spring							
Prerequisites	None							
Course Objectives	The aim of this course to understand programming algorithms and elements. To gain basic infrastructure related to machine application using the visual programming language.							
Course Contents	Basic informations related to computer systems, introduction to hardware and software, algorithm and programming. The structure of visual project operations forms, events, message boxes, objects and applications. Constants, variant types and variant definition steps. Loops, functions, events, prepared forms and templates. Objects, API applications, prepare menu, tool and status bar. Data base generation and data base operations. Prepare report files, project compile. Applications to solve machine related problems.							
Course Learning Outcomes	At the end of this course, Students will be having information about visual programming language and programming elements and they will be having advanced application skills.							
References **(References must be up to date)**	**Books**	1- Demirli N., İnan Y.; Delphi 7, Prestige yayınları, 2003. 2- Pacheco X., Çeviri Çömlekçi M.; Delphi 8 Delphi for.NET, Alfa yayınları, 2004. 3- Dikici M., Delphi 2009-2010, Seçkin Yayıncılık, 2012. 4- Akgöbek Ö.; Borland Delphi ile Görsel Programlama Sanatı, Beta basım yayım, 2005.						
	Journals, Articles, Papers, Symposiums							

Planned learning activities and teaching methods	**Theor**	**Pract**	**Lab.**	**Projects**	**Assign.**	**Other**	**Total**	**ECTS**
	30		30			15	75	3

Assessment Methods and Criteria	**Quantity (mark with "X")**	**Percentage (%)**
Midterm Exam	X	20
Quiz		
Assignment		
Projects	X	20
Laboratory		
Practice		
Other		

Final Exam	X	60

WEEKLY COURSE PLAN	
Week	**Contents and topics**
1. Week	Basic informations related to computer systems, introduction to hardware and software
2. Week	Introduction to algorithm and programming
3. Week	Structure of visual program, project operations
4. Week	Forms, events, message boxes, objects and applications
5. Week	Constants, variant types and variant definition steps
6. Week	Loops (if-then, case-of, while-do, repeat-until)
7. Week	Functions
8. Week	Midterm exam
9. Week	Events, Prepared forms and templates (list boxes, multi-page dialog boxes, MDI forms)
10. Week	Objects (memo, rich edit, buttons, timer, calendar, scroll bar, combo and check boxes)
11. Week	API applications, image and shape controls
12. Week	Prepare menu, tool and status bar
13. Week	Dialog boxes, OLE applications
14. Week	Data base generation, data base operations and allias prepare, Data base objects and applications
15. Week	Prepare report files, project compile

GAZİ UNIVERSITY FACULTY OF TECHNOLOGY ECTS FORM								
Course Code and Title	İMM- 120 MATERIAL SCIENCE							
Credits	2							
ECTS	3							
Name of Lecturer and e-mail address	Doç.Dr. Fırat KAFKAS, fkafkas@gazi.edu.tr							
Department/Program	Manufacturing Engineering							
Course Type	Compulsory							
Course Language	Turkish							
Course Semester	Spring							
Prerequisites	Non							
Course Objectives	This course provides a conceptual framework for understanding the behavior of engineering materials by emphasizing important relationships between processing, internal structure and properties.							
Course Contents	Introduction to materials science and classification of atomic structures of materials. Crystal structures and imperfections. Mechanical and physical properties of engineering materials. Solid-state diffusion. Phase diagrams and solidification. Ferrous / non-ferrous alloys and heat treatment. Electrical, optical, thermal and magnetic properties associated with electron band structures of the materials. Metallic corrosion and prevention from corrosion.							
Course Learning Outcomes	1) Understand the relations between the chemical composition, atomic bonding and the properties of materials interrelate them with the structure 2) Understand the ordered and disordered crystal structures and the differences between them and define Bravais lattices and Miller indices 3) Understand the effects of crystal defects on material properties and the test methods for the determination of mechanical properties 4) Understand the diffusion concept and laws and its effects on material properties 5) Understand the importance of phase concept and phase diagrams, and use them 6) Classify ferrous and non-ferrous alloy systems and understand the properties of polymeric and ceramic materials 7) Understand electronic and electrical, thermal and magnetic properties of materials 8) Understand the importance of corrosion and its prevention methods							
References **(References must be up to date)**	**Books**	1. W.D. Callister Jr., 2003, Materials Science and Engineering An Introduction, John Wiley&Sons, ISBN:978047113576. 2. 1) D.R. Askeland, 1994, The Science and Engineering of Materials, PWS Pub. Co., ISBN:0534934234. 3. J. F. Shackelford, 1999, Introduction to Materials Science for Engineers, McMillan Pub. Co., ISBN:978013011287. 4. B.S. Mitchell, 2004, An Introduction to Materials Engineering and Science for, John Wiley&Sons, ISBN:0471436232. 5. W.F. Smith, 1996, Principles of Materials Science and Engineering, McGraw-Hill, ISBN:007100291.							
	Journals, Articles, Papers, Symposiums							
Planned learning activities and teaching methods	**Theor**	**Pract**	**Lab.**	**Projects**	**Assign.**	**Other**	**Total**	**ECTS**
	48				12	30	96	3

Assessment Methods and Criteria	Quantity (mark with "X")	Percentage (%)
Midterm Exam	X	30
Quiz		
Assignment	X	5
Projects		
Laboratory		
Practice		
Other	X	5
Final Exam	X	60

WEEKLY COURSE PLAN	
Week	**Contents and topics**
1. Week	Introduction To Material Science
2. Week	Atomic Structures And Interatomic Bonding
3. Week	The Structure Of Crystalline Solids
4. Week	Imperfections In Solids
5. Week	Diffusion
6. Week	Mechanic Properties Of Metals
7. Week	Dislocations And Strengthening Mechanisms
8. Week	Midterm Exam
9. Week	Failure
10. Week	Phase Diagrams
11. Week	Phase Transformations
12. Week	Structures And Properties Of Ceramics
13. Week	Polymer Structures
14. Week	Composites
15. Week	Corrosion And Degradation Of Materials
16. Week	Electrical, Thermal, Magnetic And Optic Properties

GAZİ UNIVERSITY FACULTY OF TECHNOLOGY ECTS FORM								
Course Code and Title	**İMM-122 COMPUTER AIDED DESIGN I**							
Credits	3							
ECTS	3							
Name of Lecturer and e-mail address	hdilipak@gazi.edu.tr, ikorkut@gazi.edu.tr, gulesin@gazi.edu.tr, agullu@gazi.edu.tr							
Department/Program	Department of Manufacturing Engineering							
Course Type	Obligatory							
Course Language	Turkish							
Course Semester	Spring							
Prerequisites	None							
Course Objectives	To be able to to do three-dimensional desing of industrial products and molds that related to manufacturing engineering by students. To create full and manufacturing drawings of industrial products.							
Course Contents	Drawing and selection manufacturing and assembly drawings of standard fastening elements. Drawing assembly drawings such as springs, gear wheels, pulleys, wedges, bearings, couplings and blanking dies. Drawing assembly drawings that are given manufacturing drawings of machine parts and filling the assembly drawings letterhead. Drawing manufacturing drawings that are given assembly drawings of systems. Wire frame modeling, solid modeling, create solid by extrude, revolve, sweep, etc. Surface modeling. To create views from solid model. Covering of models. Adding of standard machine element to model. Create assembly with solid models. Applications of 3D modeling and assembly methods in current CAD software.							
Course Learning Outcomes	Make the desing of machine parts and assembly. Have information about standard coupling elements. Draw assembly drawings of springs, gears, pulleys, wedges, bearings, couplings, blanking dies.							
References **(References must be up to date)**	**Books**	1. Şen, İ., Z., Özçilingir, N., Meslek Resmi, Seçkin Yayıncılık, 2011. 2. Şen, İ., Z., Özçilingir, N., Meslek Resmi II, Seçkin Yayıncılık, 2011. 3. Gülesin, M., Özdemir, A., Güllü, A., Güldaş, A., Uluer, O., SolidWorks İle Modelleme , Asil Yayın Dağıtım, 2007, Ankara (II. Baskı, 2007) 4. Gülesin, M., Güllü, A., Güldaş, A., Uluer, O., Tevfik A., SolidWorks İle Uygulamalar , Asil Yayın Dağıtım, 2006, Ankara						
	Journals, Articles, Papers, Symposiums							

Planned learning activities and teaching methods	**Theor**	**Pract**	**Lab.**	**Projects**	**Assign.**	**Other**	**Total**	**ECTS**
	45	15	15				75	3

Assessment Methods and Criteria	**Quantity (mark with "X")**	**Percentage (%)**
Midterm Exam	X	30
Quiz		
Assignment		

Projects		
Laboratory	X	10
Practice		
Other		
Final Exam	X	60

WEEKLY COURSE PLAN	
Week	**Contents and topics**
1. Week	Introduction to drawings, introduction of CAD programs and 3D modeling.
2. Week	Sketch environment basic drawing commands in the sketch environment.
3. Week	Solid modeling commands (extrude, cut extrude, revolve, swept, etc..)
4. Week	Designing of a machine parts that is given 2 or 3 dimensional as a solid model.
5. Week	Sample Applications
6. Week	Creating manufacturing drawing of machine parts
7. Week	Realizing of dimensioning, surface machining marks and tolerance on drawings
8. Week	Midterm Exam
9. Week	Creating assembly with solid models
10. Week	Adding standard connecting elements (bolts, nuts, washers, studs, etc..) Teams from the library
11. Week	Adding standard connecting elements (bolts, nuts, washers, studs, etc..) Teams from the library
12. Week	Designing of complex industrial products, the realization of assembly
13. Week	Creating assembly drawings.
14. Week	Sectioning applications in manufacturing and full drawings
15. Week	Making simulation of parts that was assembled

GAZİ UNIVERSITY FACULTY OF TECHNOLOGY ECTS FORM								
Course Code and Title	İMM-124 MANUFACTURING TECHNOLOGIES-II							
Credits	4							
ECTS	5							
Name of Lecturer and e-mail address	Assist. Prof. Dr. Yakup TURGUT-yturgut@gazi.edu.tr Assist. Prof. Dr. Hasan Basri ULAŞ							
Department/Program	Manufacturing Engineering							
Course Type	Compulsory							
Course Language	Turkish							
Course Semester	Fall/Spring							
Prerequisites	None							
Course Objectives	To teach basic applications in milling, grinding and tool grinding machines							
Course Contents	Milling, Milling tools, in milling clamping techniques, milling methods, dividing methods, Application of gear machining, helical slot milling. Grinding and tool sharpening machines and its auxiliary equipments. Clamping work pieces and grinding wheels; balancing and sharpening of grinding wheels. Applications of surface, cylindrical, tool and cutter grinding operations.							
Course Learning Outcomes	Students learn how to use milling and grinding machines.							
References (References must be up to date)	**Books**	1.S. Kalpakjian and S.R. Schmid, Manufacturing Engineering and Technology, 2009. Handbook of Manufacturing Engineering and Technology, Nee, 2.Andrew (Ed.), Springer, 2014. 3.Frezecilik, N., İpekçioğlu, M.E.B. Yayınları, Ankara, 1988. 4.Talaş Kaldırma Yöntemleri ve Takım Tezgahları, M.Akkurt, Birsen Yayınevi, İstanbul, 1992. 5.Takım Tezgahları teori ve hesaplamaları, F., Mendi, Gazi Kitabevi, Ankara, 1999. 6.Taşlama ve Alet Bileme, M. Bağcı, Yakup Erişkin, M.E.B Yayınları, Ankara, 1989.						
	Journals, Articles, Papers, Symposiums							

Planned learning activities and teaching methods	**Theor**	**Pract**	**Lab.**	**Projects**	**Assign.**	**Other**	**Total**	**ECTS**
	42	42				40	124	5

Assessment Methods and Criteria	**Quantity (mark with "X")**	**Percentage (%)**
Midterm Exam	X	20
Quiz		
Assignment		
Projects		
Laboratory		
Practice	X	20

Other		
Final Exam	X	60

WEEKLY COURSE PLAN	
Week	**Contents and topics**
1. Week	Milling definition,
2. Week	Maintenance and safety in milling
3. Week	Plane face milling applications
4. Week	Slot milling applications
5. Week	Division process in milling and applications
6. Week	Definition of gears, accounts, manufacturing practices
7. Week	Helical slot applications
8. Week	Midterm exam
9. Week	Grinding and tool sharpening machines, auxiliary equipment, abrasives, grinding stone fastening elements, standards of grinding stone.
10. Week	Control, to be balanced and sharpened of grinding stone. Occupational safety and safe working rules. Clamping methods of workpiece.
11. Week	Plane surface, cylindrical and conical grinding applications.
12. Week	Hole and centerless grinding applications.
13. Week	Grinding of lathe and drill tools in tool sharpening machines
14. Week	Grinding of single and multi-edged, helical, cross, profiles and other milling
15. Week	Broaching, honing and lapping technology

GAZİ UNIVERSITY FACULTY OF TECHNOLOGY ECTS FORM								
Course Code and Title	MAT 201 Differential Equations							
Credits	4							
ECTS	5							
Name of Lecturer and e-mail address								
Department/Program	Department of Manufacturing Engineering							
Course Type	Obligatory							
Course Language	Turkish							
Course Semester	Fall							
Prerequisites	None							
Course Objectives	Teaching topics and rules of differential equations, gaining capabilities for its applications.							
Course Contents	Introduction, First-Order and Simple Higher-Order Differential Equations, Applications, Linear Differential Equations, The Laplace Transform and Its Applications, Systems of Linear Differential Equations, Series Solutions of Differential Equations, Partial Differential Equations, Solving Ordinary Differential Equations Using Mapl.							
Course Learning Outcomes	1. Students who attend this course learn basics of differential equations. 2. They can use the knowledge of engineering mathematics while solving design problems.							
References **(References must be up to date)**	**Books**	1. Xie, W.C, Differential Equations for Engineers, Cambridge University Press, USA, 2010. 2. Farlow, S.J., Partial Differential Equations for Scientist and Engineers, Dover Pub., 1993.						
	Journals, Articles, Papers, Symposiums							
Planned learning activities and teaching methods	**Theor**	**Pract**	**Lab.**	**Projects**	**Assign.**	**Other**	**Total**	**ECTS**
	60	-	-	-	35	30	125	5

Assessment Methods and Criteria	**Quantity (mark with "X")**	**Percentage (%)**
Midterm Exam	X	40
Quiz		
Assignment		
Projects		
Laboratory		
Practice		
Other		
Final Exam	X	60

WEEKLY COURSE PLAN

Week	Contents and topics
1. Week	Introduction
2. Week	First-Order and Simple Higher-Order Differential Equations
3. Week	Applications of First-Order and Simple Higher-Order Equations
4. Week	Linear Differential Equations
5. Week	Applications of Linear Differential Equations
6. Week	The Laplace Transform and Its Applications
7. Week	Systems of Linear Differential Equations
8. Week	Midterm exam
9. Week	Applications of Systems of Linear Differential Equations
10. Week	Series Solutions of Differential Equations
11. Week	Numerical Solutions of Differential Equations
12. Week	Partial Differential Equations
13. Week	Applications of Partial Differential Equations
14. Week	Solving Ordinary Differential Equations Using Mapl
15. Week	Applications

GAZİ UNIVERSITY FACULTY OF TECHNOLOGY ECTS FORM								
Course Code and Title	İMM-201 TECHNICAL ENGLISH-I							
Credits	2							
ECTS	2							
Name of Lecturer and e-mail address	Prof.Dr.Mahmut GÜLESİN, gulesin@gazi.edu.tr Doç.Dr.Abdulkadir GÜLLÜ, agullu@gazi.edu.tr							
Department/Program	Department of Manufacturing Engineering							
Course Type	Obligatory							
Course Language	Turkish							
Course Semester	Fall							
Prerequisites	None							
Course Objectives	To learn technical English words regarding machine, machine manufacturing and dies. To be able to translate simple technical texts.							
Course Contents	English names of the machine tools, cutting tools, tools, apparatus and equipments related to machines, manufacturing and dies. Introduction to the translation of simple technical texts related to machine manufacturing.							
Course Learning Outcomes	To learn English names of the machines tools, cutting tools, tools and equipments related to manufacturing technologies. To be able to translate simple English texts related to machine manufacturing to Turkish.							
References (References must be up to date)	**Books**	1. Gülesin, M., "Teknik Terimler Sözlüğü, İngilizce-Türkçe", Asil Yayın Dağıtım, Ankara, 2010. 2. Allen, J.P.B. , Englısh in Workshop Practice, Oxford University Press, London , 1975. 3. Methold , K. , Understanding Technical English, Longman, Honk Kong, 1984.						
	Journals, Articles, Papers, Symposiums							

Planned learning activities and teaching methods	**Theory**	**Pract.**	**Lab.**	**Projects**	**Assign.**	**Other**	**Total**	**ECTS**
	28					30	58	2

Assessment Methods and Criteria	**Quantity (mark with "X")**	**Percentage (%)**
Midterm Exam	X	40
Quiz		
Assignment		
Projects		
Laboratory		
Practice		
Other		
Final Exam	X	60

WEEKLY COURSE PLAN	
Week	**Contents and topics**

1. Week	Learning English technical words regarding the occupation
2. Week	English words related to machine and manufacturing
3. Week	English words related to machine and manufacturing
4. Week	English words related to machine and manufacturing
5. Week	Analyzing simple English technical texts
6. Week	Analyzing simple English technical texts
7. Week	Translation techniques of simple English technical texts
8. Week	Midterm Exam
9. Week	Translation of simple English technical texts regarding hand tools
10. Week	Translation of simple English technical texts regarding manufacturing
11. Week	Translation of simple English technical texts regarding machine tools
12. Week	Translation of simple English technical texts regarding machines
13. Week	Translation of simple English technical texts regarding machining technologies
14. Week	Translation of simple English technical texts regarding CNC machine tools
15. Week	Translation of simple English technical texts regarding CAD/CAM

GAZİ UNIVERSITY FACULTY OF TECHNOLOGY ECTS FORM		
Course Code and Title	İMM-221 STATICS	
Credits	3	
ECTS	4	
Name of Lecturer and e-mail address	Assoc. Prof. Dr. Abdullah KURT (e-mail: akurt@gazi.edu.tr)	
Department/Program	Department of Manufacturing Engineering	
Course Type	Obligatory	
Course Language	Turkish	
Course Semester	Fall	
Prerequisites	None	
Course Objectives	Purpose of this course is to advance knowledge the students about basic principles of static's (force and moment analysis according to steady state) prior to mechanics of materials.	
Course Contents	Introduction to static: Vectors, cross and dot products, Newton's laws, unit systems. Force systems; 2 and 3 dimensional force systems, components and resultants of 2 and 3 dimensional forces, moment (moment about a point and a axis), Varignon's theorem, equivalent force and couple systems. Equilibrium; Newton's 1st and 3rd laws, equilibrium of a particle, equilibrium in 2 and 3 dimensions, free-body diagram, equilibrium conditions. Structures; analysis of plane trusses by methods of joints and section, frames and machines. Center of mass and centroids; centroids of lines, areas and volumes, centroids of composite areas, theorems of Poppus Goldinus, distributed forces, finding the center of gravity by the integral and moments of inertia (area moments of inertia, moments of inertia of composite areas, theorems of Steiner, principals moments of inertia). Beams; type of beams and loadings, shear force, bending moment, torsional moment, diagrams of shear force and bending moment. Friction; static and kinetic friction, friction angles, factors affecting friction, types of friction problems.	
Course Learning Outcomes	Main objective of the course is to give the basic information about the concepts of stability and balance to provide the background for the future structural analysis and design courses prior to strength of materials. Starting with the concept of forces acting upon a system, the course handles the behaviour of engineering structures under the effect of external disturbances or forces.	
References **(References must be up to date)**	**Books**	1. Beer, F.P., Johnston E.R., Eisenberg, E.R., Vector mechanics for engineers: Statics and Dynamics, McGraw-Hill Higher Education, Boston, 2004 2. Beer, F. P., Mühendisler için mekanik, Birsen Yayınevi, İstanbul, 199? 3. Beer, F. P., Mühendisler için mekanik statik problemlerin çözümleri, Birsen Kitabevi, İstanbul, 1974 4. Hibbeler, R. C., Engineering mechanics: Statics, Macmillan, New York, 1989 5. Karataş, H., Mühendislik mekaniğinde statik problemleri: Özlü teori ile birlikte, Çağlayan Kitabevi, İstanbul, 1987 6. Meriam, J. L., Statik: Problem Çözümleri, Birsen Yayınevi, İstanbul, 199? 7. İnan, M., Statik: Ders notları, İTÜ İnşaat Fakültesi, İstanbul, 1990
	Journals, Articles, Papers, Symposiums	-

Planned learning activities and teaching methods	Theor	Pract	Lab.	Projects	Assign.	Other	Total	ECTS
	40			30		30	100	4

Assessment Methods and Criteria	Quantity (mark with "X")	Percentage (%)
Midterm Exam	X	40
Quiz		
Assignment		
Projects		
Laboratory		
Practice		
Other		
Final Exam	X	60

WEEKLY COURSE PLAN

Week	Contents and topics
1. Week	Introduction to static: Vectors, cross and dot products, Newton's laws, unit systems.
2. Week	Introduction to static: Vectors, cross and dot products, Newton's laws, unit systems.
3. Week	Force systems: 2 and 3 dimensional force systems, components and resultants of 2 and 3 dimensional forces.
4. Week	Force systems: Moment (moment about a point and a axis), Varignon's theorem.
5. Week	Force systems: Equivalent force and couple systems.
6. Week	Equilibrium: Newton's 1^{st} and 3^{rd} laws:
7. Week	Equilibrium: Equilibrium of a particle, equilibrium in 2 and 3 dimensions, free-body diagram, equilibrium conditions.
8. Week	Midterm exam
9. Week	Structures: Analysis of plane trusses by methods of joints and section, frames and machines.
10. Week	Center of mass and centroids: Centroids of lines, areas and volumes, centroids of composite areas, theorems of Poppus Goldinus, distributed forces.
11. Week	Center of mass and centroids: Finding the center of gravity by the integral.
12. Week	Center of mass and centroids: Moments of inertia (area moments of inertia, moments of inertia of composite areas, theorems of Steiner, principals moments of inertia).
13. Week	Beams: Type of beams and loadings, shear force, bending moment, torsional moment, diagrams of shear force and bending moment.
14. Week	Beams: Type of beams and loadings, shear force, bending moment, torsional moment, diagrams of shear force and bending moment.
15. Week	Friction: Static and kinetic friction, friction angles, factors affecting friction, types of friction problems.

GAZİ UNIVERSITY TECHNOLOGY FACULTY ECTS FORM								
Course Code and Title	IMM-233 Thermodynamics-I							
Credits	3							
ECTS	3							
Name of Lecturer and e-mail address								
Department/Program	Manufacturing Engineering							
Course Type	Obligatory							
Course Language	Turkish							
Course Semester	Fall							
Prerequisites	None							
Course Objectives	To give basic concepts related to thermodynamics, its principles and terminology, to perform thermal design of engineering systems, to apply the laws of thermodynamics in the related fields.							
Course Contents	Course content and properties of pure substances. Ideal and real gases. Energy, heat, work. Energy conservation, indoor and outdoor systems implementation. Heat machine. The second law of thermodynamics. Carnot Cycle. Clausius inequality, entropy. The increase of entropy principle. Exergy, the second law analysis. Gas power cycles. Steam power cycles. Refrigeration cycles,							
Course Learning Outcomes	Students can use energy transformation principles and terminology, design thermal engineering systems, know thermodynamics laws any solve problems in the related areas.							
References **(References must be up to date)**	**Books**	1. Çengel, Y. ve Boles, M., Mühendislik Yaklaşımıyla Termodinamik, (ç. T. Derbentli), McGraw-Hill, İst., 1996. 2. Çengel, Yunus A. Fundamentals of thermal-fluid science, McGraw-Hill 3. Öztürk, A. ve Kılıç, A., Çözümlü Problemlerle Termodinamik, Çağlayan Kitabevi, 1998. 4. Öztürk, A. and Kılıç, A., Thermodynamics with Solved Problems, Çağlayan Kitabevi, 1998.						
	Journals, Articles, Papers, Symposiums							

Planned learning activities and teaching methods	**Theor**	**Pract**	**Lab.**	**Projects**	**Assign.**	**Other**	**Total**	**ECTS**
	45	-	-	15	10	5	75	3

Assessment Methods and Criteria	**Quantity (mark with "X")**	**Percentage (%)**
Midterm Exam	X	40
Quiz		
Assignment		
Projects		
Laboratory		
Practice		
Other		
Final Exam	X	60

WEEKLY COURSE PLAN	
Week	**Contents and topics**
1. Week	Basic concepts and definitions. Dimensions and units. Properties of Systems. State and equilibrium. State change and cycles. Pressure. Temperature. The Zeroth Law of Thermodynamics.
2. Week	Pure substance and properties. Phases of pure substance and phase change. Properties diagrams and tables.
3. Week	Ideal gas and equation of state. Real gasses. Compressibility factor. Generalized chart for Compressibility factor. Other equations of state. Introduction to the first law of thermodynamics.
4. Week	1st law of thermodynamics (for closed systems). Heat and work. Specific heats. Internal energy, enthalpy, specific heat of ideal gasses. Specific heat of solids and liquids.
5. Week	First law of Thermodynamics (for open systems). Conservation of mass. Conservation of energy. Flow work. Open systems with steady flow.
6. Week	Unsteady open systems. The uniform-state, uniform-flow systems. Second law of Thermodynamics. Heat engines. Refrigeration systems and heat pumps.
7. Week	Reversible and irreversible processes. Carnot cycles. Carnot principles. The thermodynamic temperature scale.
8. Week	Midterm exam
9. Week	Clausius inequality. Entropy. Principle of the increase of Entropy. Third law of Thermodynamics. Entropy change of pure substance. Temperature-Entropy (T-s) diagram.
10. Week	Entropy change of ideal gasses. Reversible steady flow work. Adiabatic efficiency of some engines. Exergy and second law solution.
11. Week	Second law solution of closed and open systems. Power cycles with gas flow: Air standard assumptions.
12. Week	Otto and Diesel cycles. Brayton cycle. Brayton cycle with regeneration. Ideal jet propulsion cycles. Vapor power cycles: Rankine cycle. Ideal reheat Rankine cycle, Ideal regenerative Rankine cycle. Cogeneration.
13. Week	Refrigeration cycles: Refrigerators and heat pumps. Reversed Carnot cycle. Vapor compression refrigeration cycle. Heat pump systems. Gas refrigeration cycle.
14. Week	Ideal gas mixtures. Air-vapor mixture.
15. Week	Applications.

GAZİ UNIVERSITY FACULTY OF TECHNOLOGY ECTS FORM								
Course Code and Title	IMM-225 Fluid Mechanics I							
Credits	3							
ECTS	4							
Name of Lecturer and e-mail address								
Department/Program	Department of Manufacturing Engineering							
Course Type	Compulsory							
Course Language	Turkish							
Course Semester	Fall							
Prerequisites								
Course Objectives	This course aims to provide students with knowledge about the fundamental concept of fluid mechanics (density, pressure, viscosity, shear stress, etc.), In the frame of fluid statics, pressure measurement, forces on the submerged plates, motions of block fluid, Types of fluid flow, laminar and turbulent flow, Bernouilli equations and its applications, general energy equation and its applications, flow loses, Siphon and cavitation phenomenon.							
Course Contents	This course covers the fundamental concept of fluid mechanics, statics of fluids, kinematics of fluids, momentum eqution, Types of fluid flow, friction losses and local losses, and dimensional analysis.							
Course Learning Outcomes	1) Understanding basic concepts regarding fluid mechanics 2) Comprehending the basics and use of units, dimensions and related parameters 3) Understanding with examples basic values (Density, specific volume, specific weight, relative density) 4) An appreciation of basic paramters such as; Newtonien and non-newtonien fluids, compressibility, bulk modulus and vapor pressure 5) Ability to apply the hydrostatic concepts to constant conditions 6) Ability to apply the hydrostatic concepts to variable conditions 7) Ability of calculating the pressure and force in planar and decadent surface 8) Able to solve the problems with constant accerelation transition movement and rotary movement 9) Gaining the ability to apply the hydrodynamic concepts to constant conditions 10) Gaining the ability to apply the hydrodynamic concepts variable conditions 11) Able to apply the Continuity equation, flow lines, pressure and energy lines,bernoulli equation,local and continuity loses, flow in tubes 12) Gaining the ability to apply the kinematic concepts to constant conditions 13) Gaining the ability to apply the kinematic concepts to various conditions							
References **(References must be up to date)**	**Books**	White, F.M., (2004). Akışkanlar Mekaniği. Çevirenler: Kadir Kırıkköprü, Erkan Ayder, Literatür yayınları, 1034s, İstanbul. Çengel, Y.A. ve Cimbala, J.M., (2008). Akışkanlar Mekaniği Temelleri ve Uygulamaları. Çeviri Editörü: Tahsin Engin, İzmir Güven Bilimsel Kitabevi, 938s., İzmir.						
	Journals, Articles, Papers, Symposiums							
Planned learning activities and teaching methods	**Theor**	**Pract**	**Lab.**	**Projects**	**Assign.**	**Other**	**Total**	**ECTS**
	42				28	30	100	4
Assessment Methods and Criteria	**Quantity (mark with "X")**					**Percentage (%)**		

Midterm Exam	X	30
Quiz		
Assignment	X	10
Projects		
Laboratory		
Practice		
Other		
Final Exam	X	60

WEEKLY COURSE PLAN	
Week	**Contents and topics**
1. Week	Basic concepts about fluid mechanics
2. Week	Units, dimensions and some related parameters
3. Week	Density, specific volume, specific weight, relative density
4. Week	Newtonien and non-newtonien fluids, compressibility, bulk modulus and vapor pressure
5. Week	Hydrostatic concepts
6. Week	Hydrostatic concepts
7. Week	Hydrostatic concepts
8. Week	Midterm Exam
9. Week	Hydrostatic concepts
10. Week	Constant accerelation transition movement and rotary movement
11. Week	Constant accerelation transition movement and rotary movement
12. Week	Hydrodynamic concepts
13. Week	Apply to the Continuity equation, flow lines, pressure and energy lines,bernoulli equation,local and continuity loses, flow in tubes
14. Week	Kinetics of fluids
15. Week	Kinetics of fluids

GAZİ UNIVERSITY FACULTY OF TECHNOLOGY ECTS FORM								
Course Code and Title	İMM-227 BASIC DIE TECHNOLOGIES							
Credits	4							
ECTS	7							
Name of Lecturer and e-mail address	Assoc. Prof. Dr. Çetin KARATAŞ cetink@gazi.edu.tr Assist Prof. Dr. Hakan GÜRÜN, hgurun@gazi.edu.tr Assist Prof. Dr. İbrahim KARAAĞAÇ, ibrahimkaraagac@gazi.edu.tr							
Department/Program	Department of Manufacturing Engineering							
Course Type	Obligatory							
Course Language	Turkish							
Course Semester	Fall							
Prerequisites	None							
Course Objectives	In the manufacturing sector used to produce series and identical parts of the cutting and bending of sheet metal mold manufacturing principle is to comprehend.							
Course Contents	Introduction to cutting and bending dies; Material selection for die components and Machine tools used for die making; Basic operations for die making: filing, marking, punching, reaming, tapping operations; Sheet metal dies design techniques; Plan of cutting die; The die cutting space, space angle; Cutting and bending dies components and their functions; Design of a cutting sheet metal cutting and bending dies; Determination and manufacturing of die components; Assembly of the manufactured sheet metal cutting and bending dies; Mounting the die on a press and cutting samples; Die problems and rules to eliminate them. Introduction to cutting and bending dies							
Course Learning Outcomes	1 - Cutting, punching, bending die recognition, 2 - Punch-cutting and bending die design and make calculations required for the manufacture, 3 - Cutting and bending die design, to make 4 - One to make the manufacture of cutting or bending die							
References **(References must be up to date)**	**Books**	8. Saç Metal Kalıpçılığı, I.Uzun-Y.Erişgin M.E.B.Yayınları, Ankara, 1989. 9. Delme-kesme ve bilimum biçimlendirme kalıpları S. Ataşimşek, 1977 Bursa 10. Pres işleri tekniği I, A.T.Güneş, 1989 Ankara, MMO yanını No:306 11. Die desingn and diemaking practice, Franklin D. Jones, Industrial pres inc, New York,1951						
	Journals, Articles, Papers, Symposiums	-						
Planned learning activities and teaching methods	**Theor**	**Pract**	**Lab.**	**Projects**	**Assign.**	**Other**	**Total**	**ECTS**
	45	45	20	30			110	5

Assessment Methods and Criteria	**Quantity (mark with "X")**	**Percentage (%)**
Midterm Exam	X	20
Quiz		
Assignment	X	10
Projects		
Laboratory	X	10
Practice		

Other		
Final Exam	X	60

WEEKLY COURSE PLAN	
Week	**Contents and topics**
1. Week	Introduction to cutting and bending dies
2. Week	Material selection for die components and Machine tools used for die making
3. Week	Basic operations for die making: filing, marking, punching, reaming, tapping operations
4. Week	Sheet metal dies design techniques.
5. Week	Calculations necessary for a cutting and bending dies
6. Week	Plan of cutting die
7. Week	The die cutting space, space angle
8. Week	Cutting and bending dies components and their functions
9. Week	Design of a cutting sheet metal cutting and bending dies
10. Week	Determination and manufacturing of die components
11. Week	Assembly of the manufactured sheet metal cutting and bending dies
12. Week	Mounting the die on a press and cutting samples
13. Week	Mounting the die on a press and cutting samples
14. Week	Mounting the die on a press and cutting samples
15. Week	Die problems and rules to eliminate them. Introduction to cutting and bending dies

GAZİ UNIVERSITY FACULTY OF TECHNOLOGY ECTS FORM								
Course Code and Title	**İMM-229 COMPUTER AIDED DESIGN II**							
Credits	2							
ECTS	4							
Name of Lecturer and e-mail address	Assoc. Prof. Dr. Hakan DİLİPAK hdilipak@gazi.edu.tr, Prof. Dr. İhsan KORKUT ikorkut@gazi.edu.tr, Prof. Dr. Mahmut GÜLESİN gulesin@gazi.edu.tr, Assoc. Prof..Dr. Abdulkadir GÜLLÜ agullu@gazi.edu.tr							
Department/Program	Department of Manufacturing Engineering							
Course Type	Obligatory							
Course Language	Turkish							
Course Semester	Fall							
Prerequisites	None							
Course Objectives	Desinging and drawing single or collective machine systems on computer enviroment. Performing some analysis ob the program to extent feasible							
Course Contents	3D modeling methods by the help of UG or equivalent design program. Wire frame modeling, surface modeling and examining the characteristics of solid modeling. Single part modeling by Extrude, Revolve, Sweep, Loft, Rib, Cut Extrude, Cut Sweep, Wrap, Dome, Helix and other commands and assignments of material. Surface modeling and surface modeling commands with the help of these models to be converted to solid. Sheet metal modeling with the help of commands, sheet metal modeling and defining blank size. Merging designed parts on assembly page. Movement simulations of parts that were assembled.							
Course Learning Outcomes	Students who taking this course have ablity to assembly and analysis of machine parts.							
References **(References must be up to date)**	**Books**	1. Unigraphics NX Unigraphics NX2, M., Gülesin, A., Güllü, İ, Utanır, Asil Yayın Dağıtım, Ankara, 2003. 2. Unigraphics NX2 Mekanik Unigraphics NX2 ve Montaj, İ. Utanır, Asil Yayın Dağıtım, Ankara, 2005.						
	Journals, Articles, Papers, Symposiums							

Planned learning activities and teaching methods	**Theor**	**Pract**	**Lab.**	**Projects**	**Assign.**	**Other**	**Total**	**ECTS**
	40	30	30				100	4

Assessment Methods and Criteria	**Quantity (mark with "X")**	**Percentage (%)**
Midterm Exam	X	30
Quiz		
Assignment		
Projects		
Laboratory	X	10
Practice		
Other		
Final Exam	X	60

WEEKLY COURSE PLAN	
Week	**Contents and topics**
1. Week	3D solid and surface modeling by the help of NX or equivalent design program
2. Week	Drawing on the sketch environment in NX
3. Week	Drawing on the modeling environment in NX
4. Week	Solid modeling commands (Extrude, Sweep, to Revolve, etc.)
5. Week	Hole, boss, pocket, etc. commands
6. Week	3D solid and surface modeling by using Wrap, Dome, Helix etc. commands
7. Week	Assigning material and lighting
8. Week	Midterm Exam
9. Week	Surface modeling commands.
10. Week	Surface modeling applications
11. Week	Adding of standard machine elements to model.
12. Week	Assembly
13. Week	Creating views from solid model
14. Week	Transformation of different CAD models by using standard data structure
15. Week	Sample applications

GAZİ UNIVERSITY FACULTY OF TECHNOLOGY ECTS FORM								
Course Code and Title	MAT-202, NUMERICAL ANALYSIS							
Credits	3							
ECTS	4							
Name of Lecturer and e-mail address	Doç.Dr.Onuralp ULUER uluer@gazi.edu.tr Yrd.Doç.Dr.Ali ÖZGEDİK ozkedik@gazi.edu.tr							
Department/Program	Department of Manufacturing Engineering							
Course Type	Compulsory							
Course Language	Turkish							
Course Semester	Spring							
Prerequisites								
Course Objectives	To solve engineering problems using derivation, matrice and integral equations							
Course Contents	Partial derivation equations and it's numerical solutions. Vector spaces. Matrices and determinants. Matrix functions. Adding, multiplying of matrices. Solution of equation sets. Algebric eigen value problems. Coordinate transformations. Quadratic forms. Vector differential calculus; gradient, divergence, curl and related vector identities. Green, Gauss divergence, and Stokes' theorems. Theory of analytic functions. Contour integration. Solving engineering problems with samples.							
Course Learning Outcomes	To be able to solve engineering problems using derivation, matrice and integral equations							
References **(References must be up to date)**	**Books**	İrfan Baki yaşar, "Uygulamalı Matematik", Siyasal Kitabevi, 2005.						
	Journals, Articles, Papers, Symposiums							
Planned learning activities and teaching methods	**Theor**	**Pract**	**Lab.**	**Projects**	**Assign.**	**Other**	**Total**	**ECTS**
	42	33			33		75	4

Assessment Methods and Criteria	**Quantity (mark with "X")**	**Percentage (%)**
Midterm Exam	X	30
Quiz		
Assignment	X	10
Projects		
Laboratory		
Practice		
Other		
Final Exam	X	60

WEEKLY COURSE PLAN	
Week	**Contents and topics**
1. Week	Partial derivation equations and it's numerical solutions.

2. Week	Vector spaces.
3. Week	Matrices
4. Week	Determinants.
5. Week	Matrix functions.
6. Week	Adding, multiplying of matrices.
7. Week	Solution of equation sets.
8. Week	Algebric eigen value problems.
9. Week	Coordinate transformations.
10. Week	Quadratic forms.
11. Week	Vector differential calculus; gradient, divergence, curl and related vector identities.
12. Week	Green, Gauss divergence, and Stokes' theorems.
13. Week	Theory of analytic functions.
14. Week	Contour integration.
15. Week	Solving engineering problems with samples

GAZİ UNIVERSITY FACULTY OF TECHNOLOGY ECTS FORM								
Course Code and Title	İMM-202 TECHNICAL ENGLISH-II							
Credits	2							
ECTS	2							
Name of Lecturer and e-mail address	Prof.Dr.Mahmut GÜLESİN, gulesin@gazi.edu.tr Doç.Dr.Abdulkadir GÜLLÜ, agullu@gazi.edu.tr							
Department/Program	Department of Manufacturing Engineering							
Course Type	Obligatory							
Course Language	Turkish							
Course Semester	Spring							
Prerequisites	None							
Course Objectives	Being able to translate technical texts relevant to machine and machine manufacture from English to Turkish.							
Course Contents	Translation techniques. Explanation of the grammar necessary for translation of technical texts. Translation of technical texts from English to Turkish.							
Course Learning Outcomes	To be able to translate intermediate difficulty level of technical texts from English to Turkish.							
References (References must be up to date)	**Books**	1. Gülesin, M., "Teknik Terimler Sözlüğü, İngilizce-Türkçe", Asil Yayın Dağıtım, Ankara, 2010. 1. Bonamy, D. , English For Technical Students 2, Longman, Malaysiya , 1990. 2. Çakalır, C. , English For Technical Schools II, 1975.						
	Journals, Articles, Papers, Symposiums							

Planned learning activities and teaching methods	**Theory**	**Pract.**	**Lab.**	**Projects**	**Assign.**	**Other**	**Total**	**ECTS**
	28					30	58	2

Assessment Methods and Criteria	**Quantity (mark with "X")**	**Percentage (%)**
Midterm Exam	X	40
Quiz		
Assignment		
Projects		
Laboratory		
Practice		
Other		
Final Exam	X	60

WEEKLY COURSE PLAN	
Week	**Contents and topics**
1. Week	Translation techniques of intermediate complex technical texts
2. Week	Translation of English technical texts related to hand tools

3. Week	Translation of English technical texts related to machine tools
4. Week	Translation of English technical texts related to machine tools
5. Week	Translation of English technical texts related to CNC systems
6. Week	Translation of English technical texts related to technical drawing
7. Week	Translation of English technical texts related to CAD/CAM/CAE programs
8. Week	Midterm Exam
9. Week	Translation of English technical texts related to CAD/CAM/CAE programs
10. Week	Translation of English technical texts related to CAD/CAM/CAE programs
11. Week	Translation of English technical texts related to die technologies
12. Week	Translation of English technical texts related to die technologies
13. Week	Translation of English technical texts related to electronics and automation
14. Week	Translation of English technical texts related to quality management systems
15. Week	Samples regarding to technical English letters and business letters

GAZİ UNIVERSITY FACULTY OF TECHNOLOGY ECTS FORM								
Course Code and Title	IMM-220, Manufacturing Methods							
Credits	2							
ECTS	2							
Name of Lecturer and e-mail address								
Department/Program	Department of Manufacturing Engineering							
Course Type	Compulsory							
Course Language	Turkish							
Course Semester	Spring							
Prerequisites								
Course Objectives	Provide information about general manufacturing methods.							
Course Contents	Principles and classifications of processes in manufacturing; advantages, limitations and comparisons of material processing. Design and manufacturing; selection of process. Casting, welding, forming, machining, and powder metallurgy. Manufacturing of polymer and composites parts. Rapid prototyping and ceramic part manufacturing.							
Course Learning Outcomes	The students who pass the course: Be familiarized with the principles and application fields of material processes, Be familiarized with the advantages and limitations of manufacturing technologies with respect to each other's depending on the application fields Recognize the tool and machines used in manufacturing and select proper tool and machines in the applications, Select the best manufacturing method at design stage of machine components Use the principles and do the basic calculations for traditional manufacturing processes Select proper process parameters in manufacturing							
References **(References must be up to date)**	**Books**	Fundamentals of modern manufacturing, M.P. Groover, 3rd ed., 2007, Wiley						
	Journals, Articles, Papers, Symposiums							
Planned learning activities and teaching methods	**Theor**	**Pract**	**Lab.**	**Projects**	**Assign.**	**Other**	**Total**	**ECTS**
	42	33			33		75	2

Assessment Methods and Criteria	**Quantity (mark with "X")**	**Percentage (%)**
Midterm Exam	X	40
Quiz		
Assignment		
Projects		
Laboratory		
Practice		
Other		

Final Exam	X	60

WEEKLY COURSE PLAN	
Week	**Contents and topics**
1. Week	Solidification and heat treatment, metal casting. Properties of castings. Cast alloys, melting and casting practice.
2. Week	Casting processes. Finishing processes of cast parts. Quality of cast products
3. Week	Surface treatments of metallic parts. Manufacturing of ceramic parts
4. Week	Introduction to metal forming. Hot and cold forming. Metallurgical and mechanical fundamentals. Yield criteria.
5. Week	Formability and workability. Bulk forming processes. Forging
6. Week	Extrusion, bar and wire drawing, rolling
7. Week	Sheet forming processes, shearing, bending, stretching, deep drawing, etc. Economics of manufacturing
8. Week	Midterm Exam
9. Week	Dimensional and geometrical tolerances, surface roughness, classification of material removal processes, machining parameters.
10. Week	Chip formation. Cutting force and power. Cutting fluids, Tools and tool life. Machinability. Turning
11. Week	Design in manufacturing. Non-traditional manufacturing processes. Classification of welding methods. Solid state welding.
12. Week	Fusion welding. Resistance welding. Arc welding. Other welding and cutting methods.
13. Week	Soldering, brazing and bonding. Manufacturing of polymer parts.
14. Week	Manufacturing of composites. Powder metallurgy
15. Week	Rapid prototyping.

GAZİ UNIVERSITY FACULTY OF TECHNOLOGY ECTS FORM								
Course Code and Title	İMM-222 Dynamics							
Credits	3							
ECTS	4							
Name of Lecturer and e-mail address	Assoc. Prof. Dr. Abdullah KURT (e-mail: akurt@gazi.edu.tr)							
Department/Program	Department of Manufacturing Engineering							
Course Type	Obligatory							
Course Language	Turkish							
Course Semester	Spring							
Prerequisites	İMM-221 STATICS							
Course Objectives	To present the basic concepts in the rijid body mechanics.							
Course Contents	Introduction to dynamics: Vectors, cross and dot products, Newton's laws, unit systems. Kinematics of a particle; selection of coordinate systems, relations between position, velocity and acceleration, rectilinear motion, curvilinear motion, investigation of curvilinear motion in the coordinates of cartesian, natural and polar, circular motion, relative motion. Kinetics of a particle; Newton's 2nd law, force, mass and acceleration, rectilinear motion, curvilinear motion, work and energy, kinetic energy and potential energy, power, impulse and momentum (linear and angular momentum), conservation of energy and momentum. Kinematics of a rigid body; absolute motion and relative motion, translation, relations of angular motion, rotation, instantaneous center of rotation, motions relative to fixed and rotary axis motion by teams							
Course Learning Outcomes	Learning to predict the effects of force and motion.							
References **(References must be up to date)**	**Books**	1. Meriam, J. L., Kraige, L.G., Dynamics, Wiley, 1998, 2003, 2012 2. Beer, F.P., Johnston E.R., Cornwell, P., Vector Mechanics for Engineers: Dynamics, McGraw-Hill Higher Education, 2004, 2009 3. Beer, F.P., Johnston E.R., Eisenberg, E.R., Vector mechanics for engineers: Statics and Dynamics, McGraw-Hill Higher Education, Boston, 2004 4. Hibbeler, R. C., Engineering mechanics: Dynamics, MacMillan Pub. Co., 1983, Prentice Hall, 2010 5. Hibbeler, R. C., Engineering mechanics: Statics and Dynamics, Macmillan, 1992, Pearson/Prentice Hall, 2001, 2004.						
	Journals, Articles, Papers, Symposiums	-						

Planned learning activities and teaching methods	**Theor**	**Pract**	**Lab.**	**Projects**	**Assign.**	**Other**	**Total**	**ECTS**
	40			30		30	100	4

Assessment Methods and Criteria	**Quantity (mark with "X")**	**Percentage (%)**
Midterm Exam	X	40
Quiz		

Assignment		
Projects		
Laboratory		
Practice		
Other		
Final Exam	X	60

WEEKLY COURSE PLAN	
Week	**Contents and topics**
1. Week	Introduction to dynamics: Vectors, cross and dot products, Newton's laws, unit systems.
2. Week	Kinematics of a particle; selection of coordinate systems, relations between position, velocity and acceleration.
3. Week	Kinematics of a particle; rectilinear motion, curvilinear motion.
4. Week	Kinematics of a particle; curvilinear motion, investigation of curvilinear motion in the coordinates of cartesian, circular motion, relative motion.
5. Week	Kinematics of a particle; investigation of curvilinear motion in the coordinates of natural, circular motion, relative motion
6. Week	Kinematics of a particle; investigation of curvilinear motion in the coordinates of polar, circular motion, relative motion.
7. Week	Kinematics of a particle; circular motion, relative motion.
8. Week	Midterm exam
9. Week	Kinetics of a particle; Newton's 2^{nd} law, force, mass and acceleration, rectilinear motion.
10. Week	Kinetics of a particle; curvilinear motion.
11. Week	Kinetics of a particle; work and energy, kinetic energy and potential energy, power.
12. Week	Kinetics of a particle; impulse and momentum (linear and angular momentum), conservation of energy and momentum.
13. Week	Kinematics of a rigid body; absolute motion and relative motion, translation, relations of angular motion, rotation, instantaneous center of rotation, motions relative to fixed and rotary axis motion by teams
14. Week	Kinematics of a rigid body; absolute motion and relative motion, translation, relations of angular motion, rotation, instantaneous center of rotation, motions relative to fixed and rotary axis motion by teams
15. Week	Kinematics of a rigid body; absolute motion and relative motion, translation, relations of angular motion, rotation, instantaneous center of rotation, motions relative to fixed and rotary axis motion by teams

GAZİ UNIVERSITY FACULTY OF TECHNOLOGY ECTS FORM								
Course Code and Title	IMM-224 Heat Transfer I							
Credits	3							
ECTS	4							
Name of Lecturer and e-mail address								
Department/Program	Department of Manufacturing Engineering							
Course Type	Compulsory							
Course Language	Turkish							
Course Semester	Spring							
Prerequisites								
Course Objectives	This course aims to provide students with knowledge about the fundamental concept of fluid mechanics (density, pressure, viscosity, shear stress, etc.), In the frame of fluid statics, pressure measurement, forces on the submerged plates, motions of block fluid, Types of fluid flow, laminar and turbulent flow, Bernouilli equations and its applications, general energy equation and its applications, flow loses, Siphon and cavitation phenomenon.							
Course Contents	Types of heat transfers. Conductivity, transfer and radiation. General heat transfer. Heat transfer in parallel plates and cylindrical parts. Heat conductivity, total heat transfer coefficient. Temperature in pipes, critical isolation thickness. Cooling small parts. Heat radiation.							
Course Learning Outcomes	It is to objective to become of knowledge master of heat transfer applications area: heating-cooling, engine-turbine design, power plants, painting-drying, food sectors, press-publication sectors, transportations, etc.							
References **(References must be up to date)**	**Books**	1-Incropera F. P ve DeWitt, D. P., "Fundamentals of Heat and Mass Transfer" literatür publishing house, 2001 2-Halıcı, F. ve Gündüz, M., "Heat Transfer with examples", Burak publishing house, 2001 3-Kılıç, M. ve Yiğit A., "HeatTransfer" Alfa publishing house, 2004						
	Journals, Articles, Papers, Symposiums							

Planned learning activities and teaching methods	**Theor**	**Pract**	**Lab.**	**Projects**	**Assign.**	**Other**	**Total**	**ECTS**
	42				33	25	100	4

Assessment Methods and Criteria	**Quantity (mark with "X")**	**Percentage (%)**
Midterm Exam	X	30
Quiz		
Assignment	X	10
Projects		
Laboratory		
Practice		
Other		

Final Exam	X	60

WEEKLY COURSE PLAN	
Week	**Contents and topics**
1. Week	Units and dimensions
2. Week	Introduction to heat transfer
3. Week	Heat transfer types: conduction, convection, radiation
4. Week	General heat conduction equation
5. Week	One-dimensional steady-state conduction
6. Week	Conduction of parallel plane
7. Week	Conduction of cylindrical elements
8. Week	Conduction of spherical elements
9. Week	Heat convection
10. Week	Total heat transfer coefficient
11. Week	Temperature loss in pipes
12. Week	Critical isolation thickness
13. Week	Cooling small parts
14. Week	Thermal radiation
15. Week	Sample problem solving exercises

GAZİ UNIVERSITY FACULTY OF TECHNOLOGY ECTS FORM								
Course Code and Title	İMM-226 Mechanics of Materials							
Credits	3							
ECTS	4							
Name of Lecturer and e-mail address	Assoc. Prof. Dr. Abdullah KURT (e-mail: akurt@gazi.edu.tr)							
Department/Program	Department of Manufacturing Engineering							
Course Type	Obligatory							
Course Language	Turkish							
Course Semester	Spring							
Prerequisites	İMM-221 STATICS							
Course Objectives	Purpose of this course is to advance knowledge the students about basic strengths and type of strengths learning (tensile stress, compressing stress bending stress, shear stress, torsional stress) and resultant stresses. In addition to learning compulsory lecture of Machine Design Lectures basics.							
Course Contents	Concepts of stress; internal and external loads, components of internal force and stress, normal and shear stress, allowable stress and factor of safety. Mechanical properties of materials, deformation and strain, tension test, stress-strain diagram, Hook's law, strain energy, Poisson's ratio, creep and fatigue. Axial loading; tension and compressive stresses, Saint-Venant's principle, elastic deformation of an axially loaded member, statically indeterminate axially loaded member. Torsion; torsional deformation, and angle of twist, power transmission, torsion of noncircular shafts. Bending; moment of inertia, diagrams of shear force and bending moment, Mohr's circle, bending of beams, relations between load, shear force and bending moment, slope and displacement in beams and shafts and elastic curve formula, design of beams and shafts. Transverse stress; shear formula, transverse stress in beams and shafts, shear center. Buckling of columns; critical load, slenderness ratio, Euler's and Johnson's formula, buckling of columns. Combined loading. Stress concentrations and residual stresses. Stress and strain transformations; plane stress and plane strain, principal stress and maximum shear stress. Theories of failure. Energy methods; work and strain energy, conservation of energy, principle of virtual work, Castigliano's theorem and applications.							
Course Learning Outcomes	Students attended this course are able to analyse and design the mechanical systems.							
References **(References must be up to date)**	**Books**	1. Beer, F.P., Johnston E.R., Eisenberg, E.R., Mechanics of Materials, McGraw-Hill Higher Education, 1981, 2012 2. Hibbeler, R. C., Mechanics of Materials, Macmillan 1991, 1997, 2003, 2005, 2011 3. Ugural, A.C., Mechanics of Materials, J. Wiley & Sons, 2008 4. Gere, J. M., Mechanics of Materials, Brooks/Cole, 2001, 2004						
	Journals, Articles, Papers, Symposiums	-						

Planned learning activities and teaching methods	**Theor**	**Pract**	**Lab.**	**Projects**	**Assign.**	**Other**	**Total**	**ECTS**
	40			30		30	100	4

Assessment Methods and Criteria	**Quantity (mark with "X")**	**Percentage (%)**
Midterm Exam	X	40

Quiz		
Assignment		
Projects		
Laboratory		
Practice		
Other		
Final Exam	X	60

WEEKLY COURSE PLAN	
Week	**Contents and topics**
1. Week	Concepts of stress; internal and external loads, components of internal force and stress, normal and shear stress, allowable stress and factor of safety.
2. Week	Mechanical properties of materials, deformation and strain, tension test, stress-strain diagram, Hook's law, strain energy, Poisson's ratio, creep and fatigue. Axial loading; tension and compressive stresses, Saint-Venant's principle, elastic deformation of an axially loaded member, statically indeterminate axially loaded member.
3. Week	Mechanical properties of materials, deformation and strain, tension test, stress-strain diagram, Hook's law, strain energy, Poisson's ratio, creep and fatigue. Axial loading; tension and compressive stresses, Saint-Venant's principle, elastic deformation of an axially loaded member, statically indeterminate axially loaded member.
4. Week	Mechanical properties of materials, deformation and strain, tension test, stress-strain diagram, Hook's law, strain energy, Poisson's ratio, creep and fatigue. Axial loading; tension and compressive stresses, Saint-Venant's principle, elastic deformation of an axially loaded member, statically indeterminate axially loaded member.
5. Week	Torsion; torsional deformation, and angle of twist, power transmission, torsion of noncircular shafts.
6. Week	Bending; moment of inertia, diagrams of shear force and bending moment, Mohr's circle, bending of beams, relations between load, shear force and bending moment, slope and displacement in beams and shafts and elastic curve formula, design of beams and shafts.
7. Week	Bending; moment of inertia, diagrams of shear force and bending moment, Mohr's circle, bending of beams, relations between load, shear force and bending moment, slope and displacement in beams and shafts and elastic curve formula, design of beams and shafts.
8. Week	Midterm exam
9. Week	Transverse stress; shear formula, transverse stress in beams and shafts, shear center.
10. Week	Buckling of columns; critical load, slenderness ratio, Euler's and Johnson's formula, buckling of columns.
11. Week	Combined loading. Stress concentrations and residual stresses.
12. Week	Stress and strain transformations; plane stress and plane strain, principal stress and maximum shear stress. Theories of failure.
13. Week	Stress and strain transformations; plane stress and plane strain, principal stress and maximum shear stress. Theories of failure.
14. Week	Energy methods; work and strain energy, conservation of energy, principle of virtual work, Castigliano's theorem and applications.
15. Week	Energy methods; work and strain energy, conservation of energy, principle of virtual work, Castigliano's theorem and applications.

GAZİ UNIVERSITY FACULTY OF TECHNOLOGY ECTS FORM								
Course Code and Title	IMM-228 Engineering Materials							
Credits	3							
ECTS	3							
Name of Lecturer and e-mail address	Asso.Prof.Dr. Fırat KAFKAS Fkafkas@Gazi.Edu.Tr							
Department/Program	Manufacturing Engineering							
Course Type	Compulsory							
Course Language	Turkish							
Course Semester	Spring							
Prerequisites	Non							
Course Objectives	To introduce the types of materials and their properties;To discuss current applications of materials in products; To show the link between material selection, manufacturing processes, and product design.							
Course Contents	This course is an introduction to the rich world of materials and their use in products. Types, structures and properties of engineering materials are discussed. The course shows the link between material selection, manufacturing processes, and industrial design. Focus will be on important types of metals, polymers, ceramics, and new generation materials.							
Course Learning Outcomes	The students who succeeded in this course; 1. Student will be able to interpret different material types and their applications. 2. Student will be able to determine which of the different material alternatives are suitable for a given product. 3. Student will be able to identify which material property has priority over others for different components and products. 4. Student will be able to interpret their knowledge on materials, production methods and design. 5. Student will be able to suggest their applications in products.							
References **(References must be up to date)**	**Books**	1. M. F. Ashby,David Rayner Hunkin Jones, Engineering Materials 1: An Introduction to Properties, Applications and Design, Published by Elsevier, 2009 2. M. F. Ashby,David Rayner Hunkin Jones, Engineering Materials 2: n Introduction to Microstructures, Processing and Design, Published by Elsevier, 2009. 3. M. Ohring Engineering Materials Science, Academic Press İnc.,1995						
	Journals, Articles, Papers, Symposiums							
Planned learning activities and teaching methods	**Theor**	**Pract**	**Lab.**	**Projects**	**Assign.**	**Other**	**Total**	**ECTS**
	48				12	36	96	3
Assessment Methods and Criteria	**Quantity (mark with "X")**					**Percentage (%)**		
Midterm Exam	X					20		

Quiz		
Assignment	X	10
Projects		
Laboratory		
Practice		
Other	X	10
Final Exam	X	60

WEEKLY COURSE PLAN	
Week	**Contents and topics**
1. Week	Overview To Engineering Material
2. Week	Ferro Materials- Steels
3. Week	Ferro Materials- Cast Iron
4. Week	Termal and mechanica Treatment processes For Steels
5. Week	Non-Ferro Materials
6. Week	Non-Ferro Materials
7. Week	Arasınav
8. Week	Advanced Materials
9. Week	Nano Technology And Smart Materials
10. Week	Ceramics And Refracters
11. Week	Composits
12. Week	Polymers
13. Week	Powder metallurgy applications
14. Week	Use And Selection Of Engineering Materials
15. Week	Use And Selection Of Engineering Materials
16. Week	Use And Selection Of Engineering Materials

GAZİ UNIVERSITY FACULTY OF TECHNOLOGY ECTS FORM								
Course Code and Title	İMM-230 PROGRAMMING OF CNC MACHINE TOOLS							
Credits	4							
ECTS	7							
Name of Lecturer and e-mail address	Prof.Dr.Mahmut GÜLESİN, gulesin@gazi.edu.tr Doç.Dr.Abdulkadir GÜLLÜ, agullu@gazi.edu.tr Doç.Dr.Hakan DİLİPAK, hdilipak@gazi.edu.tr Yrd.Doç.Dr. Yunus KAYIR, ykayir@gazi.edu.tr							
Department/Program	Department of Manufacturing Engineering							
Course Type	Obligatory							
Course Language	Turkish							
Course Semester	Spring							
Prerequisites	None							
Course Objectives	To prepare CNC part programmes suitable to CNC lathes and milling machines according to relevant technical drawings and being able to machine the part on the CNC machine tool.							
Course Contents	CNC machine tools. Application areas. Structure of CNC machine tools. Structure of CNC lathes and programming of them. Absolute, incremental programming. M and G codes. Linear and circular interpolation. Programming of outer and inner turning operations. Turning cycles. CNC turning simulation programs. Structure of CNC milling machines. Programming of CNC machining centres. Absolute and incremental programming of CNC milling machines. M and G codes. Linear and circular interpolation for milling operations. Programming of face milling, slot, pocket, contour milling operations. Cycles for milling operations. Sub programming.							
Course Learning Outcomes	Programming of the CNC turning and milling machine tools with Fanuc control unit and being able to do tool settings.							
References (References must be up to date)	**Books**	1. CNC Torna ve Freze Tezgahlarının Programlanması, M., Gülesin, A., Güllü, A., Özkan, ve G., Akdoğan, Asil Yayın Dağıtım, Ankara, 2005. 2. CNC Programming: Principles and Applications, M., Mattson, Delmar Publishers, USA, 1998. 3. CNC Programming Handbook, Second Edition, Peter Smid, ISBN: (0-8311-) 3134-9 2003.						
	Journals, Articles, Papers, Symposiums							

Planned learning activities and teaching methods	**Theory**	**Pract.**	**Lab.**	**Projects**	**Assign.**	**Other**	**Total**	**ECTS**
	50	50			25	30	155	7

Assessment Methods and Criteria	**Quantity (mark with "X")**	**Percentage (%)**
Midterm Exam	X	20
Quiz		
Assignment	X	20
Projects		
Laboratory		

Practice		
Other		
Final Exam	X	60

WEEKLY COURSE PLAN	
Week	**Contents and topics**
1. Week	CNC machines, application areas.
2. Week	Structure of CNC machine tools.
3. Week	Introduction to CNC lathes, setting of work reference point and cutting tools.
4. Week	M and G codes.
5. Week	Absolute and incremental programming
6. Week	Linear and circular interpolation.
7. Week	Programming of outer and inner surface turning operations.
8. Week	Midterm Exam
9. Week	Turning cycles and sub programming.
10. Week	Introduction of the CNC turning simulation programs.
11. Week	Structure of CNC milling machines. Setting of work reference point and cutting tools.
12. Week	Programming of face milling, slot milling operations.
13. Week	Programming of pocket, contour and profile milling operations.
14. Week	Cycles for CNC milling operations.
15. Week	Sub programming for CNC milling operations.

GAZİ UNIVERSITY FACULTY OF TECHNOLOGY ECTS FORM								
Course Code and Title	IMM-301 Machine Elements-I							
Credits	3							
ECTS	4							
Name of Lecturer and e-mail address								
Department/Program	Department of Manufacturing Engineering							
Course Type	Obligatory							
Course Language	Turkish							
Course Semester	Fall							
Prerequisites	None							
Course Objectives	Teaching topics and rules of machine elements-I, gaining capabilities for its applications.							
Course Contents	Introduction and general aspects, Stress analysis, combined stresses, Theory of fraction, fatigue, Safety factor, reliability, notch, dimension, surface and other factors, Selection of materials, Riveted joints, Welded joints, soldered joints, The loading of force and moment, Threaded and power screws, Shafts, 2D stress analysis, Cams, springs.							
Course Learning Outcomes	1. Students who attend this course learn basics of machine elements-I. 2. They can make better and more efficiently designs based on this course.							
References **(References must be up to date)**	**Books**	1. Budynas, R.G. and Nisbett, J.K, Shigley's Mechanical Engineering Design, McGraw-Hill Ser., Int. Ed., 2011 2. Hibbeler, Statics and Mechanics of Materials, Prentice-Hall, Inc, Int. Ed., 1993.						
	Journals, Articles, Papers, Symposiums	1. Journal of Engineering Design 2. Int. Journal of Design Engineering						
Planned learning activities and teaching methods	**Theor**	**Pract**	**Lab.**	**Projects**	**Assign.**	**Other**	**Total**	**ECTS**
	45	-	-	25	20	10	100	4

Assessment Methods and Criteria	**Quantity (mark with "X")**	**Percentage (%)**
Midterm Exam	X	40
Quiz		
Assignment		
Projects		
Laboratory		
Practice		
Other		
Final Exam	X	60

WEEKLY COURSE PLAN

Week	Contents and topics
1. Week	Introduction and general aspects
2. Week	Stress analysis, combined stresses
3. Week	Theory of fraction, fatigue
4. Week	Safety factor, reliability, notch, dimension, surface and other factors
5. Week	Selection of materials
6. Week	Riveted joints
7. Week	Welded joints
8. Week	Midterm exam
9. Week	Welded joints, soldered joints
10. Week	The loading of force and moment
11. Week	Threaded and power screws
12. Week	Threaded and power screws
13. Week	Shafts
14. Week	2D stress analysis
15. Week	Cams, springs

GAZİ UNIVERSITY FACULTY OF TECHNOLOGY ECTS FORM								
Course Code and Title	İMM-303 HYDRAULICS-PNEUMATICS							
Credits	3							
ECTS	4							
Name of Lecturer and e-mail address								
Department/Program	Manufacturing Engineering							
Course Type	Compulsory							
Course Language	Turkish							
Course Semester	Fall							
Prerequisites	None							
Course Objectives	To give information about symbols relevant to hydraulic and pneumatic and used components, to give theoretical and practical information about hydraulic and pneumatic circuit design.							
Course Contents	Basic principles in hydraulics. Standard symbols in hydraulics. Hydraulic pipes and hoses, pumps, motors. Hydraulic cylinders, sealing elements, valves, oil containers, Hydraulic fluids. Electro-hydraulic systems. Faults and determination of them in hydraulic systems. Application areas of hydraulic systems in industry. Hydraulic circuit design and applications. Physical principles in pneumatics. Standard symbols in pneumatics. Hydro-pneumatics. Application areas of pneumatics. Fault finding. Electro-pneumatics. System design and setting the system up using pneumatic components. Introduction to PLC and programming of PLC. Applications of pneumatic circuits.							
Course Learning Outcomes	Having sufficient information relevant to hydraulic and pneumatic circuit components and their symbols, being able to make design and application of a hydraulic and pneumatic circuit design							
References (References must be up to date)	**Books**	1.Andrew Parr, Hidrolik ve Pnömatik El Kılavuzu Bileşim Yayıncılık, 2005 2. Hidrolik-Pnomatik, İ., Karacan, Bizim Büro Basım Evi, Ankara, 1989. 3.Pnömatik Kontrol, İ., Karacan, Bizim Büro Basım Evi, Ankara, 1991.						
	Journals, Articles, Papers, Symposiums							
Planned learning activities and teaching methods	**Theor**	**Pract**	**Lab.**	**Projects**	**Assign.**	**Other**	**Total**	**ECTS**
	40	20				40	100	4

Assessment Methods and Criteria	**Quantity (mark with "X")**	**Percentage (%)**
Midterm Exam	X	20
Quiz		
Assignment		
Projects		
Laboratory		

Practice	X	20
Other		
Final Exam	X	60

WEEKLY COURSE PLAN	
Week	**Contents and topics**
1. Week	Introduction to hydraulics. Basic principles in hydraulics
2. Week	Standard symbols in hydraulics. Hydraulic pipes and hoses
3. Week	Pumps, motors, hydraulic cylinders
4. Week	Sealing elements, valves
5. Week	Oil containers. Filters, accumulators. Hydraulic fluids
6. Week	Electro-hydraulic systems. Faults and determination of them in hydraulic systems
7. Week	Hydraulic circuits. Application areas of hydraulic systems in industry. Hydraulic circuit design and applications
8. Week	Midterm exam
9. Week	Introduction to pneumatics. Physical principles in pneumatics
10. Week	Collecting, maintenance and distribution of air
11. Week	Standard symbols in pneumatics. Cylinders, sealing elements, valves and motors
12. Week	Design and drawing of pneumatic circuits. Circuit drawing methods
13. Week	Hydro-pneumatics. Application areas of pneumatics. Fault finding
14. Week	Electro-pneumatics. System design and setting the system up using pneumatic components
15. Week	Introduction to PLC and programming of PLC. Applications of pneumatic circuits.

GAZİ UNIVERSITY FACULTY OF TECHNOLOGY ECTS FORM								
Course Code and Title	İMM-307 SYSTEM DYNAMIC AND CONTROL							
Credits	3							
ECTS	3							
Name of Lecturer and e-mail address	Hasan Basri ULAŞ, bulas@gazi.edu.tr							
Department/Program	Department of Manufacturing Engineering							
Course Type	Obligatory							
Course Language	Turkish							
Course Semester	Fall							
Prerequisites	None							
Course Objectives	.							
Course Contents	System concept. Introduction to system dynamics, definitions. Modeling of physical systems. Global parameter models. Variable types. Power and energy. Energy ports. One-port elements. Type-A, type-T, type-D and source elements. One-port elements of physical systems. Lineer graph representation of system elements. Oriented linear graphs of systems with one-port elements. Obtaining dynamic equations of some example systems with one-port elements. Incompatibilities in modeling and dependent elements. Impure elements. Two-port elements. Oriented linear graphs and dynamic equations of systems with one-port and two-port elements. Obtaining dynamic equations of some example systems with one-port and two-port elements. State variables and equations. Determination of state variables of systems with one-port elements from their linear graphics and evaluation of state equations. Determination of state variables of systems with one-port and two-port elements and evaluation of state equations. Linearization of nonlineer systems. Linearization around steady and non-steady operating points. Response of systems to impulse, step and ramp inputs. Step and ramp responses of first order systems. Step responses of second order systems.							
Course Learning Outcomes	1. Be able to model and analyze mechanical systems by common methods. 2. These methods can be applied to systems different from engineering systems.							
References **(References must be up to date)**	**Books**	1. Ercan, Y., Mühendislik Sistemlerinin Modellenmesi ve Dinamiği, 2. Literatür Yayınları, İstanbul, 2003. 3. Özdağ, N., Dinibütün, A.T., Kuzucu, A., Otomatik Kontrol Temelleri, Birsen Yayı., İstanbul, 1998. 4. Kuo, B.J., Otomatik Kontrol Sistemleri, Literatür Yay., İstanbul, 1999.						
	Journals, Articles, Papers, Symposiums							

Planned learning activities and teaching methods	**Theor**	**Pract**	**Lab.**	**Projects**	**Assign.**	**Other**	**Total**	**ECTS**
	30	-	-	25	15	5	75	3

Assessment Methods and Criteria	**Quantity (mark with "X")**	**Percentage (%)**
Midterm Exam	X	40
Quiz		
Assignment		

Projects		
Laboratory		
Practice		
Other		
Final Exam	X	60

WEEKLY COURSE PLAN	
Week	**Contents and topics**
1. Week	System concept. Introduction to system dynamics, definitions.
2. Week	Modeling of physical systems. Global parameter models. Variable types.
3. Week	Power and energy. Energy ports. One-port elements. Type-A, type-T, type-D and source elements.
4. Week	One-port elements of physical systems.
5. Week	Lineer graph representation of system elements. Oriented linear graphs of systems with one-port elements.
6. Week	Obtaining dynamic equations of some example systems with one-port elements.
7. Week	Incompatibilities in modeling and dependent elements. Impure elements.
8. Week	Midterm exam
9. Week	Two-port elements. Oriented linear graphs and dynamic equations of systems with one-port and two-port elements.
10. Week	Obtaining dynamic equations of some example systems with one-port and two-port elements. State variables and equations.
11. Week	Determination of state variables of systems with one-port elements from their linear graphics and evaluation of state equations.
12. Week	Determination of state variables of systems with one-port and two-port elements and evaluation of state equations. Linearization of nonlineer systems.
13. Week	Linearization around steady and non-steady operating points.
14. Week	Laplace transforms. Transfer functions. Characteristic equation. Poles and zeros. Test input types and time response.
15. Week	Response of systems to impulse, step and ramp inputs. Step and ramp responses of first order systems. Step responses of second order systems.

GAZİ UNIVERSITY FACULTY OF TECHNOLOGY ECTS FORM								
Course Code and Title	**İMM-305 METAL CUTTING THEORY AND CUTTING TOOLS**							
Credits	4							
ECTS	5							
Name of Lecturer and e-mail address	Prof. Dr. Yusuf ŞAHİN, ysahin@gazi.edu.tr, Prof Dr. Ulvi ŞEKER, useker@gazi.edu.tr Asoc. Prof. Dr. Hakan DİLİPAK, hdilipak@gazi.edu.tr							
Department/Program	Department of Manufacturing Engineering							
Course Type	Obligatory							
Course Language	Turkish							
Course Semester	Fall							
Prerequisites	None							
Course Objectives	To teach some basic concepts of metal cutting processes (cutting tool geometry,parametres and cutting tool materials etc.)							
Course Contents	Structure of Materials and Their Mechanical Behaviours, Metal Cutting Operations and Terminology, The Essential Features of Metal Cutting, Metal Cutting Theories, Forces and Stress in Metal Cutting, Heat in Metal Cutting, Tool Life and Tool Life Models, Tool Wear and Machining Economics, Cutting Tool Materials, Classification of Cutting Tool Materials and Code Keys for Inserts, Machinability and Machinability Evaluation, Surface Roughness, Coolants and Lubricants, Tool Holders and Code Keys for Tool Holders, Selection of appropriate cutting tools and holders in machining							
Course Learning Outcomes	To have some basic knowledge about cutting tools and factors effecting on chip formation and to be able selection an appropriate cutting tools for any machining.							
References **(References must be up to date)**	**Books**	1. Metal Cutting, E. Trent and P. Wright, 4. Baskı, 2000 2. Talaş kaldırma prensipleri I, Y., ŞAHİN. Nobel basım yayım Dağıtım, Ankara, 2000 3. Talaş kaldırma prensipleri II, Y., ŞAHİN. Nobel basım yayım Dağıtım, Ankara, 2001 4. Kesici Takım Tasarımı Ders Notu, Ulvi ŞEKER, 1994 5. Talaş Kaldırma Prensipleri Ders Notu, Ulvi ŞEKER, 1994 6. Talaş Kaldırma Yöntemleri ve Takım Tezgahları, M.Akkurt, Birsen Yayınevi, İstanbul, 1992. 7. Metal Cutting Principles, Milton C.Shaw, 1984. 8. Principles of Manufacture", S.C. Black, V. Chiles, A.J. Lisseman, S.J. Martin, 1996 9. Materials and Processes in Manufacturing, E. Paul Degarmo, J.T. Black, R. A. Kohser, 1997.						
	Journals, Articles, Papers, Symposiums							
Planned learning	**Theor**	**Pract**	**Lab.**	**Projects**	**Assign.**	**Other**	**Total**	**ECTS**

activities and teaching methods	60					90	150	6

Assessment Methods and Criteria	**Quantity (mark with "X")**	**Percentage (%)**
Midterm Exam	X	40
Quiz		
Assignment		
Projects		
Laboratory		
Practice		
Other		
Final Exam	X	60

WEEKLY COURSE PLAN

Week	**Contents and topics**
1. Week	Structure of Materials and Their Mechanical Behaviours
2. Week	Metal Cutting Operations and Terminology
3. Week	The Essential Features of Metal Cutting
4. Week	Metal Cutting Theories, Forces and Stress in Metal Cutting
5. Week	Heat in Metal Cutting
6. Week	Tool Life and Tool Life Models
7. Week	Tool Wear and Machining Economics
8. Week	Midterm exam
9. Week	Cutting Tool Materials (High speed steel, Cemented carbide and Cermet cutting tools)
10. Week	Cutting Tool Materials (Ceramics, Cubic Boron Nitride-CBN, Polycrystalline Diamond – PCD, Special Cutting Tools)
11. Week	Classification of Cutting Tool Materials and Code Keys for Inserts
12. Week	Machinability and Machinability Evaluation
13. Week	Surface Roughness /Coolants and Lubricants
14. Week	Tool Holders and Code Keys for Tool Holders
15. Week	Selection of appropriate cutting tools and holders in machining

GAZİ UNIVERSITY FACULTY OF TECHNOLOGY ECTS FORM								
Course Code and Title	İMM-309 JIGS AND FIXTURE TECHNOLOGY							
Credits	3							
ECTS	6							
Name of Lecturer and e-mail address	Prof. Dr. Ulvi ŞEKER useker@gazi.edu.tr							
Department/Program	Department of Manufacturing Engineering							
Course Type	Obligatory							
Course Language	Turkish							
Course Semester	Fall							
Prerequisites	None							
Course Objectives	To know aims of jigs and fixtures using in manufacturing and being able to make jigs and fixture designs suitable to production.							
Course Contents	Classifications and definitions of jigs and fixtures. Design analysis for fixture design. Fixture design steps. Location and supporting principles. Clamping and locating of parts. Clamping elements and determining of clamping forces. Supporting elements. Design of fixture and jig body. Drawing of jigs and fixtures. Sizing and tolerancing. Standard fixture and jig elements. Jig design for drilling, reaming operations. Fixture design for milling and turning operations. Fixture and jig design for other operations. Universal and automatic jigs and fixtures. Fixture design for flexible manufacturing systems. Cost calculation. Control and inspection. Modular jigs and fixtures: features,applications and design. Fixture desing for assembly and joining operations.							
Course Learning Outcomes	To comprehend design process, to understand importance of the basic functions in design jigs and fixture designs, to learn location and supporting principles, to learn standard element selection and usage, being able to make jigs and fixture designs.							
References **(References must be up to date)**	**Books**	1.Ders Notları, U., ŞEKER, G.Ü.T.E.F, Ankara, 1999 2.Bilgisayar Destekli Bağlama Kalıbı Tasarımı, G.Ü. Fen Bilimleri Enstitüsü, Doktora Tezi, Ankara, 1995. 3.Seri Üretimde Bağlama Teknikleri, Coşkun KIRMIZI,1985 4.Handbook of Jig and Fixture Design, William E. BOYES, 1989 5.Jigs and Fixture Design Manuel, Erik K. HENRIKSEN, 1973.						
	Journals, Articles, Papers, Symposiums							

Planned learning activities and teaching methods	**Theor**	**Pract**	**Lab.**	**Projects**	**Assign.**	**Other**	**Total**	**ECTS**
	60			60		30	150	6

Assessment Methods and Criteria	**Quantity (mark with "X")**	**Percentage (%)**
Midterm Exam	X	10
Quiz		
Assignment		
Projects	X	30
Laboratory		

Practice		
Other		
Final Exam	X	60

WEEKLY COURSE PLAN	
Week	**Contents and topics**
1. Week	Classifications and definitions of jigs and fixtures.
2. Week	Design analysis for fixture design.
3. Week	Fixture design steps.
4. Week	Location and supporting principles.
5. Week	Clamping and locating of parts.
6. Week	Clamping elements and determining of clamping forces.
7. Week	Supporting elements. Design of fixture and jig body.
8. Week	Midterm Exam
9. Week	Drawing of jigs and fixtures, sizing and tolerancing.
10. Week	Standard fixture and jig elements.
11. Week	Jig design for drilling, reaming operations.
12. Week	Fixture design for milling and turning operations.
13. Week	Fixture and jig design for other operations. Universal and automatic jigs and fixtures.
14. Week	Fixture design for flexible manufacturing systems. Fixture for Assembly and joining operations. Cost calculation. Control and inspection of fixture
15. Week	Modular jigs and fixtures: features, applications and design

GAZİ UNIVERSITY FACULTY OF TECHNOLOGY ECTS FORM								
Course Code and Title	İST-201 STATISTICS							
Credits	3							
ECTS	3							
Name of Lecturer and e-mail address	Doç.Dr. Fırat KAFKAS fkafkas@gazi.edu.tr							
Department/Program	Manufacturing Engineering							
Course Type	Obligatory							
Course Language	Turkish							
Course Semester	Fall							
Prerequisites	Non							
Course Objectives	The course aims to expose students to basic concepts of statistical inference, linear regression and correlation, forecastinng and experimental design							
Course Contents	One-and two-sample estimation problems. One-and two-sample tests of hypothesis. Simple linear regression and correla**tion**. Multiple linear regression. Forecasting: Time series analysis, seasonality, smoothing, moving averages, and trend projection. Applications in industrial engineering. Design of Experiments							
Course Learning Outcomes	1. Solve many types of decision making problems of industry, make sta s cal inferences, and carry out hypothesis testings 2. Develop simple and multiple-parameter linear models that can be utilized for prediction and forecasting in industrial planning and management 3. Reinforce their problem solving skills and their analytical thinking ability 4. Become familiar with a suitable statistical package through computer-based statistical analysis							
References **(References must be up to date)**	**Books**	1. Walpole, R.E., Myers, R.H., Myers, S.L., Ye, K. (2013). Probability & Sta9s9cs for Engineers & Scien9sts, Pren9ce Hall. 2. Duxbury Barnes, J.W. (1994). Sta9s9cal Analysis for Engineers and Scien9sts: A Computer-Based Approach. McGraw Hill. 3. Vardeman, Stephen B. (1994). Sta9s9cs for Engineering Problem Solving. PWS Publishing Company						
	Journals, Articles, Papers, Symposiums							

Planned learning activities and teaching methods	**Theor**	**Pract**	**Lab.**	**Projects**	**Assign.**	**Other**	**Total**	**ECTS**
	48				36	12	96	3

Assessment Methods and Criteria	**Quantity (mark with "X")**	**Percentage (%)**
Midterm Exam	X	25
Quiz		
Assignment	X	10
Projects		

Laboratory		
Practice		
Other	X	5
Final Exam	X	60

WEEKLY COURSE PLAN	
Week	**Contents and topics**
1. Week	Introduction and Elementary Concepts
2. Week	Arrangement of data
3. Week	Measures of central tendency
4. Week	Measures of central tendency
5. Week	Measures of dispersion
6. Week	Measures of dispersion
7. Week	Simple probability concepts
8. Week	Midterm Exam
9. Week	Binomial Distribution
10. Week	Normal Distribution
11. Week	Sampling
12. Week	Testing Hypothesis
13. Week	Testing Hypothesis
14. Week	Simple Linear Regression
15. Week	Correlation
16. Week	Final Exam

GAZİ UNIVERSITY FACULTY OF TECHNOLOGY ECTS FORM								
Course Code and Title	IMM-302, Machine Elements-II							
Credits	3							
ECTS	4							
Name of Lecturer and e-mail address	Doç.Dr.Onuralp ULUER uluer@gazi.edu.tr Yrd.Doç.Dr.Ali ÖZGEDİK ozkedik@gazi.edu.tr							
Department/Program	Department of Manufacturing Engineering							
Course Type	Compulsory							
Course Language	Turkish							
Course Semester	Spring							
Prerequisites								
Course Objectives	A methodical sense of analyzing and design of machine elements is given. Training for the creative and practical phases of economic design, involving analysis, synthesis, development and engineering reserach is aimed.							
Course Contents	Welded joints, mechanical springs, rolling contact bearings, lubrication and journal bearings, gearing, spur and helical gears, bevel and worm gears, clutches, brakes, couplings and flywheels, flexiable mechanical elements.							
Course Learning Outcomes	Design the mechanical elements using a methodical approach. Assets the stress, deflection and strength of a machine element. Design machines for static and variable loadings. Design for fatigue strength.							
References **(References must be up to date)**	**Books**	[1] Richard G. Budynas, J. Keith Nisbett, "Shigley's Mechanical Engineering Design" 8th Edition in SI Units, Mcgraw-Hill Series in Mechanical Engineering, ISBN: 0073312606. [2] Bülent Ekmekci,Makina Elemanları Ders Notları. [3] İ.Hüseyin Filiz,Problems on The Design of Machine Elements, Gaziantep Üniversitesi Yayınları.						
	Journals, Articles, Papers, Symposiums							
Planned learning activities and teaching methods	**Theor**	**Pract**	**Lab.**	**Projects**	**Assign.**	**Other**	**Total**	**ECTS**
	42	33			33		75	4

Assessment Methods and Criteria	**Quantity (mark with "X")**	**Percentage (%)**
Midterm Exam	X	40
Quiz		
Assignment	X	10
Projects		
Laboratory		
Practice		
Other		
Final Exam	X	50

WEEKLY COURSE PLAN

Week	Contents and topics
1. Week	Welded joints
2. Week	Helical Springs
3. Week	Torsion springs
4. Week	Rolling contact bearings
5. Week	Hydrodynamic bearings
6. Week	Hydrostatic bearings
7. Week	Gearing-general
8. Week	Midterm Exam
9. Week	Gear trains
10. Week	Design of spur gears
11. Week	Design of helical gears
12. Week	Design of bevel gears
13. Week	Design of worm gears
14. Week	Clutch, brakes, couplings and flywheels
15. Week	Flexible mechanical elements

GAZİ UNIVERSITY FACULTY OF TECHNOLOGY ECTS FORM								
Course Code and Title	IMM-304 Computer Aided Manufacturing-I (CAM-I)							
Credits	3							
ECTS	4							
Name of Lecturer and e-mail address	Prof. Dr. İhsan KORKUT ikorkut@gazi.edu.tr Prof. Dr. Mahmut GÜLESİN, gulesin@gazi.edu.tr Prof. Dr. Muammer NALBANT, nalbant@gazi.edu.tr Asist. Prof. Dr. Hakan DİLİPAK, hdilipak@gazi.edu.tr							
Department/Program	Manufacturing Engineering							
Course Type	Obligatory							
Course Language	Turkish							
Course Semester	Spring							
Prerequisites	None							
Course Objectives	Being able to perform all 2D and 3D designs and their machining operations using a CAD/CAM package.							
Course Contents	Designing and drafting in CAD/CAM environment. 2D and 3D drawing commands. Dimensioning. 3D modelling methods. Filing, editing and auxiliary commands. Tool selection. Tool design. Definition of part geometry and operations. Cutter parameters definitions. Contour milling, slot, pocket, face milling operations for prismatic parts. Drilling operations. Turning operations: Facing, contour turning, slotting, drilling operations for cylindrical parts. Outer and inner operations. Threading. Simulation in CAD/CAM. Post processor definition in CAD/CAM. Automatic CNC code generation in CAD/CAM. CNC program downloading to a CNC machine tool using RS232 serial cable and machining of parts on a CNC lathe and milling machine.							
Course Learning Outcomes	Being able to generate tool paths doing 2D and 3D designs in a CAD/CAM package. To send part programmers to CNC machine and being able to machine parts.							
References **(References must be up to date)**	**Books**	1. MASTERCAM ile Tasarım ve Üretim Modelleme, M., Gülesin, A., Güllü, Ö., Avcı, G., Akdoğan, Asil Yayın Dağıtım, Ankara, 2005. 2. Mastercam X ve CNC Programlama Cilt 1 ve 2, M., NALBANT, Alfa. Yayınları, İstanbul, 2006. 3. MASTERCAM Torna Modülü CNC Programl. 3, M., NALBANT, Alfa Yayınları, Ankara, 2005. 4. MASTERCAM, K., Gök, A., Gök, Pusula Yayınları, İstanbul, 2004.							
	Journals, Articles, Papers, Symposiums							

Planned learning activities and teaching methods	**Theor**	**Pract**	**Lab.**	**Projects**	**Assign.**	**Other**	**Total**	**ECTS**
	28		28		19		75	4

Assessment Methods and Criteria	**Quantity (mark with "X")**	**Percentage (%)**
Midterm Exam	X	35
Quiz		
Assignment	X	15

Projects		
Laboratory		
Practice		
Other		
Final Exam	X	50

WEEKLY COURSE PLAN	
Week	**Contents and topics**
1. Week	Introduction of the CAD/CAM
2. Week	2 dimension drawing commands: line, circle, rectangle, arc commands
3. Week	Editing commands of 2 dimension drawings: copy, array, trim, etc. and dimensioning commands
4. Week	3 dimension modeling techniques
5. Week	Extrude, revolve, extrude cut commands
6. Week	Editing commands of 3 dimension models: copy, array, chamfer, fillet commands
7. Week	Tool selection and tool design, geometry and process definition, definition of cutting tool position, Definition of start point, tool start plane and cavity plane information, cutting parameters definition
8. Week	Midterm exam
9. Week	The methods of the cutting tool approach to work piece, plunge and retract, profile machining for prismatic parts, Definitions of cutting parameters, slotting, pocketing, facing, drilling and other machining methods
10. Week	Definitions of contour milling, slot, pocket, face milling, drilling operations for CNC milling machines
11. Week	Face, profile turning, grooving, drilling, internal and external threading process definitions for cylindrical parts
12. Week	Using of the simulation modules in the CAD/CAM packages
13. Week	CNC code generation, sending of the CNC part programmers to CNC machines with RS-232
14. Week	Definition of the reference point of the work piece on the CNC machine and Machining of the part on the CNC machine
15. Week	Definition of the reference point of the work piece on the CNC machine and Machining of the part on the CNC machine

GAZİ UNIVERSITY FACULTY OF TECHNOLOGY ECTS FORM								
Course Code and Title	IMM-306 TECHNOLOGY OF ELECTRICITY AND ELECTRONICS							
Credits	2							
ECTS	2							
Name of Lecturer and e-mail address	Hasan Basri ULAŞ, bulas@gazi.edu.tr							
Department/Program	Department of Manufacturing Engineering							
Course Type	Obligatory							
Course Language	Turkish							
Course Semester	Spring							
Prerequisites	None							
Course Objectives	This course provides basic knowledge about electricity and electronics circuit devices.							
Course Contents	Basic concept and units (electric current, voltage, resistance, capacitance, inductance etc.), conductance-insulation, direct and alternating current. Switches, fuses, inductors, relays, contactors, transformers, electric motors, cables, semiconductors, automatic circuit breakers. Ohm's Law, Kirchhoff's law, magnetic, chemical, heat and light effects of electrical current. Series and parallel circuits and properties. Direct and alternating current features and circuits. Digital and analogue electrical measuring instruments, direct and alternating current circuits, current and voltage measurements. Direct current and alternating current (single phase and three phase) electric motors, motor connections and control panel connections. Electricity use will be considered in the safety rules.							
Course Learning Outcomes	The students who take this course have basic electricity-electronic knowledge.							
References **(References must be up to date)**	Books	1. Çelebi H.H., Elektrik Bilgisi, Yüce Yayınları, İstanbul, 1999. 2. Özkan T., Temel Elektronik, Kayhan Matbaası, İstanbul, 1995 3. MEB publications						
	Journals, Articles, Papers, Symposiums							

Planned learning activities and teaching methods	Theor	Pract	Lab.	Projects	Assign.	Other	Total	ECTS
	30					20	50	2

Assessment Methods and Criteria	Quantity (mark with "X")	Percentage (%)
Midterm Exam	X	40
Quiz		
Assignment		
Projects		
Laboratory		
Practice		
Other		

Final Exam	X	60

WEEKLY COURSE PLAN	
Week	Contents and topics
1. Week	Basic concept and units (electric current, voltage, resistance, capacitance, inductance)
2. Week	Conductance-insulation, direct and alternating current
3. Week	Switches, fuses, inductors, relays, contactors, transformers
4. Week	Electric motors, cables, semiconductors
5. Week	Automatic circuit breaker
6. Week	Ohm's Law
7. Week	Kirchhoff's law
8. Week	Midterm exam
9. Week	Magnetic, chemical, heat and light effects of electrical current
10. Week	Series and parallel circuits and their properties
11. Week	Direct and alternating current features and circuits
12. Week	Digital and analogue electrical measuring instruments, direct and alternating current circuits, current and voltage measurements
13. Week	Direct current and alternating current (single and three phases) electric motors, motor connections, control panel connections and calculations
14. Week	Direct current and alternating current (single and three phases) electric motors, motor connections, control panel connections and calculations
15. Week	Electricity use will be considered in the safety rules

GAZİ UNIVERSITY FACULTY OF TECHNOLOGY ECTS FORM								
Course Code and Title	EKO-201 ECONOMY							
Credits	2							
ECTS	2							
Name of Lecturer and e-mail address	Yrd. Doç. Dr. Ömer ASAL omerasal@gazi.edu.tr							
Department/Program	Department of Manufacturing Engineering							
Course Type	Obligatory							
Course Language	Turkish							
Course Semester	Spring							
Prerequisites	None							
Course Objectives	To obtain necessary information regarding organization economics							
Course Contents	Introduction to organization economy. Historical background of organization economy. Organization types. Selection and analysis of a place. Analysis of general organization functions such as manufacturing, marketing, management, finance, personnel, research and design. Analysis of management functions. Analysis of requirement, product, value, usefulness and manufacturing factors. Enterprising. Economic doctrines. Price mechanism. Theory of consumption, manufacturing. Market and price systems. Money and money systems, money policy, cost, income and employment, foreign trade.							
Course Learning Outcomes	To be able to cope with the problems regarding organisation economics							
References **(References must be up to date)**	**Books**	1. İşletme Bilimlerine Giriş, Prof. Dr. M. Şerif ŞİMŞEK, Adım Matbaacılık ve Ofset, 2004.						
	Journals, Articles, Papers, Symposiums							

Planned learning activities and teaching methods	**Theor**	**Pract**	**Lab.**	**Projects**	**Assign.**	**Other**	**Total**	**ECTS**
	28					22	50	2

Assessment Methods and Criteria	**Quantity (mark with "X")**	**Percentage (%)**
Midterm Exam	X	40
Quiz		
Assignment		
Projects		
Laboratory		
Practice		
Other		
Final Exam	X	60

WEEKLY COURSE PLAN	
Week	**Contents and topics**

1. Week	Introduction to organization economy.
2. Week	Historical background of organization economy.
3. Week	Organization types.
4. Week	Selection and analysis of a place.
5. Week	Analysis of general organization functions: manufacturing, marketing, management,
6. Week	Finance, personnel, research and design.
7. Week	Analysis of management functions.
8. Week	Analysis of requirement, product, value, usefulness and manufacturing factors.
9. Week	Enterprising.
10. Week	Economic doctrines.
11. Week	Price mechanism.
12. Week	Theory of consumption, manufacturing.
13. Week	Market and price systems.
14. Week	Money and money systems, money policy,
15. Week	Cost, income and employment, foreign trade.

GAZİ UNIVERSITY FACULTY OF TECHNOLOGY ECTS FORM								
Course Code and Title	İMM-310 PROJECT DESIGN							
Credits	2							
ECTS	3							
Name of Lecturer and e-mail address	Prof. Dr. Ulvi ŞEKER, useker@gazi.edu.tr Y.Doç.Dr. Yakup TURGUT, yturgut@gazi.edu.tr							
Department/Program	Department of Manufacturing Engineering							
Course Type	Obligatory							
Course Language	Turkish							
Course Semester	Fall							
Prerequisites	None							
Course Objectives	Being able to draw an industrial machine project to product it, being able to analyses of process for manufacturing and calculate of its cost.							
Course Contents	Determining, selection of a project. Calculations necessary for the project. Project must be mechanical, manufacturing or computer related. Preparing technical drawings of the whole project and components. Preparing process plans and analyses for manufacturing of components. Cost Calculation of the whole machine.							
Course Learning Outcomes	Full project of an industrial machine to use in Course of IMM 404-Project Application, Process plans and analyses for manufacturing, cost calculation							
References **(References must be up to date)**	**Books**	1 İlgili standartlar 2. Hazır parça katalogları(Rulman, Kaplin, Redüktör vb.) 3. Kesici takım katalogları 4. Dizayn-konstrüksiyon dergisi, Makine Mühendisler Odası 5. Uygulanmış Makine Elemanları Dizayn-Konstrüksiyon, D., Düzgün, 6. Makine Teknolojileri için Birimler, Formüller ve Çizelgeler, M., Gülesin, A., Güllü, B.B., Buldum, Seçkin kitabevi, 2003, Ankara 7. Metal Mesleğinde Tablolar, MEB yayınları							
	Journals, Articles, Papers, Symposiums							

Planned learning activities and teaching methods	**Theor**	**Pract**	**Lab.**	**Projects**	**Assign.**	**Other**	**Total**	**ECTS**
	30			30		15	75	3

Assessment Methods and Criteria	**Quantity (mark with "X")**	**Percentage (%)**
Midterm Exam	X	10
Quiz		
Assignment		
Projects	X	30
Laboratory		
Practice		
Other		

Final Exam	X	60

WEEKLY COURSE PLAN	
Week	**Contents and topics**
1. Week	Project preparation techniques
2. Week	Determining of project subjects and distribution to students
3. Week	Designing of the project and calculations necessary for the project.
4. Week	Mechanical and manufacturing subjects related to preparation the project
5. Week	The problems related project design can be faced
6. Week	The problems related manufacturing can be faced
7. Week	The problems related assembly techniques that can be faced
8. Week	Midterm Exam
9. Week	Studies on example projects
10. Week	Preparing technical drawings of the assambly
11. Week	Preparing technical drawings of the project components
12. Week	Preparing 3D models of the whole project
13. Week	Preparing the process plans
14. Week	Preparing process analyses
15. Week	Cost calculation of the parts and whole machine

GAZİ UNIVERSITY FACULTY OF TECHNOLOGY ECTS FORM								
Course Code and Title	İMM-312 MACHINE DESIGN							
Credits	3							
ECTS	3							
Name of Lecturer and e-mail address	Prof. Dr. Yusuf ŞAHİN, ysahin@gazi.edu.tr Doç.Dr. Abdullah KURT, akurt@gazi.edu.tr							
Department/Program	Department of Manufacturing Engineering							
Course Type	Obligatory							
Course Language	Turkish							
Course Semester	Fall							
Prerequisites	None							
Course Objectives	To learn some basic concepts of mechanical systems, to make a design for some components and gain an analysis ability for any systems.							
Course Contents	Introduction to Mechanical Engineering Design. Materials: Material Strength and Stiffness,Hardness, Impact properties. Load–Stress Analysis: Equilibrium and Free-Body Diagrams ,Shear Force and Bending Moments in Beams, Stress. Mohr's Circle for Plane Stress, General Three-Dimensional Stress. Normal Stresses for Beams in Bending, Shear Stresses for Beams in Bending,Torsion. Stresess in Curved Beams Due to Bending. Deflection and Stiffness: Tension, Compression, and Torsion Deflection Due to Bending. Compression members. Failure Theories, Maximum-Shear-Stress Theory for Ductile Materials, Distortion-Energy Theory for Ductile Materials. Maximum-Normal-Stress Theory for Brittle Materials. Fatigue Failure Resulting from Variable Loading. Shafts and Shaft Components. Case Study for Power Transmission, Gears or Other Mechanical System.							
Course Learning Outcomes	To have some basic knowledge on machine components like gears, shafts, pulley etc. and simple mechanical system can be done.							
References **(References must be up to date)**	**Books**	Shiley's Mechanical engineering design, Ninth Edition,Richard G. Budynas,J. Keith Nisbett, Mc GRaw Hill, 2011.						
	Journals, Articles, Papers, Symposiums							

Planned learning activities and teaching methods	**Theor**	**Pract**	**Lab.**	**Projects**	**Assign.**	**Other**	**Total**	**ECTS**
	40					30	70	3

Assessment Methods and Criteria	**Quantity (mark with "X")**	**Percentage (%)**
Midterm Exam	X	40
Quiz		
Assignment		
Projects		

Laboratory		
Practice		
Other		
Final Exam	X	60

WEEKLY COURSE PLAN	
Week	**Contents and topics**
1. Week	Introduction to Mechanical Engineering Design: Phases and Interactions of the Design Process, Design Factor and Factor of Safety, Reliability
2. Week	Materials: Material Strength and Stiffness,Hardness, Impact properties, Casting ,Molding,Powder-Metallurgy Process, Hot-Working Processes, Alloy steels, Materials Selection
3. Week	Load – Stress Analysis: Equilibrium and Free-Body Diagrams, Shear Force and Bending Moments in Beams, Stress
4. Week	Stress Analysis….Cartesian Stress Components, Mohr's Circle for Plane Stress, General Three-Dimensional Stress, Elastic Strain,Uniformly Distributed Stresses
5. Week	Stress Analysis….Normal Stresses for Beams in Bending , Shear Stresses for Beams in Bending ,Torsion ,Stress Concentration
6. Week	Stress Analysis…. Stresses in Rotating Rings, Curved Beams in Bending, Contact Stresses
7. Week	Deflection and Stiffness:Tension, Compression, and Torsion Deflection Due to Bending
8. Week	Midterm exam
9. Week	Beam Deflection Methods, Beam Deflections by Superposition etc.
10. Week	Compression members, Applications of Euler and Johsons formula
11. Week	Failure Theories, Maximum-Shear-Stress Theory for Ductile Materials, Distortion-Energy Theory for Ductile Materials
12. Week	Maximum-Normal-Stress Theory for Brittle Materials, Modifications of the Mohr Theory for Brittle Materials, Coulomb-Mohr Theory for Ductile Materials
13. Week	Fatigue Failure Resulting from Variable Loading: Fatigue-Life Methods,The Stress-Life Method,The Strain-Life Method
14. Week	Shaft Design for Stress,Deflection Considerations,Critical Speeds for Shafts
15. Week	Case Study for Power Transmission, Gears or Other Mechanical System

GAZİ UNIVERSITY FACULTY OF TECHNOLOGY ECTS FORM								
Course Code and Title	Mat 101 Plastics Molding Technologies							
Credits	4							
ECTS	5							
Name of Lecturer and e-mail address								
Department/Program	Department of Manufacturing Engineering							
Course Type	Obligatory							
Course Language	Turkish							
Course Semester	Autumn/Spring							
Prerequisites	None							
Course Objectives	To gain mold design and manufacturing skills for plastic part production.							
Course Contents	Plastic injection molds, plastic extrusion die, blow molding, thermoforming, rotational molds, acquainting the mold components, mold materials and selection, new plastic molding technologies, moldability concept, determination of the mold manufacturing strategies and mold design stages, mold surface finish operations and patterning.							
Course Learning Outcomes	Knows the plastics molding methods, designs and manufactures all mold types for plastics, selects mold materials, knows and applicates the mold manufacturing strategies.							
References **(References must be up to date)**	**Books**	2. Polymer processing fundamentals, T. Osswald, 1998. 3. Plastic manufacturing system engineering, D. Kazmer, 2009. 4. Selecting injection molds, H. Rees, B. Catoen, 2005. 5. Handbook of plastic processes, C. A. Harper, 2006.						
	Journals, Articles, Papers, Symposiums							
Planned learning activities and teaching methods	**Theor**	**Pract**	**Lab.**	**Projects**	**Assign.**	**Other**	**Total**	**ECTS**
	24	60	-	24	12	30	150	5

Assessment Methods and Criteria	**Quantity (mark with "X")**	**Percentage (%)**
Midterm Exam	X	15
Quiz	-	-
Assignment	X	10
Projects	X	15
Laboratory	-	-
Practice	X	45
Other	-	-
Final Exam	X	15

WEEKLY COURSE PLAN	
Week	**Contents and topics**

1. Week	Plastic injection molds and injection mold design examples
2. Week	Plastic extrusion dies and extrusion die design examples
3. Week	Plastic blow molds, thermoforming molds, rotational molds and mold design examples for these methods.
4. Week	Mold material and their selection criterions, moldability concept, determination of the mold manufacturing strategies, surface finish operations.
5. Week	Mold manufacturing (determining the materials, cutting of the mold materials and prepare them to machining)
6. Week	Mold manufacturing (Machining of the mold components)
7. Week	Mold manufacturing (Machining of the mold components)
8. Week	Midterm exam
9. Week	Mold manufacturing (Machining of the mold components)
10. Week	Mold manufacturing (Machining of the mold components)
11. Week	Mold manufacturing (Machining of the mold components)
12. Week	Mold manufacturing (Machining of the mold components)
13. Week	Mold manufacturing (Mold surface finish operations)
14. Week	Assembly the mold components
15. Week	Testing of the molds

GAZİ UNIVERSITY FACULTY OF TECHNOLOGY ECTS FORM								
Course Code and Title	IMM 400 Senior Thesis							
Credits	1							
ECTS	5							
Name of Lecturer and e-mail address	Dr. Gültekin UZUN, uzun.gultekin@gazi.edu.tr							
Department/Program	Manufacturing Engineering							
Course Type	Compulsory							
Course Language	Turkish							
Course Semester	Spring							
Prerequisites	None							
Course Objectives	To make investigation about a matter, to write results and doing presentation.							
Course Contents	Determination of senior thesis subject. Literature review regarding the selected subject and collecting necessary information. Writing the thesis after determining the information to be included in the thesis. Presentation of the thesis in front of a group. Preparing and submitting the thesis.							
Course Learning Outcomes	To have comprehensive information about a matter, to write and to present.							
References **(References must be up to date)**	**Books**	References suitable for the thesis concept.						
	Journals, Articles, Papers, Symposiums							
Planned learning activities and teaching methods	**Theor**	**Pract**	**Lab.**	**Projects**	**Assign.**	**Other**	**Total**	**ECTS**
		28		22		50	100	5

Assessment Methods and Criteria	**Quantity (mark with "X")**	**Percentage (%)**
Midterm Exam		
Quiz		
Assignment		
Projects	X	50
Laboratory		
Practice		
Other		
Final Exam	X	50

WEEKLY COURSE PLAN	
Week	**Contents and topics**
1. Week	Determination of senior thesis subject.
2. Week	Literature review regarding the selected subject
3. Week	Literature review regarding the selected subject (continue)

4. Week	Literature review regarding the selected subject (continue)
5. Week	Literature review regarding the selected subject (continue)
6. Week	Collecting necessary information
7. Week	Collecting necessary information (continue)
8. Week	Collecting necessary information (continue)
9. Week	Collecting necessary information (continue)
10. Week	Writing the thesis after determining
11. Week	Writing the thesis after determining the information to be included in the thesis (continue)
12. Week	Writing the thesis after determining the information to be included in the thesis (continue)
13. Week	Writing the thesis after determining the information to be included in the thesis (continue)
14. Week	Presentation of the thesis.
15. Week	Last editing and submitting of the thesis.

GAZİ UNIVERSITY FACULTY OF TECHNOLOGY ECTS FORM								
Course Code and Title	IMM 402 Computer Aided Manufacturing-II (CAM-II)							
Credits	3							
ECTS	4							
Name of Lecturer and e-mail address	Prof. Dr. İhsan KORKUT ikorkut@gazi.edu.tr Prof. Dr. Mahmut GÜLESİN, gulesin@gazi.edu.tr Prof. Dr. Muammer NALBANT, nalbant@gazi.edu.tr Assist. Prof. Yakup TURGUT, yturgut@gazi.edu.tr							
Department/Program	Manufacturing Engineering							
Course Type	Obligatory							
Course Language	Turkish							
Course Semester	Spring							
Prerequisites	None							
Course Objectives	To teach CAD/CAM/CAPP and FMS systems forming computer integrated manufacturing (CIM) features and being able to make all stages of a 2D or 3D part to be produced from design to manufacture with current CAD/CAM package.							
Course Contents	Flexible Manufacturing Systems (FMS). Samples of FMS systems. Computer controlled systems in manufacturing. Computer graphics standards in CAD/CAM systems. Data exchange between different CAD/CAM systems. Phases between design and manufacturing. Computer Aided Process Planning. Approaches used in process planning. Group technology. Methods in CNC program preparation. Specifications of CAD/CAM programs. CNC code preparation techniques. DNC systems. Integration of CAD/CAM. Product design techniques. Solid and surface modelling of parts. CAM module parameters. CAM manufacturing applications. Generating CNC code and downloading CNC program to a CNC machine tool. Manufacturing the part on a CNC lathe and milling machine.							
Course Learning Outcomes	Having sufficient information about computer integrated manufacturing (CIM) and being able to perform manufacture with a current CAD/CAM package.							
References **(References must be up to date)**	**Books**	1. MASTERCAM ile Tasarım ve Üretim Modelleme, M., Gülesin, A., Güllü, Ö., Avcı, G., Akdoğan, Ankara, 2005. 2. CATIA CAD/CAM programı ile Tasarım, M., Gülesin, A., Güllü, Y., Kayır, E., Cantürk, Asil yayın Dağıtım, Ankara, 2005 3. Unigrpaphics NX2 ile Mekanik Modelleme ve Montaj, İ., Utanır, Asil yayın Dağıtım, Ankara, 2005 4. Catia CAM Modülü ile İmalat, M., Gülesin, A., Güllü, Y., Kayır, E., Cantürk, Asil yayın Dağıtım, Ankara, 2000.						
	Journals, Articles, Papers, Symposiums							

Planned learning activities and teaching methods	**Theor**	**Pract**	**Lab.**	**Projects**	**Assign.**	**Other**	**Total**	**ECTS**
	42		28		30		100	4

Assessment Methods and Criteria	**Quantity (mark with "X")**	**Percentage (%)**
Midterm Exam	X	35
Quiz		

Assignment	X	15
Projects		
Laboratory		
Practice		
Other		
Final Exam	X	50

WEEKLY COURSE PLAN	
Week	**Contents and topics**
1. Week	Flexible manufacturing systems-FMS, Structure of the computer control in manufacturing systems
2. Week	Steps of the design period in CAD/CAM systems and structure of the CAD system
3. Week	Standard databases used in CAD/CAM systems and data changing between systems in standard database
4. Week	CAD/CAM data transfer and data flow, design methods used in CAD/CAM systems
5. Week	Computer aided process planning (CAPP) in CAD/CAM integration, approaches used in process planning
6. Week	Data flow in CAPP, group technology, role of the group technology in CAD/CAM combination
7. Week	The methods of the preparation of CNC codes, properties of CAD/CAM packages DNC systems and their structure, CAD/CAM integration
8. Week	Midterm exam
9. Week	Part design techniques
10. Week	3D machine and part design techniques in computer, prismatic and cylindrical part modeling
11. Week	Solid and surface modeling, necessary operations for machining of surfaces,
12. Week	The methods of derivation of CNC codes and code sending to CNC machine tool
13. Week	2D and 3D modeling practices with CAD/CAM packages
14. Week	Process planning by modeling of the parts in CAD environment
15. Week	Machining applications on CNC machines using generated CNC codes

GAZİ UNIVERSITY FACULTY OF TECHNOLOGY ECTS FORM								
Course Code and Title	İMM-404 PROJECT APPLICATION							
Credits	4							
ECTS	6							
Name of Lecturer and e-mail address	Prof. Dr. Ulvi ŞEKER useker@gazi.edu.tr Yrd. Doç. Dr. Yakup TURGUT, yturgut@gazi.edu.tr							
Department/Program	Department of Manufacturing Engineering							
Course Type	Obligatory							
Course Language	Turkish							
Course Semester	Fall							
Prerequisites	İMM-310 PROJECT DESIGN							
Course Objectives	Production methot, tools and machine tool selection and their usage necessary for manufacturing according to complete drawing of a project design, which has been completed. To produce a working machine which has been designed before							
Course Contents	Manufacturing of the parts of the project designed earlier. Assembling of the parts according to the project. Testing the project, running and submitting the project.							
Course Learning Outcomes	Being able to read a project, being able to select method, tool and machine tool used in manufacturing, comprehension of subjects required attention before and after assembly for a project, being able to manufacture machine parts in measure and tolerance using different machines. To produce a whole working machine which has been designed before.							
References **(References must be up to date)**	**Books**	1.Hazır parça katalogları(Rulman, Kaplin, Redüktör vb.) 2. Kesici takım katalogları 3. Dizayn-konstrüksiyon dergisi, Makine Mühendisler Odası 4. Uygulanmış Makine Elemanları Dizayn-Konstrüksiyon, D., Düzgün, 5. Makine Teknolojileri için Birimler, Formüller ve Çizelgeler, M., Gülesin, A., Güllü, B.B., Buldum, Seçkin kitabevi, 2003, Ankara 6. Metal Mesleğinde Tablolar, MEB yayınları							
	Journals, Articles, Papers, Symposiums							
Planned learning activities and teaching methods	**Theor**	**Pract**	**Lab.**	**Projects**	**Assign.**	**Other**	**Total**	**ECTS**
	25	75				50	150	6

Assessment Methods and Criteria	**Quantity (mark with "X")**	**Percentage (%)**
Midterm Exam	X	10
Quiz		
Assignment		
Projects		
Laboratory		
Practice	X	30
Other		

Final Exam	X	60

WEEKLY COURSE PLAN	
Week	**Contents and topics**
1. Week	Planning for manufacturing of the project designed earlier.
2. Week	Manufacturing of the parts of the project using different machine tools.
3. Week	Manufacturing of the parts of the project using different machine tools. .
4. Week	Manufacturing of the parts of the project using different machine tools.
5. Week	Manufacturing of the parts of the project using different machine tools. .
6. Week	Manufacturing of the parts of the project using different machine tools.
7. Week	Manufacturing of the parts of the project using different machine tools. .
8. Week	Midterm Exam
9. Week	Mounting of the manufactured parts according to technical drawing of assembly of the machine .
10. Week	Mounting of the manufactured parts according to technical drawing of assembly of the machine .
11. Week	Mounting of the manufactured parts according to technical drawing of assembly of the machine .
12. Week	Mounting of the manufactured parts according to technical drawing of assembly of the machine .
13. Week	To complete the machine which has been designed before as working conditions .
14. Week	To complete the machine which has been designed before as working conditions .
15. Week	Test of the machine and evaluation of the studies have been done.

GAZİ UNIVERSITY FACULTY OF TECHNOLOGY ECTS FORM								
Course Code and Title	IMM-406 COMPUTER AIDED ENGINEERING AND ANALYSIS-CAE							
Credits	3							
ECTS	5							
Name of Lecturer and e-mail address	Assist. Prof. Dr. İbrahim KARAAĞAÇ, ibrahimkaraagac@gazi.edu.tr							
Department/Program	Department of Manufacturing Engineering							
Course Type	Obligatory							
Course Language	Turkish							
Course Semester	Spring							
Prerequisites	None							
Course Objectives	Purpose of this course, to teach concept of computer aided engineering (CAE) and finite element methods and to teach engineering analysis by finite element method and industrial applications by CAE programs.							
Course Contents	Computer aided stress and strain, thermal, vibration, flow, drop, fatigue etc. analysis, Application of sheet metal and plastic parts, Introduction to mechanisms, Computer aided motion, velocity and acceleration analysis.							
Course Learning Outcomes	At the end of this course, students will be able to learn computer aided engineering concept and will be able to analyse industrial product via finite element method programs during the design stage.							
References **(References must be up to date)**	**Books**	1. Mechanism Design, Lung-Wen Tsai, CRC Press LLC, 2001. 2. Dynamic Mechanical Analysis, Kevin P. Menard, CRC Press LLC, 1999. 3. Mechanisms and Mechanical Devices Sourcebooks, Neil Sclater, Nicholas P. Chironis, Mc-Graw-Hill, 4. Ennginering Mechanics Static, J.L. Meriam, L.G. Kraige, John Wiley&Sons, 2003. 5. Mechanics of Materials, D.Roylance, John Willey and Sons, New York, 1996. 6. Deformation and Fracture of Solids, R.M Caddel, Prentice-Hall, New Jersey, 1980. 7. Mechanical Behaviour of materials, M.A.Meyers, K.K.Chawla, Rentice-Hall, New Jersey, 1997. 8. Mechanical Metallurgy, G.E.Dieter, Mc Graw-Hill Book Comp., London, 1988. 9. Mechanical Behaviour of Materials, N.E.Dowling, Prentice-Hall, 1999.						
	Journals, Articles, Papers, Symposiums							

Planned learning activities and teaching methods	**Theor**	**Pract**	**Lab.**	**Projects**	**Assign.**	**Other**	**Total**	**ECTS**
	50	30	20	20		30	150	5

Assessment Methods and Criteria	**Quantity (mark with "X")**	**Percentage (%)**
Midterm Exam	X	30
Quiz		
Assignment		
Projects	X	10

Laboratory		
Practice		
Other		
Final Exam	X	60

WEEKLY COURSE PLAN	
Week	**Contents and topics**
1. Week	Basic concepts of Plasticity and Elasticity and yield criteria
2. Week	Computer aided static analysis and applications
3. Week	Computer aided frequency analysis and applications
4. Week	Computer aided buckling analysis and applications
5. Week	Computer aided thermal analysis and applications
6. Week	Computer-aided engineering applications to sheet metal and plastic products-1
7. Week	Computer-aided engineering applications to sheet metal and plastic products-2
8. Week	Midterm exam
9. Week	Computer aided flow analysis and applications
10. Week	Computer aided drop analysis and applications
11. Week	Computer aided fatigue analysis and applications
12. Week	Introduction to mechanisms and mechanisms
13. Week	Computer aided motion, velocity and acceleration analysis of mechanisms-1
14. Week	Computer aided motion, velocity and acceleration analysis of mechanisms-2
15. Week	Engineering applications

GAZİ UNIVERSITY FACULTY OF TECHNOLOGY ECTS FORM								
Course Code and Title	İMM-408 AUTOMATION TECHNIQUES							
Credits	1							
ECTS	2							
Name of Lecturer and e-mail address								
Department/Program	Manufacturing Engineering							
Course Type	Compulsory							
Course Language	Turkish							
Course Semester	Fall/Spring							
Prerequisites	None							
Course Objectives	To understand the automation system, industrial applications to provide information about the area, design and programming to teach in automation							
Course Contents	Automation concept. Application areas of hydraulics and pneumatics in automation. Electro-hydraulic and electro-pneumatic systems, application areas of them in industry. Logic circuits in pneumatic systems. PLC (Programmable Logic Control). Use of PLC in automation. System design with PLC and PLC programming. PLC applications. MPS applications.							
Course Learning Outcomes	To learn automation concept, application areas of hydraulics and pneumatics. To learn PLC and MPS and application areas them.							
References (References must be up to date)	**Books**	1. Manufacturing Automation, Morris A. Cohen and Uday Apte, McGraw Hill, 1997 2. PLC ile Endüstriyel Otomasyon, S., Kurtulan, İstanbul, 2005.						
	Journals, Articles, Papers, Symposiums							
Planned learning activities and teaching methods	**Theor**	**Pract**	**Lab.**	**Projects**	**Assign.**	**Other**	**Total**	**ECTS**
	28					22	50	2

Assessment Methods and Criteria	Quantity (mark with "X")	Percentage (%)
Midterm Exam	X	40
Quiz		
Assignment		
Projects		
Laboratory		
Practice		
Other		
Final Exam	X	60

WEEKLY COURSE PLAN

Week	Contents and topics
1. Week	Automation concept
2. Week	Application areas of hydraulics and pneumatics in automation
3. Week	Electro-hydraulic systems
4. Week	Electro-pneumatic systems
5. Week	Hydro-pneumatic systems
6. Week	Application areas of electro-hydraulic electro-pneumatic and in industry
7. Week	Logic circuits in pneumatic systems
8. Week	Midterm exam
9. Week	Introduction of PLC (Programmable Logic Control)
10. Week	Use of PLC in automation
11. Week	Working system of PLC
12. Week	System design with PLC, Programming languages
13. Week	Programming of conveyors and packaging systems with PLC
14. Week	PLC applications
15. Week	MPS applications

GAZİ UNIVERSITY FACULTY OF TECHNOLOGY ECTS FORM								
Course Code and Title	İMM-311 METAL FORMING TECHNIQUES							
Credits	3							
ECTS	3							
Name of Lecturer and e-mail address	Doç.Dr.Fırat KAFKAS fkafkas@gazi.edu.tr							
Department/Program	Manufacturing Engineering							
Course Type	Technical Selective							
Course Language	Turkish							
Course Semester	Fall							
Prerequisites	None							
Course Objectives	1. Teaching the essentials of forming methods and Technologies 2. Applications of mathematical models in practical metal forming processes 3. Teaching of relationship between material properties and forming **4.** Teaching the selection or design of optimum machine tool and die for manufacturing of a Components **5.**							
Course Contents	Fundamentals of elasticity and plasticity, flow behavior of materials, formability of metals . Analysis of forming processes, bulk forming methods, roll forming, wire and bar drawing, extrusion, open and closed die for ging processes. Sheet metal forming methods, cutting, bending, stretching processes. Finite element analysis and simulations of metal forming.							
Course Learning Outcomes	1. Fundamentals of elasticity and plasticity, elasto-plastic behaviour of materials, effects of material-die interface, knowledge about basic calculation methods for force, power, energy etc. required in forming 2. Knowledge about hot and cold forging, extrusion, rolling, drawing and sheet metal forming technologies. 3. Students have the knowledge about metal forming die and tools 4. Students have the knowledge about the relationship between materials and forming systems 5. Students have the knowledge about selection or design of optimum machine tool and die for manufacturing of given component. 6. Students will be able to compare the alternative methods to produce economically the given components 7.							
References **(References must be up to date)**	**Books**	1. William F. Hosford & Robert M. Caddell, Metal Forming, Mechanics and Metallurgy, , Prentice Hall Int., Englewood Cliffs NJ, 1983 2. L. Çapan, Metallere Plastik Şekil Verme , Çağlayan Yay., 1999. 3. T. Altan, S. Oh, H. Gegel, Metal Forming: Fundamentals and Applications, ASM Int., Metals Park, Ohio, 1995. 4. G.Tlusty, Manufacturing Processes and Equipment, Prentice Hall, 2000. 5.						
	Journals, Articles, Papers, Symposiums							

Planned learning activities and teaching methods	**Theor**	**Pract**	**Lab.**	**Projects**	**Assign.**	**Other**	**Total**	**ECTS**
	48			24	12	12	96	3

Assessment Methods and Criteria	Quantity (mark with "X")	Percentage (%)
Midterm Exam	X	25
Quiz		
Assignment	X	5
Projects	X	5
Laboratory		
Practice		
Other	X	5
Final Exam	X	60

WEEKLY COURSE PLAN	
Week	**Contents and topics**
1. Week	Introduction to metal forming and forming methods.
2. Week	Essentials of forming mechanics (Basics of elasticity and plasticity. Stares and strain state)
3. Week	Essentials of forming mechanics (Yield criteria and normality principle.)
4. Week	Essentials of forming mechanics (Strain hardening and plastic unstability. The effects of temperature, deformation rate and friction)
5. Week	Essentials of forming mechanics (Ideal work method, slab analyze and other advanced method)
6. Week	Metallurgical basics (Flow behavior of metals)
7. Week	Metallurgical basics (Deformation of metals under manufacturing conditions)
8. Week	Midterm exam
9. Week	Forging and forging technologies
10. Week	Forging and forging technologies
11. Week	Rolling and rolling technologies
12. Week	Extrusion and their technologies
13. Week	Drawing and their technologies
14. Week	Sheet metal forming and technologies.
15. Week	Special forming methods
16. Week	Manufacturing of forming dies

GAZİ UNIVERSITY FACULTY OF TECHNOLOGY ECTS FORM								
Course Code and Title	İMM-313 PROGRESSIVE DIE TECHNOLOGY							
Credits	3							
ECTS	3							
Name of Lecturer and e-mail address	Assoc. Prof. Dr. Çetin KARATAŞ (e-mail: cetink@gazi.edu.tr)							
Department/Program	Department of Manufacturing Engineering							
Course Type	Elective							
Course Language	Turkish							
Course Semester	Fall							
Prerequisites	None							
Course Objectives	To teach basic applications for making the progressive dies.							
Course Contents	Principles progressive dies, Methods of sheet metal forming, Scrapless dies, Forming dies, Progressive blank and draw dies, Progressive dies for bended parts, Pres machines for progressive dies, Applications for manufacturing of progressive dies, Die protection systems, Factory visiting and reporting							
Course Learning Outcomes	Students have basic information about works to be done with progressive dies and their applications.							
References **(References must be up to date)**	**Books**	1. Ataşimşek, S., Sac Kalıpları, Bursa, 1977 2. Simith, D.A., Die Design Handbook, Society of Manufacturing Engineers, Michigan, 1990 3. GüneĢ, A.T., Pres İşleri Tekniği, Makine Mühendisleri Odası Yayınları, Ankara, 2003						
	Journals, Articles, Papers, Symposiums	-						
Planned learning activities and teaching methods	**Theor**	**Pract**	**Lab.**	**Projects**	**Assign.**	**Other**	**Total**	**ECTS**
	20	20	50	10			100	3

Assessment Methods and Criteria	**Quantity (mark with "X")**	**Percentage (%)**
Midterm Exam	X	20
Quiz		
Assignment	X	10
Projects	X	10
Laboratory	X	10
Practice		
Other		
Final Exam	X	50

WEEKLY COURSE PLAN	
Week	**Contents and topics**
1. Week	Principles progressive dies,

2. Week	Methods of sheet metal forming,
3. Week	Scrapless dies, Forming dies, Progressive blank and draw dies,
4. Week	Progressive dies for bended parts, Pres machines for progressive dies,
5. Week	Applications for manufacturing of progressive dies,
6. Week	Applications for manufacturing of progressive dies,
7. Week	Applications for manufacturing of progressive dies,
8. Week	Midterm exams.
9. Week	Applications for manufacturing of progressive dies,
10. Week	Applications for manufacturing of progressive dies,
11. Week	Applications for manufacturing of progressive dies,
12. Week	Applications for manufacturing of progressive dies,
13. Week	Applications for manufacturing of progressive dies,
14. Week	Die protection systems
15. Week	Factory visiting and reporting.

GAZİ UNIVERSITY FACULTY OF TECHNOLOGY ECTS FORM								
Course Code and Title	İMM-31 HEAT AND SURFACE TREATMENTS							
Credits	3							
ECTS	3							
Name of Lecturer and e-mail address	Doç. Dr. Fırat KAFKAS, fkafkas@gazi.edu.tr							
Department/Program	İmalat Mühendisliği							
Course Type	Selective							
Course Language	Turkish							
Course Semester	Spring							
Prerequisites	None							
Course Objectives	The course aims to give the ways of changing mechanical properties of materials by applying thermal, thermo chemical and thermo mechanical processes. The parameters affecting the mechanical properties of materials, terminology and basic concepts of heat treating, the treatments applied to metallic materials in practice are presented. It is expected that a successful student should be able to select suitable material and treatment in order to produce a part that possesses properties required for its function.							
Course Contents	Basic knowledge of heat treatment: Fe-C phase diagram, time-temperature-transformation (TTT) diagram, pearlite, bainite and martensite formation, diffusion. Alloying elements in steel: austenite, ferrite, carbide, nitride formers; eutectoid point of impact; effect on the TTT diagram. Hardenability: Grossmann and Jominy tests, practical applications. General heat treatment: annealing, normalizing, hardening, tempering, transformation of retained austenite. Special heat treatment: Tool steels, surface hardening, dimensional changes during heat treatment.							
Course Learning Outcomes	1. To explain the factors that increase the strength, and the effects of microstructure on mechanical properties of materials, 2. To define the terminology and basic concepts of heat treating, 3. To explain the basic annealing treatments applied to metals, 4. To explain the phase changes that occur in steels during heating and cooling, 5. To be able to apply heat treatments to ferrous and non ferrous based alloys in order to obtain intended properties, 6. To be able to select suitable material and treatment in order to produce a part that possesses properties required for its function. 7. To see the heat treating practice of metallic materials in an industrial workshop.							
References **(References must be up to date)**	**Books**	1. George Krauss, Steels: Heat Treatment and Processing Principles, ASM, Ohio, 1989. 2. T Savaşkan, Malzeme Bilgisi ve Muayenesi, 3. Baskı, Akademi Kitapevi, Trabzon, 2004. 3. G. E. Totten (Ed.), Steel Heat Treatmen:, Metallurgy and Technologies (2nd Ed.), Taylor & Francis, Boca Raton, 2006.						
	Journals, Articles, Papers, Symposiums							
Planned learning activities and teaching methods	**Theor**	**Pract**	**Lab.**	**Projects**	**Assign.**	**Other**	**Total**	**ECTS**
	48				36	12	96	3

Assessment Methods and Criteria	Quantity (mark with "X")	Percentage (%)
Midterm Exam	X	25
Quiz		
Assignment	X	10
Projects		
Laboratory		
Practice		
Other	X	5
Final Exam	X	60

WEEKLY COURSE PLAN	
Week	**Contents and topics**
1. Week	The factors that affect the mechanical properties of materials, the terminology and basic concepts of heat treating,
2. Week	Alloy elements on Steels and their effects on Fe-C and TTT diagrams
3. Week	Formation and properties of transformation products,
4. Week	Basic annealing treatments operations-1
5. Week	Basic annealing treatments operations-2
6. Week	Continuous cooling transformation and Isothermal transformation of austenite, CCT and TTT diagrams,
7. Week	The effect of residual stresses that form during heat treatment, the concept and importance of hardenability
8. Week	Midterm exam
9. Week	Hardening practice, quenching, tempering, martempering, austempering, termomechanical treatments,
10. Week	Surface hardening by thermal and thermochemical processes,
11. Week	Laser and electron beam processes,
12. Week	Precipitation (Age) hardening, treating of aluminium alloys,
13. Week	The use of precipitation hardening in steels an copper alloys,
14. Week	Furnaces and fixtures used in heat treatment practice.
15. Week	Surface coating and their properties
16.Week	The factors that affect the mechanical properties of materials, the terminology and basic concepts of heat treating,

GAZİ UNIVERSITY FACULTY OF TECHNOLOGY ECTS FORM								
Course Code and Title	IMM-319 Mechanisms							
Credits	3							
ECTS	3							
Name of Lecturer and e-mail address								
Department/Program	Department of Manufacturing Engineering							
Course Type	Elective							
Course Language	Turkish							
Course Semester	Fall							
Prerequisites								
Course Objectives	To provide information about the mechanisms							
Course Contents	Introduction of mechanism technique and basic concepts. Determined of mechanism freedom degree. The space freedom, the joint freedom and the mechanism freedom degrees. Factors affecting the degree of freedom mechanism. Motion analysis of mechanism. Motion analysis in four-bar mechanism. Motion analysis in Krank-Biyel mechanism. synthesis of mechanisms. Synthesis of four-bar mechanism. Synthesis of Krank-Biyel mechanism. Kinematic synthesis. Analysis of mechanisms with analytical methods. Analysis of Krank-Biyel, four-bar, arm-skid and Vargel-Kurs mechanisms with analytical methods							
Course Learning Outcomes	1) will be able to understand common mechanisms and it's performance and function uses in machines. 2) will be gain the skill design of a machine uses with analysis and syntesis methods 3) will be gain the skill to do location, velocity and acceleration analysis of mechanism with graphic and analytic methods. 4) will be gain the design of special purpose cam mechanism. 5) will be gain the identification and make analysis of robot arm mechanism							
References **(References must be up to date)**	**Books**	1- Mekanizma Tekniği, Prof. Dr. İbrahim Deniz Akçalı, Birsen Yayınevi, 2002 2- Mekanizma Tekniği Prof.Dr. ,Mustafa SABUNCU, Makine Mühendisleri Odası İzmir Şubesi,2000 3- Mekanizma Tekniği Prof. Dr. Eres SÖYLEMEZ, Birsen Yayınevi, 2003						
	Journals, Articles, Papers, Symposiums							
Planned learning activities and teaching methods	**Theor**	**Pract**	**Lab.**	**Projects**	**Assign.**	**Other**	**Total**	**ECTS**
	42	33			33		75	3

Assessment Methods and Criteria	**Quantity (mark with "X")**	**Percentage (%)**
Midterm Exam	X	30
Quiz		
Assignment	X	10
Projects		
Laboratory		

Practice		
Other		
Final Exam	X	60

WEEKLY COURSE PLAN	
Week	**Contents and topics**
1. Week	Introduction to mechanism technique, definitions and basic concepts, basic examples to applications of mechanism, machine and mechanism definitions, limb, element pair, Classification of pairs of elements
2. Week	Definition of motion and mechanism types.
3. Week	Kinematic diagrams in mechanisms
4. Week	Classification of kinematic pairs
5. Week	Forced mobilization and freedom degrees of mechanisms
6. Week	Arm mechanisms
7. Week	Problem and drawings
8. Week	Midterm Exam
9. Week	Krank-biyel mechanism and arm-sled mechanism.
10. Week	Kinematic of arm mechanisms
11. Week	Speed analysis of mechanism limbs.
12. Week	Acceleration analysis of mechanism limbs.
13. Week	Kam mechanisms
14. Week	Kinematic and dynamic analysis
15. Week	Problem solving

GAZİ UNIVERSITY FACULTY OF TECHNOLOGY ECTS FORM								
Course Code and Title	IMM-321 TRIBOLOGY							
Credits	3							
ECTS	3							
Name of Lecturer and e-mail address	Prof. Dr. Mahmut İZCİLER, mizciler@gazi.edu.tr							
Department/Program	Department of Manufacturing Engineering							
Course Type	Selective							
Course Language	Turkish							
Course Semester	Fall							
Prerequisites	None							
Course Objectives	To learn some basic concepts of Tribology.							
Course Contents	What is tribology?, Friction and determination of surface roughness due to friction, Wear of metals, wear mechanisms, adhesive wear, abrasive wear, fatigue and cavitation wear etc., methods of wear mesurement							
Course Learning Outcomes	Understanding the effects of different parameters of the components ,which having interraction with each other, determimation of the surface roughness rates, which occurs with friction, understanding types of wear and performing the wear measurements							
References **(References must be up to date)**	**Books**	1. Microstructure and wear of materials, Karl Heinz Zum Gahr, Elsevier Science Publishing Co., Tribology Series 10, 1987 2. Wear of Materials, American S. of Mechanical Engineers, 1981 3. Tribology: friction and wear of engineering materials, Metallurgy and Material Science Series, Lan M Hutching, CRC press, 1992 4. Farklı Isıl İşlemlerdeki 8620 Sementasyon Çeliğinin Abrasiv Aşınma Davranışları, Yüksek Lisans Tezi, G.Ü, 2003						
	Journals, Articles, Papers, Symposiums	Wear, Journal of Material Processing Technology, Material Science, Proceedings of Tribology						

Planned learning activities and teaching methods	**Theor**	**Pract**	**Lab.**	**Projects**	**Assign.**	**Other**	**Total**	**ECTS**
	30				15	25	70	3

Assessment Methods and Criteria	**Quantity (mark with "X")**	**Percentage (%)**
Midterm Exam	X	20
Quiz		
Assignment	X	20
Projects		
Laboratory		
Practice		
Other		
Final Exam	X	60

WEEKLY COURSE PLAN	
Week	**Contents and topics**
1. Week	Tribology and friction
2. Week	Surface roughness
3. Week	Surface roughness measurement methods
4. Week	Wear and wear causing factors or parameters
5. Week	Abrasive wear
6. Week	Adhesive wear
7. Week	Cavitation wear
8. Week	Midterm exam
9. Week	Fatigue
10. Week	Wear mesurement methods
11. Week	Wear testing devices
12. Week	Weight loss method
13. Week	Calculation of weght losses
14. Week	Beam measurements
15. Week	Microscobic examination of worn surfaces

GAZİ UNIVERSITY FACULTY OF TECHNOLOGY ECTS FORM								
Course Code and Title	IMM 325 Occupatıonal Psychology							
Credits	2							
ECTS	2							
Name of Lecturer and e-mail address	Dr. Gültekin UZUN, uzun.gultekin@gazi.edu.tr							
Department/Program	Manufacturing Engineering							
Course Type	Elective							
Course Language	Turkish							
Course Semester	Fall							
Prerequisites	None							
Course Objectives	The aim and goal of this course is to understand work psychology and importance of work psychologists in work life.							
Course Contents	The definition of work psychology, work areas, differences in industrial psychology, the importance of personnel selection, training plans and benefits, performance evaluation, the importance of psychologist in health care jobs. The relationship between psychology and and business psychology and rehabilitation work. Ergonomics and anthropometry. Occupational health and safety. The importance of industrial accidents, environmental, chemicals and human factors in accidents.							
Course Learning Outcomes	The importance of occupational psychology, The subjects of occupational psychology, Worker's performance, Suitable working conditions, Occupational health and work accident, The factors effected occupational health and safety							
References **(References must be up to date)**	**Books**	1. Telman, N. 1987. İş Psikolojisi. Amaç Basımevi. 2. Ünsal, P. 1998. Ergonomi. Edebiyat Fakültesi Basımevi, yayın no: 3411.						
	Journals, Articles, Papers, Symposiums							
Planned learning activities and teaching methods	**Theor**	**Pract**	**Lab.**	**Projects**	**Assign.**	**Other**	**Total**	**ECTS**
	28				10	12	50	2
Assessment Methods and Criteria	**Quantity (mark with "X")**					**Percentage (%)**		
Midterm Exam	X					40		
Quiz								
Assignment								
Projects								
Laboratory								
Practice								
Other								
Final Exam	X					60		
WEEKLY COURSE PLAN								

Week	Contents and topics
1. Week	What is work psychology? It’s differences from industrial psychology. What work
2. Week	does work psychologists do, what is the fields of responsibility
3. Week	Importance and fields of work psychology, personel selection
4. Week	Orientation training, preparation of training programs, performans evaluation
5. Week	Ergonomics
6. Week	Ergonomics
7. Week	Antropometry
8. Week	Midterm exam
9. Week	Mechanical factors and work accident
10. Week	Mechanical factors and work accident
11. Week	Place and importance of human factor in work accidents
12. Week	Place and importance of human factor in work accidents
13. Week	Environmental factors
14. Week	Influence of chemical factors on work
15. Week	Mechanical factors and work accident

GAZİ UNIVERSITY FACULTY OF TECHNOLOGY ECTS FORM								
Course Code and Title	İMM-327 TECHNICAL REPORT WRITING AND COMMUNICATION							
Credits	2							
ECTS	2							
Name of Lecturer and e-mail address	Assist. Prof. Dr. Oğuz POYRAZOĞLU, opoyrazoglu@gazi.edu.tr							
Department/Program	Department of Manufacturing Engineering							
Course Type	Elective							
Course Language	Turkish							
Course Semester	Fall							
Prerequisites	None							
Course Objectives	Technical report writing and communication to teach the basic concepts.							
Course Contents	Introduction to the course in general and its goals. General information on communication. Written reports and types of formal documents. Preparing a curriculum vitae. Barriers in written and oral communication and methods to overcome. Gathering information. Preparing technical articles. Midterm Exam. Preparing thesis and emphasizing the differences with articles. Oral reports. Presenting written and oral reports. Speaking and listening in conferences. Participating in group meetings and interviews. Evaluating the topics.							
Course Learning Outcomes	Preparing technical reports and articles, presenting written reports and gaining skills to participate in meeting and interviews.							
References **(References must be up to date)**	**Books**	1. Tutar, H., Yılmaz, M. K., Erdönmez, C., Genel ve Teknik İletişim, Nobel Yay., Ankara, 2004 2. Woods, C., Everything You Need to Know at Work, Pearson Education Limited, 2004 3. Dumaine, D., Writting For Bısiness, Harvard Business Shool Publishing Corporation, 2007 4. Morgan, N., Running Meetings, Harvard Business Shool Publishing Corporation, 2006						
	Journals, Articles, Papers, Symposiums							

Planned learning activities and teaching methods	**Theor**	**Pract**	**Lab.**	**Projects**	**Assign.**	**Other**	**Total**	**ECTS**
	22					28	50	2

Assessment Methods and Criteria	**Quantity (mark with "X")**	**Percentage (%)**
Midterm Exam	X	30
Quiz		
Assignment		
Projects		
Laboratory		
Practice	X	10
Other		

Final Exam	X	60

WEEKLY COURSE PLAN	
Week	**Contents and topics**
1. Week	Introduction to the course in general and its goals.
2. Week	General information on communication.
3. Week	Written reports and types of formal documents.
4. Week	Preparing curriculum vitae.
5. Week	Barriers in written and oral communication and methods to overcome.
6. Week	Gathering information. Preparing technical articles.
7. Week	Preparing technical articles.
8. Week	Midterm exam
9. Week	Preparing thesis and emphasizing the differences with articles.
10. Week	Oral reports.
11. Week	Presenting written and oral reports.
12. Week	Speaking and listening in conferences.
13. Week	Participating in group meetings and interviews.
14. Week	Evaluating the topics.
15. Week	Evaluating the topics.

GAZİ UNIVERSITY FACULTY OF TECHNOLOGY ECTS FORM								
Course Code and Title	İMM-329 ENTERPRISING							
Credits	2							
ECTS	2							
Name of Lecturer and e-mail address	Yrd. Doç. Dr. Ömer ASAL omerasal@gazi.edu.tr							
Department/Program	Department of Manufacturing Engineering							
Course Type	Elective							
Course Language	Turkish							
Course Semester	Fall							
Prerequisites	None							
Course Objectives	To give information about entrepreneurship and their specifications.							
Course Contents	Concept of enterprise, enterprising and an enterpriser. Kinds of enterprising. Reasons becoming an enterpriser and functions of enterprising. Similar features of enterprisers. Historical background of enterprising in Turkey. Barriers and restrictions of enterprising. Removing barriers of enterprising. Personality features of enterprising. Tendency and abilities of an enterpriser. Enterprising culture and management of imagination power. Education and purpose of enterprising. Target group of enterprising education and application phases. Subjects of enterprising education, marketing, production management, financial management, personnel management. Accountancy information, public relations, management and a manager. Features of managers. General features of managers in Turkey. Generating work ideas. Work ideas that can do enterprising in Turkey and enterprising kinds that can lead profit. Marketing, trade, tourism, education and work ideas of private sectors that can produce service. Policy of enterprising, competition in enterprising and increasing competition power. Reconstruction in small and medium companies in global competition environment. Enterprising, problems of organizations and solution suggestions for them in Turkey.							
Course Learning Outcomes	Preparing the people who being want entrepreneurship to private sector. To gain entrepreneurship specifications to their. Preparing to their business manager.							
References **(References must be up to date)**	**Books**	5. Entrepreneurship, Prof. Dr. Mahmut TEKIN, Damla Ofset, 1999. 6. Entrepreneurship Culture and SMEs, Assoc. Prof. Dr. Adnan CELIK, Assoc. Prof. Dr. Tahir AKGEMCI, Nobel Press, 1998.						
	Journals, Articles, Papers, Symposiums							

Planned learning activities and teaching methods	**Theor**	**Pract**	**Lab.**	**Projects**	**Assign.**	**Other**	**Total**	**ECTS**
	28					22	50	2

Assessment Methods and Criteria	**Quantity (mark with "X")**	**Percentage (%)**
Midterm Exam	X	40
Quiz		
Assignment		
Projects		
Laboratory		

Practice		
Other		
Final Exam	X	60

WEEKLY COURSE PLAN	
Week	**Contents and topics**
1. Week	Concepts of entrepreneur and entrepreneurship
2. Week	Variations of entrepreneurship
3. Week	Purpose ou being entrepreneurship and functions of entrepreneurship
4. Week	Species of general entrepreneurships. Historical development of entrepreneurship in Turkey
5. Week	Difficulties and restrict of entrepreneurship. Characteristics of entrepreneurship,
6. Week	Skills and trend of entrepreneurship. Entrepreneurship culture and management of image power
7. Week	Purpose and education of entrepreneurship. Entrepreneurship education: marketing,
8. Week	Production management, financial management,
9. Week	Personnel management, accounting. Public relations. Management and manager
10. Week	General spesifications of manager in Turkey, to creativity job opinion
11. Week	Marketing will doing service production, commerce,
12. Week	Tourism, education and vocational job opinions,
13. Week	New entrepreneur fields. Entrepreneurship policies, competetive at entrepreneur
14. Week	Rising competetive power, Reorganising on small and medium sizes enterprises at global rivals
15. Week	Problems and solvings of entrepreneurship and business in Turkey

GAZİ UNIVERSITY FACULTY OF TECHNOLOGY ECTS FORM								
Course Code and Title	İMM-316 Manufacturing Properties of Materials							
Credits	3							
ECTS	3							
Name of Lecturer and e-mail address	Doç. Dr. Fırat KAFKAS fkafkas@gazi.edu.tr							
Department/Program	Manufacturing Engineering							
Course Type	Technical selective							
Course Language	Turkish							
Course Semester	Spring							
Prerequisites	non							
Course Objectives	The aim of this course is to recognize engineering materials an to understand the relationship of these materials to manufacturing.							
Course Contents	This course consists of the topics about Fundamentals of engineering materials production process, Classification of production methods, Application areas of manufacturing processes, their operating parameters, economic modeling and cost, selection of suitable process.							
Course Learning Outcomes	The students taking this course are able to; 1. know the advantage and disadvantage of conventional and non-traditional manufacturing processes 2. know the applications of core mechanical engineering principles to design manufacturing processes and systems 3. interpret product requirements, manufacturing process capability data and apply them select and/or synthesize suitable manufacturing process(es) 4. know students basic process optimization techniques							
References **(References must be up to date)**	**Books**	1. Serope Kalpakjian, Steven R. Schmid, Manufacturing Processes For Engineering Materials, 5th Edition, Prentice Hall, 2007. 2. K. G. Swift, J. D. Booker, Manufacturing Process Selection Handbook, Butterworth Heinemann, 2013 3. D. Koshal, Manufacturing Engineer's Reference Book, Butterworth-Heineman, 1993						
	Journals, Articles, Papers, Symposiums							

Planned learning activities and teaching methods	**Theor**	**Pract**	**Lab.**	**Projects**	**Assign.**	**Other**	**Total**	**ECTS**
	48			24	12	12	96	3

Assessment Methods and Criteria	**Quantity (mark with "X")**	**Percentage (%)**
Midterm Exam	X	20
Quiz		
Assignment	X	5
Projects	X	10
Laboratory		
Practice		

Other	X	5
Final Exam	X	60

WEEKLY COURSE PLAN	
Week	**Contents and topics**
1. Week	The classification of engineering material
2. Week	The properties and tests of Engineering matrerials
3. Week	The properties and tests of Engineering matrerials
4. Week	Taxonomy Of Manufacturing Processes
5. Week	Casting And Castability
6. Week	Bulk Deformation And Plastical Formability (Forging, Rolling, Drawing, Extrusion)
7. Week	Sheet Metal Forming And Plastical Formability
8. Week	Mechanical Material Removal (Cutting, Grinding) And Machinability
9. Week	Midterm exam
10. Week	Non-Mechanical Material Removal: Material Properties To Be Used By These Method (ECM, EDM, Laser, Electron Beam, Water Jet)
11. Week	Polymer And Polymer Composites Processing: Material Properties To Be Used By These Method
12. Week	Joining (Welding, Adhesives, Rivets)
13. Week	Micro Manufacturing Methods (MEMS, Micromachining): Material Properties To Be Used By These Method
14. Week	Economic Modeling And Cost Analysis
15. Week	Process Selection
16.Week	Project Presentation

GAZİ UNIVERSITY FACULTY OF TECHNOLOGY ECTS FORM								
Course Code and Title	İMM 318 POLYMERS AND RHEOLOGY							
Credits	3							
ECTS	3							
Name of Lecturer and e-mail address								
Department/Program	Department of Manufacturing Engineering							
Course Type	Obligatory							
Course Language	Turkish							
Course Semester	Autumn/Spring							
Prerequisites	None							
Course Objectives	To classify engineering polymers, to determine the polymer properties, to teach the rheology of polymeric systems and polymer test methods, to model the polymer processing parameters from the test results.							
Course Contents	Polymer materials, modification of plastics and fillers, compounding, polymer characterization							
Course Learning Outcomes	Knows the polymers and properties, knows the compounding, tests and characterizies the polymers, models the polymer properties.							
References **(References must be up to date)**	**Books**	1. Savaşçı O.T., Uyanık N., Akovalı G.; "Plastikler ve Plastik teknolojisi", **PAGEV yayınları**, İstanbul, 2008 2. Osswald, A. T., "Polymer Processing Fundamentals", Hanser / Gardner Publications, Inc., Cincinnati (1998) 3. Brent Strong, "Plastics: Materials and Processing 2nd Edition", **Prentice Hall**, 2000 4. Carreau, P.J., Kee, D.C.R.D., Chhabra, R.P., 1997, "Rheology of Polymeric System", **Hanser/Gardner Publications Inc.**, Cincinati, USA.						
	Journals, Articles, Papers, Symposiums							

Planned learning activities and teaching methods	**Theor**	**Pract**	**Lab.**	**Projects**	**Assign.**	**Other**	**Total**	**ECTS**
	50	-	15	-	5	5	75	3

Assessment Methods and Criteria	**Quantity (mark with "X")**	**Percentage (%)**
Midterm Exam	X	20
Quiz	X	10
Assignment	-	-
Projects	-	-
Laboratory	X	20
Practice	-	-
Other	-	-
Final Exam	X	50

WEEKLY COURSE PLAN

Week	Contents and topics
1. Week	Introduction to polymers
2. Week	Introduction to polymers
3. Week	Modification of plastics physical methods and fillers
4. Week	Modification of plastics physical methods and fillers
5. Week	Compounding
6. Week	Polymer characterization
7. Week	Thermal properties of polymers
8. Week	Midterm exam
9. Week	Mechanical properties and mechanical characterization of polymers
10. Week	Mechanical properties and mechanical characterization of polymers
11. Week	Rheometry
12. Week	Rheometry
13. Week	Non newtonian phenomena
14. Week	Viscosity models and viscoelasticity
15. Week	Viscosity models and viscoelasticity

GAZİ UNIVERSITY FACULTY OF TECHNOLOGY ECTS FORM								
Course Code and Title	İMM-320 POWDER METALLURGY							
Credits	3							
ECTS	3							
Name of Lecturer and e-mail address	Assoc. Prof. Dr. Çetin KARATAŞ (e-mail: cetink@gazi.edu.tr)							
Department/Program	Department of Manufacturing Engineering							
Course Type	Elective							
Course Language	Turkish							
Course Semester	Fall							
Prerequisites	None							
Course Objectives	students are got knowledge and experience on advanced manufacturing methods and powder metallurgy techniques, compacting, sintering and other PM							
Course Contents	Introduction manufacturing methods, powder production methods, powder characterization, powder treatment, powder compaction pressureless powder shaping, sintering theory,sintering technology, full density consalidation,secondary treatments, testing and quality control of PM Materials and product metallic and ceramic PM Materials, applications of PM products, Techno-economics of PM processing							
Course Learning Outcomes	Powder metallurgy, production of metal powders, powder properties measurement pressing of metal powders, sintering, and learn the application fields							
References **(References must be up to date)**	**Books**	• German, Randall M. (2007) Toz Metalurjisi ve Parçacıklı Malzeme İşlemleri , Uyum Ajans, Ankara. (R.M. German`in Powder Metallurgy and Particulate Materials Processing isimli kitabın Türkçe Tercümesidir. Orijinal kitabın ISBN: 0-9762057-1-8, Metal Powder Industries Federation, 2005-USA.)						
	Journals, Articles, Papers, Symposiums	-• Dowson, G (1991) "Introduction to Powder Metallurgy - The Process and Its Products", EMPA Eğitim Materyalleri Kitapcığı, England. • Jenkins, I ve Wood, J.V. (Ed.) (1991) "Powder Metallurgy: An Overview" ISBN: 0-901462-81-0, Institute of Metals yayını, London. • Muhammad, E.F. (Ed.) (1997) "Handbook of Powder Science & Technology ", ISBN: 0-412-99621-9, Chapman & Hall Yayıncılık, New York.						

Planned learning activities and teaching methods	**Theor**	**Pract**	**Lab.**	**Projects**	**Assign.**	**Other**	**Total**	**ECTS**
	45	45	20	30			110	5

Assessment Methods and Criteria	**Quantity (mark with "X")**	**Percentage (%)**
Midterm Exam	X	20
Quiz		
Assignment	X	10
Projects		
Laboratory	X	20
Practice		
Other		
Final Exam	X	50

WEEKLY COURSE PLAN

Week	Contents and topics
1. Week	Introduction to Manufacturing Processes
2. Week	Metal powder productions
3. Week	Characterisation of metal powders
4. Week	Characterisation of metal powders
5. Week	Powder compaction
6. Week	Pressureless powdershaping
7. Week	Sintering theory
8. Week	Solid state sintering and liquid phase sintering
9. Week	Activated sintering
10. Week	Pressure- assisted sintering
11. Week	Viscos flow sintering
12. Week	Sinter atmosphers
13. Week	Full density consolidation
14. Week	Secondary treatments
15. Week	Testhing and quality control of PM materials

GAZİ UNIVERSITY FACULTY OF TECHNOLOGY ECTS FORM								
Course Code and Title	İMM-322 MODERN WELDING METHODS							
Credits	3							
ECTS	3							
Name of Lecturer and e-mail address								
Department/Program	Manufacturing Engineering							
Course Type	Compulsory							
Course Language	Turkish							
Course Semester	Spring							
Prerequisites	None							
Course Objectives	Detailed examination of the welding method and new technological knowledge about this method and the equipment used to transfer students to							
Course Contents	Introduction of modern welding methods and welding methods comparison, welding method and material selection, Determining the criteria for design and manufacturing source applications, modern welding methods used in the industrial							
Course Learning Outcomes	Recognize the current and modern welding techniques, Select the method of welding and materials for manufacturing, know the methods of modern welding in the industrial, knows the relative advantages and limitations of welding methods, Know the characteristics of welding equipment.							
References (References must be up to date)	**Books**	1. Modern Kaynak Teknolojisi, Nizamettin Kahraman, Behçet Gülenç, EPA-MAT Basım Yayın, 2013. 2. Modern Welding Technology, Cary, H. B., Prentice Hall. 5 edition, 2002.						
	Journals, Articles, Papers, Symposiums							
Planned learning activities and teaching methods	**Theor**	**Pract**	**Lab.**	**Projects**	**Assign.**	**Other**	**Total**	**ECTS**
	50					25	75	3

Assessment Methods and Criteria	Quantity (mark with "X")	Percentage (%)
Midterm Exam	X	40
Quiz		
Assignment		
Projects		
Laboratory		
Practice		
Other		
Final Exam	X	60

WEEKLY COURSE PLAN

Week	Contents and topics
1. Week	Modern welding processes in general classification, job security in manufacturing
2. Week	Criteria to be considered in the choice of welding method and applications in this topic. Manual arc and oxy-gas welding
3. Week	MIG-MAG welding methods, Filler metals and shielding gases
4. Week	Tungsten arc welding (TIG) welding
5. Week	Gas-shielded metal-arc (MIG/MAG) welding
6. Week	Gas-shielded metal-arc (MIG/MAG) welding, Narrow gap welding
7. Week	Submerged arc welding
8. Week	Midterm exam
9. Week	Electric resistance welding, plasma welding
10. Week	Preventive maintenance techniques, metal spray, metal bonding, Welding of Plastics, filling welding, soldering
11. Week	Friction welding, stud welding, electron beam welding, laser beam welding
12. Week	Ultrasonic welding, diffusion welding, electro slag welding
13. Week	The solid state welding, cold pressure welding, explosion welding
14. Week	Examples of industrial welding applications
15. Week	Examples of industrial welding applications

GAZİ UNIVERSITY FACULTY OF TECHNOLOGY ECTS FORM								
Course Code and Title	IMM-324 Modern Manufacturing Methods							
Credits	3							
ECTS	3							
Name of Lecturer and e-mail address	Yrd.Doç.Dr. Oğuz POYRAZOĞLU (opoyrazoglu@gazi.edu.tr) Yrd.Doç.Dr. Hasan Basri ULAŞ (bulas@gazi.edu.tr)							
Department/Program	Department of Manufacturing Engineering							
Course Type	Elective							
Course Language	Turkish							
Course Semester	Fall							
Prerequisites	None							
Course Objectives								
Course Contents	Introduction, Ultrasonic machining (USM), Rotary Ultrasonic Machining (RUSM), Abrasive Jet Machining (AJM), Water Jet Machining (WJM), Electro-Chemical Machining (ECM), Electro Chemical Grinding (ECG), Electro Chemical Deburring (ECD), Electro Chemical Honing (ECH), Chemical Machining (ECM), Electric Discharge Machining (EDM), Wire Electric Discharge Machining (WEDM), Laser Beam Machining (LBM), Electron Beam Machining (LBM), Plasma Arc Machining/Cutting (PAM/PAC)							
Course Learning Outcomes	1. Learn about non-traditional manufacturing methods.							
References **(References must be up to date)**	**Books**	1. Groover, Mikell P., Fundamental of Modern Manufacturing Materials,Processes and Systems, Wiley Press						
	Journals, Articles, Papers, Symposiums							
Planned learning activities and teaching methods	**Theor**	**Pract**	**Lab.**	**Projects**	**Assign.**	**Other**	**Total**	**ECTS**
	30	-	-	25	15	5	75	3

Assessment Methods and Criteria	Quantity (mark with "X")	Percentage (%)
Midterm Exam	X	40
Quiz		
Assignment		
Projects		
Laboratory		
Practice		
Other		
Final Exam	X	60

WEEKLY COURSE PLAN

Week	Contents and topics
1. Week	Introduction
2. Week	Ultrasonic machining (USM)
3. Week	Rotary Ultrasonic Machining (RUSM),
4. Week	Abrasive Jet Machining (AJM)
5. Week	Water Jet Machining (WJM)
6. Week	Electro-Chemical Machining (ECM)
7. Week	Electro Chemical Grinding (ECG)
8. Week	Examination
9. Week	Electro Chemical Deburring (ECD)
10. Week	Electro Chemical Honing (ECH)
11. Week	Chemical Machining (ECM)
12. Week	Electric Discharge Machining (EDM)
13. Week	Wire Electric Discharge Machining (WEDM)
14. Week	Laser Beam Machining (LBM)
15. Week	Electron Beam Machining (LBM), Plasma Arc Machining/Cutting (PAM/PAC)

GAZİ UNIVERSITY FACULTY OF TECHNOLOGY ECTS FORM								
Course Code and Title	İMM-323 CNC TECHNIQUES (ELECTIVE)							
Credits	3							
ECTS	3							
Name of Lecturer and e-mail address	Prof.Dr. Mahmut GÜLESİN, gulesin@gazi.edu.tr Assoc.Prof. Dr. Abdulkadir GÜLLÜ, agullu@gazi.edu.tr Assist.Prof.Dr. Yakup TURGUT, yturgut@gazi.edu.tr							
Department/Program	Department of manufacturing engeneering							
Course Type	Selective							
Course Language	Turkish							
Course Semester	Spring							
Prerequisites	None							
Course Objectives	Creating programs for CNC control systems and its application							
Course Contents	DNC, CIM. Programming techniques using dialog method. Programming of CNC lathes and milling machines by ISO method.							
Course Learning Outcomes	Being able to make macro programme and write programme with dialogue method, use to CNC machine.							
References **(References must be up to date)**	**Books**	1-Mahmut Gülesin, Abdulkadir Güllü, Özkan Avcı, Gökalp Akdoğan, "CNC Torna ve Freze Tezgahlarının Programlanması",Asil Yayınları, 2010. 2- P.M. Agrawal and V.J. Patel, CNC Fundamentals and Programming, Charotar Publishing House, 2009.						
	Journals, Articles, Papers, Symposiums							
Planned learning activities and teaching methods	**Theor**	**Pract**	**Lab.**	**Projects**	**Assign.**	**Other**	**Total**	**ECTS**
	48				36	12	96	3

Assessment Methods and Criteria	**Quantity (mark with "X")**	**Percentage (%)**
Midterm Exam	X	25
Quiz		
Assignment		
Projects		
Laboratory		
Practice	X	15
Other		
Final Exam	X	60

WEEKLY COURSE PLAN	
Week	**Contents and topics**
1. Week	CNC programming techniques, Machine parameters

2. Week	DNC and CIM systems
3. Week	Macro programming
4. Week	The programming of CNC machine
5. Week	Dialog programming on CNC a lathe
6. Week	Programming of cylindrical, taper turning, groving and facing operations with dialog programming on CNC a lathe
7. Week	Implementation of NC programs on CNC machines
8. Week	Midterm exam
9. Week	Programming of CNC Milling Machines
10. Week	Programming of face, slot milling and drilling operations with dialog programming on CNC a milling machine
11. Week	Programming of contour and profile milling operations with dialog programming on CNC a milling machine
12. Week	NC code to obtain using CAD/CAM software
13. Week	Transferring NC codes to CNC machines
14. Week	NC code transferring methods to CNC machines by DNC systems
15. Week	Implementation in CNC machines by DNC systems

GAZİ UNIVERSITY FACULTY OF TECHNOLOGY ECTS FORM								
Course Code and Title	IMM- 328 ERGONOMICS							
Credits	2							
ECTS	2							
Name of Lecturer and e-mail address	Prof. Dr. Muammer NALBANT, mnalbant@gazi.edu.tr Dr. Gültekin UZUN, uzun.gultekin@gazi.edu.tr							
Department/Program	Department of Manufacturing Engineering							
Course Type	Elective							
Course Language	Turkish							
Course Semester	Spring							
Prerequisites	None							
Course Objectives	To teach the basic principles of ergonomics.							
Course Contents	This course covers; definition of ergonomics, disciplines based on ergonomics, human body, nervous system, skeletal structure, sensory organs in point of ergonomics, workplace environment, the relationship between environment and efficieny, environmental and working conditions' effects to health and efficiency, factors affecting the work environment, environmental conditions, lighting, noise, air pollution, vibration and dust, work physiology, works based on the strength of muscle, human machine and workspace relationship, management tools, controls and humans who control improvement of working environment, the bad working environments' effects on human, monotony, considerations on layout of working environment, the bad working environments' effects on human health, the color effect on working life, contrast sensitivity, the workings of job enrichment, setting of fatigue and rest intervals, the effects of these intervals on human performance, mental working, stress model in business life.							
Course Learning Outcomes	In order to use the correct ergonomics in the design process.							
References **(References must be up to date)**	**Books**	1- Özkul E. ve Anagün S. Ergonomi, Anadolu Üniversitesi,Yayın No:973, Eskişehir 1999. 2- Ergonomik Kontrol Noktaları,Milli Prodüktivite Merkezi Yayınları No:682, Ankara 2005. 3- Güler Ç.(ed).; Ergonomiye Giriş(Ders notları),Ankara Tabip Odası 2003. 4- Güler Ç.(ed).; Ergonomi,Palme Yayıncılık,Ankara 2004. 5- İş Sağlığı ve Güvenliği Dergileri, Çalışma ve Sosyal Güvenlik Bakanlığı İş Sağlığı ve Güvenliği Genel Müdürlüğü, ISSN:1300-2341. 6- Erkan,N; Ergonomi, MPM Yayın No373, Ankara 1988. 7- Fatih Babalık,Mühendisler için Ergonomi, 2011 8- Murrel KFH, Human Performance in Industry, Mc,Graw Hill,NY 1965.						
	Journals, Articles, Papers, Symposiums	-						

Planned learning activities and teaching methods	**Theor**	**Pract**	**Lab.**	**Projects**	**Assign.**	**Other**	**Total**	**ECTS**
	28					22	50	2

Assessment Methods and Criteria	**Quantity (mark with "X")**	**Percentage (%)**
Midterm Exam	X	40

Quiz		
Assignment		
Projects		
Laboratory		
Practice		
Other		
Final Exam	X	60

WEEKLY COURSE PLAN	
Week	**Contents and topics**
1. Week	Industrial Society and Ergonomy
2. Week	Human-Machine Systems
3. Week	Ergonomically Human
4. Week	Antropometry
5. Week	Study Of Human and Its Properties
6. Week	Study Of Human And İts Properties (Work and Performance)
7. Week	Work organisation
8. Week	Midterm exam
9. Week	The noise problem
10. Week	Visual and lighting
11. Week	Physical Ergonomy
12. Week	Ventilation
13. Week	Design of study place and settlement arrangement-Special Groups
14. Week	Ergonomic Evaluation Control List
15. Week	Ergonomy Risk Assesment

GAZİ UNIVERSITY FACULTY OF TECHNOLOGY ECTS FORM								
Course Code and Title	İMM-330 PRODUCTION PLANNING							
Credits	2							
ECTS	2							
Name of Lecturer and e-mail address	Yrd. Doç. Dr. Ömer ASAL omerasal@gazi.edu.tr							
Department/Program	Department of Industrial Design Engineering							
Course Type	Elective							
Course Language	Turkish							
Course Semester	Spring							
Prerequisites	None							
Course Objectives	To succes our students' can do production planning at beginner stage in private sector							
Course Contents	Basic concepts in production planning. Production, planning, production planning and systems. Open and closed systems. Classifications of production planning systems. Capacity concept. Production design and scheduling. Demand estimation methods. Mathematical programming methods in production planning.							
Course Learning Outcomes	To have information about production systems. To do micro stage to demand guess and capacity planning.							
References **(References must be up to date)**	**Books**	1. Production/Operations Management, Prof. Dr. Sevinc Ureten, Gazi University Pres, 1998						
	Journals, Articles, Papers, Symposiums							
Planned learning activities and teaching methods	**Theor**	**Pract**	**Lab.**	**Projects**	**Assign.**	**Other**	**Total**	**ECTS**
	28					22	50	2

Assessment Methods and Criteria	**Quantity (mark with "X")**	**Percentage (%)**
Midterm Exam	X	40
Quiz		
Assignment		
Projects		
Laboratory		
Practice		
Other		
Final Exam	X	60

WEEKLY COURSE PLAN	
Week	**Contents and topics**
1. Week	Production, factors of production
2. Week	Planning, production planning,

3. Week	Classifications of production plans
4. Week	Waves of demand
5. Week	Concepts of capacity
6. Week	Classifications of production systems
7. Week	Analysis of job
8. Week	Long term production planning
9. Week	Capacity planning
10. Week	Analysis of market
11. Week	Mid term production planning
12. Week	Short term production planning
13. Week	Variations of product
14. Week	Machine tool selection
15. Week	Part loading to machine tool

GAZİ UNIVERSITY FACULTY OF TECHNOLOGY ECTS FORM								
Course Code and Title	İMM-332 FLEXIBLE MANUFACTURING SYSTEMS							
Credits	2							
ECTS	2							
Name of Lecturer and e-mail address	Doç.Dr. Hakan DİLİPAK, hdilipak@gazi.edu.tr Yrd.Doç.Dr. Yakup TURGUT, yturgut@gazi.edu.tr Yrd.Doç.Dr. Hasan Basri ULAŞ, bulas@gazi.edu.tr							
Department/Program	Department of Manufacturing Engineering							
Course Type	Elective							
Course Language	Turkish							
Course Semester	Spring							
Prerequisites	None							
Course Objectives	Teaching of the systems used in FMS, application way of FMS to companies,							
Course Contents	Production systems, making comparisons, cellular production systems, their programming and applications. Applications of computer integrated manufacturing (CIM) systems and computer aided technologies to companies. Advantages and disadvantages for companies.							
Course Learning Outcomes	To be able to design products for FMS. To be able to do period planning. To be able to use and plan FMS components.							
References (References must be up to date)	**Books**	1. Groover, Mikel P., Automation Production Systems and Computer Integrated Manufacturing, Prentice Hall Inc., New Jersey, 1987. 2. Koren, Yoram, Computer Control of Manufacturing Systems, Mc Graw-Hill Book Comp., New York, 1983. 3. Carye, A., Simulation of Manufacturing Systems, John Wiley&Sons, New York 1988.						
	Journals, Articles, Papers, Symposiums							

Planned learning activities and teaching methods	**Theory**	**Pract.**	**Lab.**	**Projects**	**Assign.**	**Other**	**Total**	**ECTS**
	28					22	50	2

Assessment Methods and Criteria	**Quantity (mark with "X")**	**Percentage (%)**
Midterm Exam	X	40
Quiz		
Assignment		
Projects		
Laboratory		
Practice		
Other		
Final Exam	X	60

WEEKLY COURSE PLAN

Week	Contents and topics
1. Week	CIM systems (product design, period planning, production, systems management).
2. Week	Product design tools in FMS (CAD, CAE, GT; definitions and usage).
3. Week	DFM, IGES, PDES; definitions and usage.
4. Week	CAD/CAM, CAPP; definitions and usage.
5. Week	CM, MAP, STEP; definitions and usage.
6. Week	Production tools in FMS, CNC, DNC, work stations; definitions and usage.
7. Week	Robots and AGV definitions and usage.
8. Week	Midterm Exam
9. Week	ASRS, Cells, Centers; definitions and usage.
10. Week	Systems management tools in FMS TQM, BARCODE, EDI, MRP; definitions and usage.
11. Week	AI, LAN, TOP, SATELLITES; definitions and usage.
12. Week	FMS, FMG, FMA, FMC.
13. Week	Flexible Modular Manufacturing (FMM), Group technology, cellular manufacturing, Software and databases used in FMS.
14. Week	Planning methods and tools.
15. Week	MRP II, Information technologies.

GAZİ UNIVERSITY FACULTY OF TECHNOLOGY ECTS FORM								
Course Code and Title	IMM-422, COMPUTER AIDED MELT FLOW ANALYSIS							
Credits	3							
ECTS	3							
Name of Lecturer and e-mail address	Doç. Dr. Abdulmecit GÜLDAŞ aguldas@gazi.edu.tr							
Department/Program	Manufacturing Engineering							
Course Type	Elective							
Course Language	Turkish							
Course Semester	Fall							
Prerequisites	None							
Course Objectives	The aim of this lesson, learning manufacturing techniques of industrial thermoplastics parts and flow analysis using current computer software and determination of thermoplastics of rheological properties.							
Course Contents	Definition and determination of properties of molten materials, derivation of constitutive equations, determination of rheological properties of melt, modeling of viscosity, flow and filling analysis of melt in the cavity, moldability, determenition of filling time and cycle time, hot and cold sprue, section and type of runner, type and location and section of gate, cavity number, producing parameters such as pressure and velocity and temperature, flow simulation and software application.							
Course Learning Outcomes	It is provided students with an improvement in capability of understanding rheology of molten plastics and filling and flow analyzing of melt in cavity							
References **(References must be up to date)**	**Books**	1. Kennedy, P., 1995, Flow Analysis of Injection Molding, **Hanser/Gardner Publications**, Cincinnati, USA 2. Carreau, P.J., Kee, D.C.R.D., Chabra, R.P., 1997, Rheology of Polymeric System, **Hanser/Gardner Publications Inc.**, Cincinati, USA. 3. Crochet, M.J., Davides, A.R., Walters, K., 1991, Numerical Simulation of Non-Newtonian Flow 3. Ed., **Elsevier Rheology Series 1**, Amsterdam, Netherlands 4. Welty, J.R., Wicks, C. E., Wilson, R.E., 1984, Fundamentals of Momentum, Heat, and Mass Transfer 3.Ed., **John Wiley & Sons Inc., USA** 5. Moldflow User Guide, 2002, **Moldflow Paggage** 8. Rosato, D. V., Rosato, D. V., 1999, Injection Molding Handbook 2nd ed., **Kluwer Academic Publishers**, Boston/London						
	Journals, Articles, Papers, Symposiums							

Planned learning activities and teaching methods	**Theor**	**Pract**	**Lab.**	**Projects**	**Assign.**	**Other**	**Total**	**ECTS**
	28		10	6	6	20	70	3

Assessment Methods and Criteria	**Quantity (mark with "X")**	**Percentage (%)**
Midterm Exam	X	15
Quiz	X	20
Assignment		

Projects	X	5
Laboratory	X	10
Practice		
Other		
Final Exam	X	50

WEEKLY COURSE PLAN	
Week	**Contents and topics**
1. Week	Manufacturing techniques of industrial plastic part and determination of material properties for flow analysis
2. Week	Newtonian flows, non-Newtonian flows, visco-elastic flows
3. Week	Viscosity models, relation of pressure-volume-temperature (PVT)
4. Week	Governing equations and affect parameters on flow
5. Week	Computer aided solution of non-linear differential equation by numerical analysis
6. Week	Flow simulation using a current software
7. Week	Import the part geometry from CAD to flow analysis, material selection, determination of flow parameters
8. Week	Midterm exam
9. Week	Filling type, flow direction and orientation of flow
10. Week	Determination of filling time and cycle time
11. Week	Effects of pressure, temperature, viscosity and density on melt flow
12. Week	Effects of runner and section of runner and gate type and number of gate on filling type and time
13. Week	Effects of filling type on part, air traps
14. Week	Temperature and pressure and velocity distribution, determination of weld lines, confidence of filling and flow, report preparing
15. Week	Summary and overview of the topics

GAZİ UNIVERSITY FACULTY OF TECHNOLOGY ECTS FORM								
Course Code and Title	IMM-412 METAL INJECTION EXTRUSION MOULD DESIGN							
Credits	3							
ECTS	3							
Name of Lecturer and e-mail address	Assist. Prof. Dr. İbrahim KARAAĞAÇ, ibrahimkaraagac@gazi.edu.tr							
Department/Program	Department of Manufacturing Engineering							
Course Type	Elective							
Course Language	Turkish							
Course Semester	Spring							
Prerequisites	None							
Course Objectives	This course aims introduce metal extrusion/injection molds and mold parts, design a metal extrusion/injection mold of a product.							
Course Contents	Metal extrusion process. Structure of metal extrusion molds, the introduction of the press and mold components. The defects that may occur in metal extrusion process, solution methods. Metal extrusion mold design. Metal extrusion mold project prepare. Metal injection molding process. Structure of metal injection molds, the introduction of the press and mold components. The defects that may occur in metal injection molding process, solution methods. Metal injection mold design. Metal injection mold project prepare. Technical visiting and reporting.							
Course Learning Outcomes	A student who takes this course knows metal extrusion/injection molds, designs metal extrusion/injection mold of any product.							
References **(References must be up to date)**	**Books**	1. High integrity die casting processes / Edward J. Vinarcik., 2003, John Wiley & Sons, New York,. 2. Handbook of Aluminum: Vol. 1: Physical Metallurgy and Processes, George E. Totten, D. Scott MacKenzie, 2003, Marcel Dekker Ltd, USA. 3. Die Casting Engineering: A Hydraulic, Thermal and Mechanical Process, Bill Andresen, 2005, Marcel Dekker Ltd, USA						
	Journals, Articles, Papers, Symposiums							

Planned learning activities and teaching methods	**Theor**	**Pract**	**Lab.**	**Projects**	**Assign.**	**Other**	**Total**	**ECTS**
	40			20		20	80	3

Assessment Methods and Criteria	**Quantity (mark with "X")**	**Percentage (%)**
Midterm Exam	X	30
Quiz		
Assignment		
Projects	X	10
Laboratory		
Practice		
Other		

Final Exam	X	60

WEEKLY COURSE PLAN	
Week	**Contents and topics**
1. Week	Metal extrusion process
2. Week	Structure of metal extrusion molds, the introduction of the press and mold components
3. Week	The defects that may occur in metal extrusion process, solution methods
4. Week	Metal extrusion molding design
5. Week	Metal extrusion mold design
6. Week	Metal extrusion mold project prepare
7. Week	Metal extrusion mold project prepare
8. Week	Midterm
9. Week	Metal injection molding process
10. Week	Structure of metal injection molds, the introduction of the press and mold components
11. Week	The defects that may occur in metal injection molding process, solution methods
12. Week	Metal injection mold design
13. Week	Metal injection mold design
14. Week	Metal injection mold project prepare
15. Week	Technical visiting and reporting

GAZİ UNIVERSITY FACULTY OF TECHNOLOGY ECTS FORM								
Course Code and Title	IMM-414 ADVANCED SURFACE MODELLING TECHNIQUES							
Credits	3							
ECTS	3							
Name of Lecturer and e-mail address	Assist. Prof. Dr. İbrahim KARAAĞAÇ, ibrahimkaraagac@gazi.edu.tr							
Department/Program	Department of Manufacturing Engineering							
Course Type	Elective							
Course Language	Turkish							
Course Semester	Spring							
Prerequisites	None							
Course Objectives	The aim of this course, to understand the logic of surface modelling and gain part design ability by using surface modelling tools.							
Course Contents	Introduction to surface modelling, degree and segments of curves. Defining the plane and axis. Creating two-dimensional and three-dimensional curves. Point and point cloud creating, creating surfaces from point clouds. Creating two-dimensional surface from the curve. Creating three-dimensional surface from the curve. The merging, subtracting and trimming of surfaces. Free form applications on surface. The measurable changes making on surface. The extracting curves from surfaces. Solid-surface relations, solid-surface and surface-solid transitions. Surface analysis, detection and elimination of surface defects. Part design via surface modelling.							
Course Learning Outcomes	At the end of this course, students will have knowledge about surface modeling. They will gain advanced surface modelling skills and be able to modelling the complex parts.							
References **(References must be up to date)**	**Books**	1- SolidWorks Surface Modelling and Complex Shape Modeling, Matt Lombard, 2008, Wiley 2- Unigraphics NX ile Modelleme, Mahmut Gülesin, Abdulkadir Güllü, İbrahim Utanır, 2009, Asil Yayınevi, Ankara 3- SolidWorks 2014, Sevilay Turgut, Mustafa Turgut, 2014, Seçkin Yayıncılık, Ankara 4- SolidWorks 2013, Kadir Gök, Arif Gök, 2013, Seçkin Yayıncılık, Ankara						
	Journals, Articles, Papers, Symposiums							

Planned learning activities and teaching methods	**Theor**	**Pract**	**Lab.**	**Projects**	**Assign.**	**Other**	**Total**	**ECTS**
	30	30		20			80	3

Assessment Methods and Criteria	**Quantity (mark with "X")**	**Percentage (%)**
Midterm Exam	X	30
Quiz		
Assignment		
Projects	X	10
Laboratory		

Practice		
Other		
Final Exam	X	60

WEEKLY COURSE PLAN	
Week	**Contents and topics**
1. Week	Introduction to surface modelling, degree and segments of curves
2. Week	Defining the plane and axis
3. Week	Creating two-dimensional and three-dimensional curves
4. Week	Point and point cloud creating, creating surfaces from point clouds
5. Week	Creating two-dimensional surface from the curve
6. Week	Creating three-dimensional surface from the curve
7. Week	The merging, subtracting and trimming of surfaces
8. Week	Midterm exam
9. Week	Free form applications on surface
10. Week	The measurable changes making on surface
11. Week	The extracting curves from surfaces
12. Week	Solid-surface relations, solid-surface and surface-solid transitions
13. Week	Surface analysis, detection and elimination of surface defects
14. Week	Part design via surface modelling
15. Week	Part design via surface modelling

GAZİ UNIVERSITY FACULTY OF TECHNOLOGY ECTS FORM								
Course Code and Title	İMM-418 ROBOTICS							
Credits	3							
ECTS	3							
Name of Lecturer and e-mail address	Prof.Dr.Mahmut GÜLESİN, gulesin@gazi.edu.tr Yrd.Doç.Dr. Hasan Basri ULAŞ, bulas@gazi.edu.tr							
Department/Program	Department of Manufacturing Engineering							
Course Type	Elective							
Course Language	Turkish							
Course Semester	Spring							
Prerequisites	None							
Course Objectives	To learn structure, types and usage areas of industrial robots. Being able to programme industrial robots.							
Course Contents	Introduction to robotics. Industrial robots. Configuration types. Application areas of industrial robots. Programming of industrial robots. Languages used to program industrial robots and structures of them. Drive systems. Kinematics and dynamics of manipulators. Motion equations. Control methods of manipulators.							
Course Learning Outcomes	To learn structure, types and usage areas of industrial robots. Being able to programme industrial robots.							
References (References must be up to date)	**Books**	1. Endüstriyel Robotlar, Gülesin, M., Basılmamış ders notları, 2000. 2. Robotics, Wise, E., McGraw Hill, USA, 2005. 3. Industrial Robotics: Programming, Simulation and Applications, Huat, L.K, Pro Literatur Verlag, Germany, 2006.						
	Journals, Articles, Papers, Symposiums							
Planned learning activities and teaching methods	**Theory**	**Pract.**	**Lab.**	**Projects**	**Assign.**	**Other**	**Total**	**ECTS**
	42					33	75	3
Assessment Methods and Criteria	**Quantity (mark with "X")**					**Percentage (%)**		
Midterm Exam	X					40		
Quiz								
Assignment								
Projects								
Laboratory								
Practice								
Other								
Final Exam	X					60		
WEEKLY COURSE PLAN								
Week	**Contents and topics**							

1. Week	General robotics.
2. Week	Industrai robots.
3. Week	Configuration types, application areas, driving systems of industrial robots.
4. Week	Kinematics of manipulators.
5. Week	Dynamics of manipulators.
6. Week	Rotation matrices, homogeneous transformations.
7. Week	Direct and inverse kinematics, Jacobian matrix.
8. Week	Midterm Exam
9. Week	Static and dynamic force analysis, motion equations.
10. Week	Control methods of manipulators.
11. Week	Programming languages for industrial robots.
12. Week	Programming for stacking and moving parts from one place to another
13. Week	Programming for loading and unloading parts from CNC turning and milling machines
14. Week	Programming of drilling operations after changing the manipulator.
15. Week	Programming of grinding operations after changing the manipulator.

GAZİ UNIVERSITY FACULTY OF TECHNOLOGY ECTS FORM								
Course Code and Title	İMM-418 TRANSPORT TECHNIQUES							
Credits	3							
ECTS	3							
Name of Lecturer and e-mail address								
Department/Program	Manufacturing Engineering							
Course Type	Compulsory							
Course Language	Turkish							
Course Semester	Fall/Spring							
Prerequisites	None							
Course Objectives	Understand the basic principles of transport operations, to acquire skills of selecting proper handling equipment, to acquire skills of lifting machinery elements calculation.							
Course Contents	Lifting, handling equipment and components, actuators and gearboxes between the motor and load. Reels and reel systems, Stopping and load brakes, locking gears, Cranes, wheels and rails. Feeders and belt, chain, vibratory, screw conveyors. Pneumatic conveying systems.							
Course Learning Outcomes	To knows transport industry, to knows transport machines, to know crane, lifts and conveyors.							
References (References must be up to date)	**Books**	1.Sürekli Transport Sistemleri, İ.Gerdemeli, C.E.İmrak, M.K.Kesikçi, Birsen Yayınevi, İstanbul, 2005. 2. Cranes-design, and practice, and maintenance, J. Verschoof, Profes Eng Publishing, London, 2000. 3. Transport Tekniği ve Tesisleri, Acar, H. H., KTÜ Yayınları, No: 62, Trabzon, 1998.						
	Journals, Articles, Papers, Symposiums							

Planned learning activities and teaching methods	**Theor**	**Pract**	**Lab.**	**Projects**	**Assign.**	**Other**	**Total**	**ECTS**
	50					25	75	3

Assessment Methods and Criteria	**Quantity (mark with "X")**	**Percentage (%)**
Midterm Exam	X	40
Quiz		
Assignment		
Projects		
Laboratory		
Practice		
Other		
Final Exam	X	60

WEEKLY COURSE PLAN	
Week	**Contents and topics**
1. Week	Internal and external industry transport
2. Week	Classification of materials and transport equipment
3. Week	Industrial storage techniques
4. Week	Planning and design of material flow in production
5. Week	Electric crane construction and the design of elements
6. Week	Chains and chain drives
7. Week	Mechanical brake constructions
8. Week	Midterm exam
9. Week	Mechanisms of action in crane structures
10. Week	Kran types and construction
11. Week	Lifts and escalators
12. Week	Belt conveyor design
13. Week	Chain conveyor design
14. Week	Construction of hydraulic and pneumatic transport system
15. Week	Part of cargo storage and automatic storage

GAZİ UNIVERSITY FACULTY OF TECHNOLOGY ECTS FORM								
Course Code and Title	IMM-420 MECHANIC VIBRATIONS							
Credits	3							
ECTS	3							
Name of Lecturer and e-mail address	Yrd.Doç.Dr. Hasan Basri ULAŞ (bulas@gazi.edu.tr)							
Department/Program	Department of Manufacturing Engineering							
Course Type	Elective							
Course Language	Turkish							
Course Semester	Spring							
Prerequisites	None							
Course Objectives								
Course Contents	A brief history of vibrations, importance of the study of vibration, basic concepts of vibrations; vibration, elementary parts. Free and forced vibrations, undamped and damped vibrations, linear and nonlinear vibrations, deterministic and random. Spring element, mass or inertia element, damping element, harmonic motion, harmonic analysis. Free vibration of undamped translational system, solution of equation of motion, harmonic motion. Free vibration of damped systems, logarithmic decrement, free vibrations with Coulomb damping, free vibrations. Equations of motion for an undamped system under harmonic force and their solution, beating. Forced vibration of damped systems, response of a system for general periodic forcing, convolution integral. Equations of motion for two degree of freedom systems and their solution. Torsional systems. Coordinate coupling and principal coordinates, vibration modes and nodes.							
Course Learning Outcomes	Understanding of basic properties of mechanical vibrations. Learning the methods used for analysis of vibrations which is an indispensable phenomena in physical systems. Learning of dynamic force caused by mec.							
References	Books	1. Ercan, Y., Mühendislik Sistemlerinin Modellenmesi ve Dinamiği, Literatür Yayınları, İstanbul, 2003. 2. Kellly S.Graham, Mechanical Vibrations, Schaum's Outlines 3. Hartog, J.P.Den, Mechanical Vibrations.						
(References must be up to date)	Journals, Articles, Papers, Symposiums							
Planned learning activities and teaching methods	Theor	Pract	Lab.	Projects	Assign.	Other	Total	ECTS
	40					30	70	3
Assessment Methods and Criteria		Quantity (mark with "X")				Percentage (%)		
Midterm Exam		X				40		

Quiz		
Assignment		
Projects		
Laboratory		
Practice		
Other		
Final Exam	X	60

WEEKLY COURSE PLAN	
Week	Contents and topics
1. Week	A brief history of vibrations, importance of the study of vibration, basic concepts of vibrations; vibration, elementary parts.
2. Week	Free and forced vibrations, undamped and damped vibrations, linear and nonlinear vibrations, deterministic and random.
3. Week	Spring element, mass or inertia element, damping element, harmonic motion, harmonic analysis
4. Week	Free vibration of undamped translational system, solution of equation of motion, harmonic motion
5. Week	Free vibration of damped systems, logarithmic decrement, free vibrations with Coulomb damping, free vibrations
6. Week	Free vibration of damped systems, logarithmic decrement, free vibrations with Coulomb damping, free vibrations
7. Week	Equations of motion for an undamped system under harmonic force and their solution, beating
8. Week	Examination
9. Week	Equations of motion for an undamped system under harmonic force and their solution, beating
10. Week	Forced vibration of damped systems, response of a system for general periodic forcing, convolution integral
11. Week	Forced vibration of damped systems, response of a system for general periodic forcing, convolution integral
12. Week	Equations of motion for two degree of freedom systems and their solution. Torsional systems.
13. Week	Equations of motion for two degree of freedom systems and their solution. Torsional systems.
14. Week	Coordinate coupling and principal coordinates, vibration modes and nodes.
15. Week	Coordinate coupling and principal coordinates, vibration modes and nodes.

GAZİ UNIVERSITY FACULTY OF TECHNOLOGY ECTS FORM		
Course Code and Title	İMM-422 COMPOSITE MATERIALS	
Credits	3	
ECTS	3	
Name of Lecturer and e-mail address	Prof. Dr. Yusuf ŞAHİN, ysahin@gazi.edu.tr, Assist Prof. Dr. Yunus, KAYIR, ykayir@gazi.edu.tr	
Department/Program	Department of Manufacturing Engineering	
Course Type	Selective	
Course Language	Turkish	
Course Semester	Spring	
Prerequisites	None	
Course Objectives	To teach some basic concepts of composite materials, and their applications fields.	
Course Contents	Composites, definitions, types and clasifications. Its importance and application fields in aotomotive and airspace industries. Ceramic fibers as reinforcements such as glass, carbon,boron and SiC etc. used for making composites. Matrix selected for composites (aluminium and its alloys, magnesium and its alloys, titanium and its alloys, zinc alloys). Fabrication methods like liquid phase and solid phase. Squeeze casting, vacuum pressing, powder metalurgy, hand lay-up, filament winding etc. Design of composites (fiber arrangement). Macro-mechanical analysis. Mikro-mechanical analysis like elastic modulus, tensile strength, poissons ratio etc. calculations). Mechanical properties (the effect of volume fraction, fibres shape, types, direction, diameter, aspect ratio, matrix and geometry). Deformation processes for composites. Nano based composite materials and their some properties.	
Course Learning Outcomes	To understand the basic steps of design and production methods for composite materials	
References **(References must be up to date)**	**Books**	References: 1. Talaş kaldırma prensipleri I, Y., ŞAHİN. Nobel bAsım yayım Dağıtım, Ankara, 2000 2. Materials and Processes in Manufacturing, E. Paul Degarmo, J.T. Black, R. A. Kohser, 1997. 3. Kompozit Malzemelere Giriş, Y., şahin, Nobel Yayın Dağıtım, Ankara, 2001 4. Structure and properties of composites, Chan, R.W., Haasen, P., Kramer, E.J., Materials Science and Technology, 13, 1-339, 1993. 5. Fundamentals of modern manufacturing, Groover, M.P., ISBN 0-13-312182-8, Prentice-Hall Inc., USA, 1996.
	Journals, Articles, Papers, Symposiums	

Planned learning activities and teaching methods	Theor	Pract	Lab.	Projects	Assign.	Other	Total	ECTS
	40					30	70	3

Assessment Methods and Criteria	Quantity (mark with "X")	Percentage (%)
Midterm Exam	X	40
Quiz		
Assignment		
Projects		
Laboratory		
Practice		
Other		
Final Exam	X	60

WEEKLY COURSE PLAN

Week	Contents and topics
1. Week	Metal-matrix composites,their definitions, types and classifications
2. Week	Application fields like automotive and airspace industry
3. Week	Ceramic fibers, particulate and whiskers and their properties (glass, carbon, boron, SiC etc.)
4. Week	Matrix materials like aluminium, magnesium,titanium, and zinc alloys
5. Week	Fabrication techniques and its problems. Liquid phase and solid phase.
6. Week	Fabrication techniques like vacuum pressing, hand lay-up, helisel winding, profil squeezing and a comparison with others
7. Week	Composite's design, fibers arrangement, macro-analysis. Strength theories for isotropic and orthotropic materials
8. Week	Midterm
9. Week	Micro-analysis
10. Week	Toughness and fatique properties
11. Week	Interface between fibers and matrix. Adhesion theory. Some bonding mechanisms.
12. Week	Mechanical properties (fiber's type, direction and production methods)
13. Week	Some variables like volume fraction,fibers type, matrix etc. affecting on mechanical properties
14. Week	Deformations in composite materials
15. Week	Nano based-composite materials and their properties

GAZİ UNIVERSITY FACULTY OF TECHNOLOGY ECTS FORM								
Course Code and Title	İMM 424 WORK HEALTH AND SAFETY							
Credits	2							
ECTS	2							
Name of Lecturer and e-mail address	Yrd. Doç. Dr. Ömer ASAL, omerasal@gazi.edu.tr							
Department/Program	Department of Manufacturing Engineering							
Course Type	Elective							
Course Language	Turkish							
Course Semester	Spring							
Prerequisites	None							
Course Objectives	To learn factors that cause workplace accidents and illneses							
Course Contents	The effects of work place, location, cleanliness, lightning, heating and sound level on work accidents and worker health. The factors that cause working place accidents. Burning, falling, poisoning, electrocuting, machine accidents, injuries with sharp/pointed tools. Precautions to be taken for preventing accidents. First aid rules.							
Course Learning Outcomes	To learn factors that cause workplace accidents and illneses and to take precaoutions.							
References **(References must be up to date)**	**Books**	Abdulvahap YİĞİT, "İş Güvenliği ve İşçi Sağlığı", Alfa Aktüel Kitapevi, 2008, İstanbul.						
	Journals, Articles, Papers, Symposiums							
Planned learning activities and teaching methods	**Theor**	**Pract**	**Lab.**	**Projects**	**Assign.**	**Other**	**Total**	**ECTS**
	28					22	50	2

Assessment Methods and Criteria	**Quantity (mark with "X")**	**Percentage (%)**
Midterm Exam	X	40
Quiz		
Assignment		
Projects		
Laboratory		
Practice		
Other		
Final Exam	X	60

WEEKLY COURSE PLAN	
Week	**Contents and topics**
1. Week	History and importance of worker health and work safety
2. Week	The reasons that affect worker health and work accidents in workplace environment

3. Week	The reasons of accidents and occupation illnesses
4. Week	The effects of work place, location, cleanliness, lightning, heating and sound level on work accidents and health. The factors that cause working place accidents.
5. Week	Typical workplace accidents: Burning, falling, poisoning, electrocuting, machine accidents,
6. Week	Injuries with sharp/pointed tools.
7. Week	Precautions to be taken for preventing accidents.
8. Week	First aid rules.
9. Week	Precautions for fire and explosion and methods for intervention
10. Week	Financial compensation arising from accidents at work and occupational disease cases; Worker health and work safety in Turkey
11. Week	Worker's compensation in case of death be deprived of support
12. Week	Responsibilities of the employer
13. Week	Compensation trials regarding work accidents and occupation illnesses
14. Week	Compensation for worker death
15. Week	Work safety inspection in Turkey

GAZİ UNIVERSITY FACULTY OF TECHNOLOGY ECTS FORM								
Course Code and Title	İMM-426 QUALITY CONTROL IN MANUFACTURING							
Credits	2							
ECTS	2							
Name of Lecturer and e-mail address	Yrd. Doç. Dr. Ömer ASAL omerasal@gazi.edu.tr							
Department/Program	Department of Industrial Design Engineering							
Course Type	Elective							
Course Language	Turkish							
Course Semester	Spring							
Prerequisites	None							
Course Objectives	To give information about quality and reliability.							
Course Contents	Basic information for quality and quality control. Quality control in industry. Standardization concepts. Standardization in industry. Total quality management. Quality performance tests for products. Reliability concept.							
Course Learning Outcomes	To succes development and learn at quality concept,, total quality management, vision and mision, standardization and reliability. To apply these skills at vocational field.							
References **(References must be up to date)**	**Books**	Total Quality Management, Assist. Prof. Dr. Enver AYDOGAN, Gazi Press, 2004.						
	Journals, Articles, Papers, Symposiums							
Planned learning activities and teaching methods	**Theor**	**Pract**	**Lab.**	**Projects**	**Assign.**	**Other**	**Total**	**ECTS**
	28					22	50	2

Assessment Methods and Criteria	Quantity (mark with "X")	Percentage (%)
Midterm Exam	X	40
Quiz		
Assignment		
Projects		
Laboratory		
Practice		
Other		
Final Exam	X	60

WEEKLY COURSE PLAN	
Week	**Contents and topics**
1. Week	Quality concept
2. Week	Factors of Quality

3. Week	Concept of Total Quality Management
4. Week	Purpose of Total Quality Management
5. Week	Elements of Total Quality Management
6. Week	Total Quality Culture
7. Week	Total Quality Vision
8. Week	Total Quality Mission
9. Week	Leadership of Total Quality
10. Week	Team Work at Total Quality Organizations
11. Week	Sustainable Growth, Quality Control Circles
12. Week	Motivation at Total Quality Management
13. Week	Quality Economics
14. Week	Relation of Qulaity-Cost at Total Quality Management
15. Week	Reliability

GAZİ UNIVERSITY FACULTY OF TECHNOLOGY ECTS FORM								
Course Code and Title	IMM 428 Engineering Ethics							
Credits	2							
ECTS	2							
Name of Lecturer and e-mail address	Dr. Gültekin UZUN, uzun.gultekin@gazi.edu.tr							
Department/Program	Manufacturing Engineering							
Course Type	Elective							
Course Language	Turkish							
Course Semester	Spring							
Prerequisites	None							
Course Objectives	This course will provide students with an interactive study of ethical theory and development of engineering ethics							
Course Contents	Introduction to engineering ethics, Professionalism and codes of ethics, Understanding ethical problems, Ethical problem solving techniques, Risk, safety and accident, The rights and responsibilities of engineers, Ethics in research and experimentation, Doing the right thing, technology, engineer and society, Technological innovation and engineering							
Course Learning Outcomes	Describe a clear definition of engineering ethics, To develop understanding of the ethical issues that engineers often face in professional practice, To develop appreciation and ability about ethical issues, Explain the importance of professional ethics as an engineer, To develop the need for professional registration							
References **(References must be up to date)**	**Books**	1. M.W. Martin and R.Schinzinger, Ethics in Engineering, McGraw Hill Inc., 2004 2. Fleddermann, C.B., "Engineering Ethics", Prentice Hall, New Jersey, 1999. 3. Whitbeck, C., "Ethics in Engineering Practice and Research", Cambridge University Press, 1998. 4. Mantell, M. I., "Ethics and Professionalism in Engineering", McMillan, New York, 1964.						
	Journals, Articles, Papers, Symposiums	TMMOB, Yayın No :203/3. "Mühendislik Etiği Panel Notları", 3. Ulusal Tesisat Mühendisliği Kongresi, İzmir, Kasım 1997.						
Planned learning activities and teaching methods	**Theor**	**Pract**	**Lab.**	**Projects**	**Assign.**	**Other**	**Total**	**ECTS**
	28				10	12	50	2
Assessment Methods and Criteria	**Quantity (mark with "X")**					**Percentage (%)**		
Midterm Exam	X					40		
Quiz								
Assignment								
Projects								
Laboratory								
Practice								
Other								

Final Exam	X	60

WEEKLY COURSE PLAN	
Week	**Contents and topics**
1. Week	Introduction to engineering ethics
2. Week	Professionalism and codes of ethics
3. Week	Understanding ethical problems
4. Week	Ethical problem solving techniques
5. Week	Risk, safety and accident
6. Week	The rights and responsibilities of engineers
7. Week	Ethics in research and experimentation
8. Week	Midterm exam
9. Week	Doing the right thing, technology, engineer and society
10. Week	Technological innovation and engineering
11. Week	Case study, seminar presentation
12. Week	Case study, seminar presentation
13. Week	Case study, seminar presentation
14. Week	Case study, seminar presentation
15. Week	Case study, seminar presentation