Karabük University

Faculty of Engineering
Automotive Engineering

OMD103	Computer Programming I				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
1	OMD103	Computer Programming I	3	2	3

Mode of Delivery:
Face to Face
Language of Instruction:
Turkish
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Required
Objectives of the Course:
Learning of programming and algorithm techniques, application of various problem solutions using MATLAB program. To be able to use Matlab program effectively and efficiently in the parts of engineering problems that require programming. To be able to do the programming with Simulik program.
Teaching Methods and Techniques:
Structure of computer systems, Algorithms and algorithm development, Program flow diagrams, Creating simple program flow diagrams with different algorithms, Introduction of Matlab program, Writing programs in Matlab, Basic controls, Variable and Assignments, Arithmetic and Logic Operators, Arrays, Loop Expressions , Terms, Functions and Sub-Procedures, Disk and File Operations, Graphical Representation of Data, Mathematical Expressions, Working with Matlab Gui and Applications, Working with Matlab Simulink and Applications
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:
Associate Prof.Dr. Can Bülent FİDAN
Assistants:

Recommended or Required Reading

Resources	Turkish, Book, • Matlab and Engineering Applications, Uğur ARİFOĞLU, Cemalettin KUBAT.

Course Category

Mathmatics and Basic Sciences	:	**Education**	:
Engineering	:	**Science**	:
Engineering Design	:	**Health**	:
Social Sciences	:	**Field**	:

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Introduction to computer and its elements		
2	Introduction to computer programming: machine, assembly and high level programming languages.		
3	Problem solving and algorithm development		
4	Flow diagrams and different problem solving techniques		
5	Data types, logical commands, input / output commands in MATLAB programming.		
6	Condition structures and examples in MATLAB programming.		
7	Loop structures and examples in MATLAB programming		
8	Function definitions in MATLAB programming.		

Course Learning Outcomes

No	Learning Outcomes
C01	To comprehend algorithm design and programming logic.
C02	To acquire the skills of writing programs with Matlab.
C03	Programming engineering applications in MATLAB program.
C04	Programming engineering applications in MATLAB program.
C05	Programming engineering applications in MATLAB program.

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria		
In-Term Studies	**Quantity**	**Percentage**
Mid-terms	1	%20
Quizzes	0	%0
Assignment	3	%20
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload			
Activities	**Quantity**	**Duration**	**Total Work Load**
Course Duration	12	4	48
Hours for off-the-c.r.stud	12	1	12
Assignments	4	2	8
Presentation	0	0	0
Mid-terms	1	0	0
Practice	0	0	0
Laboratory	0	0	0
Project	1	10	10
Final examination	1	10	10
Total Work Load			**88**
ECTS Credit of the Course			**3**

Contribution of Learning Outcomes to Programme Outcomes

Karabük University

Faculty of Engineering
Automotive Engineering

FOL183	Foreign Language I				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
1	FOL183	Foreign Language I	2	2	2

Mode of Delivery:
Face to Face
Language of Instruction:
English (%100)
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Required
Objectives of the Course:
The aim of the course is to improve the students' basic grammar, listening and reading skills at A1 level. It is aimed to improve the students' ability to understand short, simple texts containing the most commonly used words in the target language; to make short, simple descriptions of events; to understand simple, clear, short dialogues; to use grammatical structures correctly.
Teaching Methods and Techniques:
The content of the course is designed to teach basic grammar structures in the target language (such as articles, tenses, imperatives, pronouns and conjunctions), common vocabulary and phrases (such as daily routines, animals, common verbs and transport), and to improve the students' comprehension skills in reading and listening at A1 level (such as introducing a friend and describing people).
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:

Assistants:
Instructor Akile BAŞARInstructor Nihal TOPCU Instructor Büşra ŞANLI Instructor Duygu YAZICI AŞÇI Instructor Fatma Zehra KÖK

Recommended or Required Reading

Resources 1. Azar, Betty Schrampfer, Fundamentals of English Grammar (New York: Pearson Education, 2003)
2. Murphy, Raymond, Essential Grammar in Use (Cambridge: Ca

Course Category

Mathmatics and Basic Sciences	:	0	**Education**	:	0
Engineering	:	0	**Science**	:	0
Engineering Design	:	0	**Health**	:	0
Social Sciences	:	0	**Field**	:	0

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Grammar:Subject Pronouns Verb "To Be"Vocabulary:The Alphabet, Greetings, Countries and NationalitiesReading & Listeni		
2	Grammar:Indefinite Articles (A/ An)Singular and Plural NounsDemonstrative AdjectivesVocabulary:Days, Months, SeasonsR		
3	Grammar:Have got/ Has got Possessive AdjectivesVocabulary:Family Members, Occupations/ JobsReading & Listening:Gett		
4	Grammar:There is/ There areSome/ Any/ NoVocabulary:Common ObjectsReading & Listening:Inviting Someone to the Cine		
5	Grammar:Telling the TimeVocabulary:Cardinal Numbers, Ordinal Numbers, DatesReading & Listening:Understanding Numb		
6	Grammar:Simple Present TenseVocabulary:Daily RoutinesReading & Listening:Interview with a Swimmer		
7	Grammar:Present Continuous TensePresent Continuous Tense Compared with the Simple Present TenseVocabulary:State V		
8	Grammar:ImperativesMaking SuggestionsVocabulary:Weather ConditionsAnimalsReading & Listening: A Good Night's Sleep		
9	MIDTERM EXAM		
10	Grammar:Object PronounsPossessive PronounsOne/ OnesVocabulary:Asking for and Giving DirectionsAsking about PriceRe		
11	Grammar:Simple Past TenseVocabulary:Expressions with go, get, haveReading & Listening: Christopher Columbus		
12	Grammar:Past Continuous TenseVocabulary:Common VerbsReading: The Rabbit and The Turtle		
13	Grammar:Conjunctions: Because, So, But, And, Also, OrVocabulary:Hobbies, Sports, InterestsReading & Listening:Free Tim		
14	Grammar:Prepositions of Time and PlaceVocabulary:Common PlacesReading & Listening:Trains and Travel		
15	Grammar:Articles (a/ an/ the/ Ø)Vocabulary:TransportReading & Listening:Tour of London		
16	FINAL EXAM		
17	FINAL EXAM		

Course Learning Outcomes

No	Learning Outcomes
C01	Students will be able to develop a positive attitude towards the target language.
C02	Students will be able to enhance their basic academic skills in order to communicate both in the academic environment and in daily life.
C03	Students will be able to use A1 level grammar structures and words in the target language.
C04	Students will be able to understand A1 level texts and dialogues in the target language.
C05	Students will be able to express themselves orally in the target language at A1 level.

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%40
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	14	2	28
Hours for off-the-c.r.stud	14	1	14
Assignments	0	0	0
Presentation	0	0	0
Mid-terms	1	3	3
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	2	3	6
Total Work Load			**51**
ECTS Credit of the Course			**2**

Contribution of Learning Outcomes to Programme Outcomes

	P01	P03	P04	P05
C01	1	5	1	2
C02	1	5	1	2
C03	1	5	1	2
C04	1	5	1	2
C05	1	5	1	2

Karabük University

Faculty of Engineering
Automotive Engineering

CHE189	General Chemistry				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
1	CHE189	General Chemistry	5	4	4

Mode of Delivery:
Face to Face
Language of Instruction:
English (%100)
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Required
Objectives of the Course:
This course teaches and examines the behavior of atoms and molecules and providing knowledge to students to forecast the behaviour of them in reactions.
Teaching Methods and Techniques:
Knowledge of matter , structure of atom, sequence of electrons, periodic system, Chemical bonds and interactions, classification and atomicity, mole and equivalency concept, chemical laws, reactions, gases, solutions and concentration.
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:
Dr. Nurettin ELTUĞRAL
Assistants:

Recommended or Required Reading

Resources

Prof. Dr. Ender Erdik, Prof. Dr. Yüksel Sarikaya; Temel Üniversite Kimyasi, Gazi Kitabevi, Ankara,Petrucci-Harwood-Herring, Genel Kimya, Palme Yayıncılık, Ankara,Peter A
1. Türkçe, Kitap, Petrucci-Harwood-Herring, Genel Kimya, Palme Yayıncılık, Ankara
2. Türkçe, Kitap, Prof. Dr. Ender Erdik, Prof. Dr. Yüksel Sarikaya; Temel Üniversite Kimyasi, Gazi Kitabevi, Ankara
3. Türkçe, Kitap, Peter Atkins, Loretta Jones, Temel Kimya, Moleküller, maddeler ve degisimler, Bilim Yayincilik

Course Category

Mathmatics and Basic Sciences	:	**Education**	:
Engineering	:	**Science**	:
Engineering Design	:	**Health**	:
Social Sciences	:	**Field**	:

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Introduction and General Information		
2	Matter and Measurement		
3	Atoms, Molecules, and ions, Atomic Structure		
4	Chemical Formulas, Reaction Equations		
5	Stochiometry: Chemical calculations		
6	Stochiometry: Chemical calculations		
7	Chemical Reactions in Aqueous Solutions		
8	Solutions, and the concentration		
9	Electronic Configurations and the Periodic Table		
10	Periodic Table		
11	Chemical bonding theorys		
12	Gases		
13	Gases		
14	Thermochemistry		

Course Learning Outcomes

No	Learning Outcomes
C01	Comprehend the basic concepts of chemistry
C02	Recognize the chemical events occurring in the environment
C03	Distinguish matter and properties of matter
C04	Evaluate the basics of heat and energy exchange in chemical reactions
C05	Comprehend basic knowledge to understand the concepts of atomic structure and chemical bonds.

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria		
In-Term Studies	**Quantity**	**Percentage**
Mid-terms	1	%30
Quizzes	0	%0
Assignment	1	%10
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload			
Activities	**Quantity**	**Duration**	**Total Work Load**
Course Duration	14	3	42
Hours for off-the-c.r.stud	12	1	12
Assignments	1	8	8
Presentation	0	0	0
Mid-terms	1	10	10
Practice	0	0	0
Laboratory	14	1	14
Project	0	0	0
Final examination	1	22	22
Total Work Load			**108**
ECTS Credit of the Course			**4**

Contribution of Learning Outcomes to Programme Outcomes

Karabük University

Faculty of Engineering
Automotive Engineering

PHY195	General Physics I				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
1	PHY195	General Physics I	5	4	5

Mode of Delivery:
Face to Face
Language of Instruction:
English (%100)
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Required
Objectives of the Course:
To teach the concepts of kinematics and dynamics given in the course content, their applications in daily life and modern technology.
Teaching Methods and Techniques:
Units and physical quantities, Vectors, Linear motion, Motion in two dimensions, The Newton laws of motion, Applications of Newton's laws, Work and kinetic energy, Potential energy, Conservation of energy, Linear momentum, Impulse and collisions, Rotation of a rigid body, Rolling motion and angular momentum
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:
Associate Prof.Dr. Necla ÇAKMAK
Assistants:

Recommended or Required Reading

Resources	Fundamentals Of Physics, D. Halliday-R. Beichner-J. Walker, John Wiley&Sons, Extended Fifth Edition (1997),University Physics with Modern Physics, H.D. Young ve R.A. 1. Physics for Scientists and Engineers, Raymond Serway-Robert Beichner, BROOKS/COLE CENGAGE Learning, (2010).

Course Category

Mathmatics and Basic Sciences	:	**Education**	:
Engineering	: 25	**Science**	: 75
Engineering Design	:	**Health**	:
Social Sciences	:	**Field**	:

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Units and physical quantities		
2	Motion in one dimension		
3	Vectors		
4	Motion in two dimensions		
5	The laws of motion		
6	Applcations of Newton`s law		
7	Applcations of Newton`s law		
8	Work and kinetic energy		
9	Potential energy		
10	Conservation of energy		
11	Lineer momentum		
12	Impulse and collisions		
13	Rotation of a rigid body		
14	Rolling motion and angular momentum		

Course Learning Outcomes

No	Learning Outcomes
C01	Defines the basic concepts of mechanics.
C02	Analyses the dynamics of single and many particle systems.
C03	Formulates mathematically kinematic processes in nature.
C04	Analyses mechanical problems using graphical methods.
C05	Solves the mechanical problems in view of laws and principles.
C06	Defines the relationship between the obtained physical results and technology.

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%25
Quizzes	0	%0
Assignment	1	%5
Attendance	0	%0
Practice	1	%10
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	14	3	42
Hours for off-the-c.r.stud	12	3	36
Assignments	12	1	12
Presentation	0	0	0
Mid-terms	1	10	10
Practice	14	1	14
Laboratory	14	1	14
Project	0	0	0
Final examination	1	15	15
Total Work Load			**143**
ECTS Credit of the Course			**6**

Contribution of Learning Outcomes to Programme Outcomes

Karabük University

Faculty of Engineering
Automotive Engineering

CAL181	Mathematics I				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
1	CAL181	Mathematics I	4	4	5

Mode of Delivery:
Face to Face
Language of Instruction:
English (%100)
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Required
Objectives of the Course:
The aim of this course is to give students the basic concepts of calculus, to teach the concepts of limit, continuity, derivative for single variable functions. Giving the ability of solving engineering problems by using mathematics knowledge.
Teaching Methods and Techniques:
Induction, Sequences, Completeness Axiom, Bolzano-Weierstrass Theorem, Bounded and Monotone Sequences, Series as Sequences and Some Convergence Criteria, the concepts of Greatest Lower Bound, Upper Limit and Lower Limit, Functions, Limits and Continuity, Theorems on Continuous Functions, Descriptions of Some Special Functions, Exponential Function of Base a and Its Inverse, Trigonometric Functions and Its Inverses, Derivative and Its Geometric Comment, Graph drawing.
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:
Instructor Emrullah DemiralDr. Burhan SelçukDr. Hakan Kutucu
Assistants:

Recommended or Required Reading

Resources

Genel Matematik I, Balcı Yayınları, 2008., Thomas' Calculus, Addison-Wesley, 2005., Analize Giriş I(2.Baskı), Grafiker Yayınları, 2007., Genel Matematik, 3. Baskı, Nobel Ya
1. Genel Matematik I, Balcı Yayınları, 2008.
2. İngilizce, Kitap, Thomas' Calculus, Addison-Wesley, 2005.
3. Türkçe, Kitap, Analize Giriş I(2.Baskı), Grafiker Yayınları, 2007.
4. Türkçe, Kitap, Genel Matematik, 3. Baskı, Nobel Yayın Dağıtım Tic. Ltd. Şti., 2009.

Course Category

Mathmatics and Basic Sciences	:	**Education**	:
Engineering	:	**Science**	:
Engineering Design	:	**Health**	:
Social Sciences	:	**Field**	:

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	The concept of set, operations on sets. Function and its properties. Inverse function.		
2	The properties of the natural, the rational and the real numbers. The method of Induction.		
3	Numerical sequences and operation on them.		
4	The concept of limit, Convergent sequences, Monotone sequences, the Bolzano -Weierstrass's theorem.		
5	Limit points of a sequence, upper and lower limits, Cauchy's test for convergence.		
6	Cauchy's and Heine's definitions of limit of a function, Algebraic operations on limit.		
7	Cauchy's criterion on the existence of limit of a function, Infinite shrinking and growing functions.		
8	Continuity, Algebraic operations on the continuous functions, compositon function and its continuity.		
9	Monotone functions, Continuity of the inverse of a function.		
10	Points of discontinuity of a function and their classification, The concept uniform continuity.		
11	Differential and derivative of a function, Geometric meaning of derivative. Differential and derivative of the inverse and the		
12	Methods for taking differential. Derivatives of the elementary functions. Higher differential and derivative. Local extremum.		
13	Fermat's, Rolle's, mean value and Darboux theorems. L'Hospital's rule.		
14	Taylor Formula, Finding of the extremum points, Investigation of the graphic of a function.		

Course Learning Outcomes

No	Learning Outcomes
C01	Identify the concept of set and operations on sets.
C02	Identify the concept of function and some elementary functions
C03	Use some properties of real numbers.
C04	Analyze equences and the properties of sequences.
C05	Examine the limits of a sequence and a function.
C06	Use the properties of continuous function.
C07	Calculate derivation of a function.
C08	Draw a graph of a function.

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria		
In-Term Studies	**Quantity**	**Percentage**
Mid-terms	1	%35
Quizzes	0	%0
Assignment	1	%5
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload			
Activities	**Quantity**	**Duration**	**Total Work Load**
Course Duration	14	4	56
Hours for off-the-c.r.stud	12	4	48
Assignments	12	1	12
Presentation	0	0	0
Mid-terms	1	10	10
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	1	15	15
Total Work Load			**141**
ECTS Credit of the Course			**6**

Contribution of Learning Outcomes to Programme Outcomes

Karabük University

Faculty of Engineering
Automotive Engineering

OMT101	Introduction to Automotive Engineering				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
1	OMT101	Introduction to Automotive Engineering	2	2	4

Mode of Delivery:
Face to Face
Language of Instruction:
Turkish
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Required
Objectives of the Course:
To enable students to learn the basic concepts of automotive engineering and to increase their interest in automotive engineering. To create an infrastructure that can follow the automotive sector and technological developments.
Teaching Methods and Techniques:
Automotive engineering, history of automotive, vehicle design and dynamics, vehicle manufacturing methods, vehicle safety, vehicle components, propulsion systems, engines, hybrid vehicles, fuels and combustion, emissions, vehicle powertrain, vehicle electrical and electronic systems, automotive mechatronics, electric vehicles , preliminary information about automotive industry and technological developments.
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:
Prof.Dr. M. Bahattin Çelik
Assistants:

Recommended or Required Reading

Resources	Heywood, J. B., Internal Combustion Engine Fundamentals, McGraw Hill Book Company , 2000, New York.,Pulkrabek, W.W., "Engineering undamentals of Internal Combu -

Course Category

Mathmatics and Basic Sciences	:	10	**Education**	:	
Engineering	:	40	**Science**	:	
Engineering Design	:	10	**Health**	:	
Social Sciences	:		**Field**	:	40

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Basic concepts in engineering.		
2	Automotive engineering and history		
3	Engines, power and torque.		
4	Motion Transmission Systems		
5	Steering and Suspension Systems.		
6	Safety system		
7	Electric Electronic Systems		
8	Basic Manufacturing Methods		
9	Gasoline and diesel engines operation		
10	Engine systems		
11	Fuels and combustion		
12	Electric vehicles		
13	Measuring and Measuring Instruments		
14	Automotive industry and technological developments		

Course Learning Outcomes

No	Learning Outcomes
C01	Recognizes automotive engineering.
C02	Recognizes the systems and elements that make up the automobile and explains the functions of these systems and elements.
C03	Explain the basic concepts of automotive design and manufacturing techniques.
C04	Recognize and classify motor systems.
C05	Recognize automotive technologies and realize the effects of automotive technologies on social economic structure.

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
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P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%40
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	14	2	28
Hours for off-the-c.r.stud	14	5	70
Assignments	0	0	0
Presentation	0	0	0
Mid-terms	1	2	2
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	1	2	2
Total Work Load			**102**
ECTS Credit of the Course			**4**

Contribution of Learning Outcomes to Programme Outcomes

	P01	P02	P03	P04	P05	P06	P07	P08	P12
C01	2	4	4	2		2	1	2	
C02		3		2	1	4	3		5
C03	3		5		1	5		3	1
C04	3	1	1	4	2		2	2	
C05									2

Karabük University

Faculty of Engineering
Automotive Engineering

OMD105	Technical Drawing				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
1	OMD105	Technical Drawing	4	3	5

Mode of Delivery:
Face to Face
Language of Instruction:
Turkish
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Required
Objectives of the Course:
To teach students to draw side views and sectional views, dimensioning the views and to draw complete structural figures by using technical drawing rules and to read any drawn technical picture.
Teaching Methods and Techniques:
Terms and definitions of technical drawing, tools and equipments of technical drawing, standard writing, types and properties of line and its application areas, rules of drawing, geometrical drawings, scales, projection planes and projection methods, plane views, perspective drawings, rules of dimensioning, sections and applications, surface quality and surface machining symbols, intersection and spreading.
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:
Associate Prof.Dr. Selami SAĞIROĞLU
Assistants:

Recommended or Required Reading

Resources Türkçe, Kitap, Modüler Öğretim Sistemli Uygulama Yapraklı Teknik Resim, , 1995.,Türkçe, Kitap, Temel Teknik Resim, , 2013.
www.ibrahimcayiroglu.com

Course Category

Mathmatics and Basic Sciences	:	**Education**	:
Engineering	: 100	**Science**	:
Engineering Design	:	**Health**	:
Social Sciences	:	**Field**	:

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Teknik resimde kullanılan araç ve gereçler ve norm yazı yazma		
2	Çizgi türleri, doğrularla ve açılarla ilgili geometrik çizimler, çokgen çizimleri		
3	Çember ve teğet doğrularla ilgili çizimler		
4	İz düşüm düzlemleri ve metodları		
5	Perspektiften üç görünüş çizmek		
6	Perspektiften üç görünüş çizmek		
7	Perspektif çeşitleri ve perspektif çizimleri		
8	Perspektif çeşitleri ve perspektif çizimleri		
9	Eksik görünüşlerin tamamlanması ve görünüşlerden perspektif çizilmesi		
10	Ölçülendirme kuralları ve ölçülendirme çeşitleri		
11	Kesit görünüşler ve kesit türleri		
12	Yüzel kalitesi ve yüzey işleme sembolleri		
13	Ara kesit ve açınımlar		
14	Ara kesit ve açınımlar		

Course Learning Outcomes

No	Learning Outcomes
C01	Norm yazı yazabilir.
C02	Bir cismin üç görünüşü çıkarabilir. 4) Cisimlerin görünüşlerinden perspektif görünüşü çizebilir. 5) Kesit alma kurallarını kullanarak cisimlerin detaylarını gösterebilir.
C03	Norm yazı yazabilir. 2) Bir cismin üç görünüşü çıkarabilir.
C04	Cisimlerin görünüşlerinden perspektif görünüşü çizebilir.
C05	Kesit alma kurallarını kullanarak cisimlerin detaylarını gösterebilir.

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%30
Quizzes	0	%0
Assignment	1	%10
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	2	14	28
Hours for off-the-c.r.stud	3	12	36
Assignments	4	8	32
Presentation	0	0	0
Mid-terms	7	1	7
Practice	0	0	0
Laboratory	2	14	28
Project	0	0	0
Final examination	15	1	15
Total Work Load			**146**
ECTS Credit of the Course			**6**

Contribution of Learning Outcomes to Programme Outcomes

	P08
C03	4

Karabük University

Faculty of Engineering
Automotive Engineering

TUR181	Turkish Language I				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
1	TUR181	Turkish Language I	2	2	2

Mode of Delivery:
Face to Face
Language of Instruction:
Turkish
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Required
Objectives of the Course:
The aim of this course is to inform students about the content, characteristics, and development of Turkish language and to provide them with writing and reading skills in Turkish and to raise the awareness of using Turkish as the national language.
Teaching Methods and Techniques:
This course is designed to teach the definiton of language and culture, language-culture relation, the role of language as a social institution in societies, the situation of Turkish Language among world languages, the development and historical periods of Turkish language, the current condition of Turkish Language and span of usage, Turkish Phonology, inflectional and derivational morphemes in Turkish, types of lexicon in Turkish, and elements of the sentence.
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:

Assistants:
Associate Prof.Dr. Türkan GÖZÜTOKAsist Prof.Dr. Nimet KARA KÜTÜKÇÜInstructor Ayşe TEPEBAŞIAsist Prof.Dr. Ahmet ÖKSÜZInstructor Sena ÖZDEMİR

Recommended or Required Reading

Resources 1. Muharrem Ergin, Üniversiteler İçin Türk Dili, Bayrak Yay. İstanbul,1994.
2. Editör Ceyhun Vedat Uygur, Yaşar Öztürk, Şerif Kutludağ, Şenel Çalışkan, Aliye Tokmak

Course Category

Mathmatics and Basic Sciences	: 0	**Education**	: 0
Engineering	: 0	**Science**	: 0
Engineering Design	:	**Health**	: 0
Social Sciences	: 100	**Field**	: 0

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	What is language? Definition and characteristics of language, emergence of languages.		
2	What is culture? Relation of language-culture, relation of language-thought, the role and importance of language in society		
3	World languages, types of language, Turkish as standart language, written and spoken language.		
4	Classification of languages, place of Turkish among world languages.		
5	Development and historical periods of Turkish, alphabets that Turks used throughout history, span of usage of Turkish.		
6	Gramer, classification of phonemes in Turkish, phonetics of Turkish.		
7	Vowel and consonant harmony, sound changes, stress and intonation in Turkish.		
8	Midterm Exam		
9	Morphology, roots and affixes, derivational morphemes and their usage.		
10	Inflectional morphemes and their usage.		
11	Types of words: nouns, adjectives, pronouns.		
12	Types of words: adverbs, prepositions, conjunctions, interjections, verbs.		
13	Types of words: verbs.		
14	Syntax.		
15	Elements of sentence.		
16	Final Exam		
17	Final Exam		

Course Learning Outcomes

No	Learning Outcomes
C01	Identify concepts of language and culture
C02	Comprehend the characteristics of Turkish.
C03	Come to an understanding of development and historical periods of Turkish.
C04	Apply the rules regarding phonetics and phonology of Turkish.
C05	Recognise the types and groups of lexicon.
C06	Distinguish types and elements of sentence.

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%35
Quizzes	0	%0
Assignment	1	%5
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	14	2	28
Hours for off-the-c.r.stud	6	1	6
Assignments	1	6	6
Presentation	0	0	0
Mid-terms	1	5	5
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	1	7	7
Total Work Load			**52**
ECTS Credit of the Course			**2**

Contribution of Learning Outcomes to Programme Outcomes

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P10	P11	P12
C01							2		3	2		
C02							2		3	2		
C03							2		3	2		
C04							2		3	2		
C05							2		3	2		
C06							2		3	2		

Program Learning Outcomes	
No	**Learning Outcome**
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria		
In-Term Studies	**Quantity**	**Percentage**
Mid-terms	0	%0
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	0	%0
Total		**%0**

ECTS Allocated Based on Student Workload			
Activities	**Quantity**	**Duration**	**Total Work Load**
Course Duration	0	0	0
Hours for off-the-c.r.stud	0	0	0
Assignments	0	0	0
Presentation	0	0	0
Mid-terms	0	0	0
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	0	0	0
Total Work Load			**0**
ECTS Credit of the Course			**0**

Contribution of Learning Outcomes to Programme Outcomes

Karabük University

Faculty of Engineering
Automotive Engineering

OMD104	Computer Programming II				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
2	OMD104	Computer Programming II	3	2	3

Mode of Delivery:
Face to Face
Language of Instruction:
Turkish
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Required
Objectives of the Course:
To give information about algorithm, flow chart, function and sub- program, to give the ability of preparing algorithm of program, programming by using the language of C and learning the techniques of algorithm and finding various solutions by programming.To give the ability of solving a problem by using the language of C.
Teaching Methods and Techniques:
Defination of algoritm, preparation algorithm of basic problems, flow charts, preparetion flow charts of basic problems, variables and constants, data types, arithmetic and mathematical operators, functions and sub-programs, modular design, comparison and loops, preparation algorithm and flow charts of complex problems. Introduction to computer programming: machine, assembly and high-level programming languages. Programming with C programming language: arithmetic and logical expressions, data ty
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:
Dr. Dursun Ekmekçi
Assistants:

Recommended or Required Reading

Resources Vatansever F., "", Seçkin yayıncılık, 2007,Cormen T., Leiseison E., Rivest R., "", The MIT Press, 1990,Koffman B., "", Addison Wesley, 1999,Darnell P.A., Margolis P.E., "",

Course Category

Mathmatics and Basic Sciences	:	40	**Education**	:	0
Engineering	:	40	**Science**	:	0
Engineering Design	:		**Health**	:	0
Social Sciences	:	10	**Field**	:	0

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Computer hardware and software, process in programing, solving problems and designing algorithm		
2	Data types used in programing language, general structure of programing language		
3	Operators and terms used in programing, preparing algorithm, flow chart, drawing flow charts by using computer		
4	Introduction to computer programming: machine, assembly and high-level programming languages		
5	Introduction to computer programming: machine, assembly and high-level programming languages		
6	Programming with C programming language: arithmetic and logical expressions		
7	Programming with C programming language: data types		
8	Midterm Exam		
9	Programming with C programming language: input/output		
10	Basic control structures (selection, iterations, etc.)		
11	Function defination and parameter parsing methods		
12	Prepared functions		
13	Pointers and pointer logic		
14	File operations		
15	Presentations of project applications		
16	Final Exam		
17	Final Exam		

Course Learning Outcomes

No	Learning Outcomes
C01	Apply flow chart
C02	Explain variable types in program
C03	Carry out function and sub-program
C04	Explain comparison and loop
C05	Analyse computer algorithms
C06	Apply the features of the language of C programming in different fields as directed
C07	Design algorithms and programs
C08	Explain the concepts related to the design of programming language
C09	Learn new programming languages quickly with the experience gained
C10	Prepare systems for desired needs

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%30
Quizzes	0	%0
Assignment	1	%10
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	12	3	36
Hours for off-the-c.r.stud	12	1	12
Assignments	2	8	16
Presentation	0	0	0
Mid-terms	1	6	6
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	1	12	12
Total Work Load			**82**
ECTS Credit of the Course			**3**

Contribution of Learning Outcomes to Programme Outcomes

Karabük University

Faculty of Engineering
Automotive Engineering

MEE114	Computer Aided Technical Drawing				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
2	MEE114	Computer Aided Technical Drawing	4	3	5

Mode of Delivery:
Face to Face
Language of Instruction:
English (%100)
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Required
Objectives of the Course:
To have students experienced in technical drawing, to draw and read manufacturing drawing of a part, to guide during drawing stages, to draw (2D and 3D) in CAD environment.
Teaching Methods and Techniques:
Definitions and terms of technical drawing, technical drawing equipments, preperation of technical drawing sheets, standard fonts and heights of fonts, line types, properties and usage places of line types, drawing rules, geometrical drawings, inside and outside tangent drawings of lines with arcs, inside and outside tangent drawings of circles with each other; helical, ellipse, evolvement, cycloid, parabola and hyperbola drawings; scales, scales of enlargement and reduction, methods and planes of projection, views; auxiliary, special, rotated and local views; perspective views; isometric, cavalier, cabinet and bird's-eye projections; the terms and rules of dimensioning, sections and applications of sections, surface treatment symbols, surface quality, indication of surface conditions; definition of CAD system, operating CAD software, sample applications; learning line drawing on computer medium, arraying, conditional drawing, trimming; drawing circle and arc, adjusting view settings; drawing ellipse, polygon, polyline, spline, rectangular; moving, rearranging and scaling drawings; 3D solid modeling methods, dimensioning, obtaining section view, hatching, texting, filleting, chamfering, extending, stretching, making block, replacing block, forming table and letterhead, calculating distance and area, view and zooming commands.
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:
Dr. Gökhan SUR
Assistants:

Recommended or Required Reading

Resources

Kadir Gök, Arif Gök, AutoCAD 2015 Eylül 2014 / 10. Baskı / 616 Syf.,Mehmet Şamil Demiryürek, Autocad, Kodlab 2015.,Gülesin M., AutoCAD 2007 ile Tasarım ve Modelle

1. Kadir Gök, Arif Gök, AutoCAD 2015 Eylül 2014 / 10. Baskı / 616 Syf.
2. Gülesin M., AutoCAD 2007 ile Tasarım ve Modelleme, 2007
3. Mehmet Şamil Demiryürek, Autocad, Kodlab 2015.

Course Category

Mathmatics and Basic Sciences	:	**Education**	:
Engineering	:	**Science**	:
Engineering Design	:	**Health**	:
Social Sciences	:	**Field**	:

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Importance of technical drawing, drawing equipments, drawing sheets and folding sheets, fonts and numbers.		
2	Definition of line and properties, geometrical drawings about lines, geometrical drawings about angles.		
3	Polygon drawings, circle drawings and drawings about tangent lines, tangent junction with arcs, ellipse drawings		
4	Types and methods of projection, basic projection planes, projection of lines, projection of planes.		
5	Views, first projection (ISO-E) method, third projection (ISO-A) method, selecting and placing views, drawing three views f		
6	Auxiliary views, special views, revolved views, inter section, section views and types of sections, section views of a part wh		
7	Completing missing views, drawing perspective from views, selecting enough views.		
8	Terms and rules of dimensioning, dimensioning systems, types of dimensioning and arranging dimensioning.		
9	Drawing circle and arc, adjusting view settings learning to draw ellipse, polygon, polyline, spline, rectangular.		
10	Moving, rearranging and scaling drawings dimensioning, obtaining section view, hatching, texting.		
11	Filleting, chamfering, extending, stretching, making block, replacing block, forming table and letterhead, calculating distanc		
12	Introduction to three-dimensional (3D) drawing.		
13	Modify the surface properties.		
14	Sample 3D drawing		

Course Learning Outcomes

No	Learning Outcomes
C01	Students know the drawing commands
C02	Drawing Creation we know the regulations.
C03	Students knows Measurements of their diagnosis.
C04	Students knows Measurements of their diagnosis.
C05	Students know 3D Commands.

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	0	%30
Quizzes	0	%0
Assignment	0	%10
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	0	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	14	3	42
Hours for off-the-c.r.stud	12	3	36
Assignments	4	12	48
Presentation	0	0	0
Mid-terms	1	10	10
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	1	17	17
Total Work Load			**153**
ECTS Credit of the Course			**6**

Contribution of Learning Outcomes to Programme Outcomes

Karabük University

Faculty of Engineering
Automotive Engineering

FOL184	Foreign Language II				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
2	FOL184	Foreign Language II	2	2	2

Mode of Delivery:
Face to Face
Language of Instruction:
English (%100)
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Required
Objectives of the Course:
The aim of the course is to improve the students' basic grammar, listening and reading skills at A2 level. It is aimed to improve the students' ability to understand short, simple texts containing the most commonly used words in the target language; to make short, simple descriptions of events; to understand simple, clear, short dialogues; to use grammatical structures correctly.
Teaching Methods and Techniques:
The content of the course is designed to teach basic grammar structures in the target language (such as adjectives, nouns, tenses, quantifiers, modals, conditionals etc.), common vocabulary and phrases (such as vegetables and fruit, health and illnesses), and to improve the students' comprehension skills in reading and listening at A2 level (such as ordering food in a cafe).
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:

Assistants:
Instructor Akile BAŞARInstructor Nihal TOPCUInstructor Büşra ŞANLIInstructor Duygu YAZICI AŞÇIInstructor Fatma Zehra KÖK

Recommended or Required Reading

Resources 1. Azar, Betty Schrampfer, Fundamentals of English Grammar (New York: Pearson Education, 2003)
2. Murphy, Raymond, Essential Grammar in Use (Cambridge: Ca

Course Category

Mathmatics and Basic Sciences	:	0	**Education**	:	0
Engineering	:	0	**Science**	:	0
Engineering Design	:	0	**Health**	:	0
Social Sciences	:	0	**Field**	:	0

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Grammar:Adjectives and Adverbs Too - enough Vocabulary:Common AdjectivesReading & Listening:The Colou		
2	Grammar:Comparative Adjectives & Superlative AdjectivesAs ..... asVocabulary:Parts of the BodyParts of the FaceReading		
3	Grammar:Countable Nouns &Uncountable NounsQuantifiersVocabulary:Vegetables and FruitReading & Listening:Ordering		
4	Grammar:Present Perfect Tense & Been & GoneVocabulary:Yet, Already, Just, Ever, NeverReading & Listening:Going to the		
5	Grammar:Present Perfect Tense Compared with Simple Past TenseVocabulary:Since, For, AgoReading & Listening:The Old		
6	Grammar:Modals: Can/ Can't & Could/ Couldn't & Should/ Shouldn'tVocabulary:Health and Illnesses Reading & Listening:		
7	Grammar:Modals: Must/ Mustn't Have to /Has to Don't have to/ Doesn't have to Had toVocabularyCl		
8	MIDTERM EXAM		
9	Grammar:Future Tense (Will/ Be Going to)Vocabulary:Common Phrasal VerbsReading & Listening: The Weekend		
10	Grammar:Conditionals: Zero Conditional (Type 0)First Conditional (Type 1) Second Conditional (Type 2)Vocabulary:Rooms		
11	Grammar:Gerunds & InfinitivesVocabulary:Verb + PrepositionsAdjective + PrepositionsReading & Listening: Stop Wasting T		
12	Grammar:Passive VoiceVocabulary:Participle Adjectives (-ing/-ed Adjectives)Reading & Listening:Organising Your Time		
13	Grammar:Relative Clauses (Adjective Clauses)Vocabulary:Expressions with Do and MakeReading & Listening:My Favourite		
14	Grammar:Tag QuestionsVocabulary:ClothesReading & Listening:Online Safety Conversation		
15	Grammar:Too/ Either & So/ NeitherVocabulary:Feelings and EmotionsReading & Listening:Redwood Trees		
16	FINAL EXAM		
17	FINAL EXAM		

Course Learning Outcomes

No	Learning Outcomes
C01	Students will be able to develop a positive attitude towards the target language.
C02	Students will be able to enhance their basic academic skills in order to communicate both in the academic environment and in daily life.
C03	Students will be able to use A2 level grammar structures and words in the target language.
C04	Students will be able to understand A2 level texts and dialogues in the target language.
C05	Students will be able to express themselves orally in the target language at A2 level.

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%40
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	14	2	28
Hours for off-the-c.r.stud	14	1	14
Assignments	0	0	0
Presentation	0	0	0
Mid-terms	1	3	3
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	2	3	6
Total Work Load			**51**
ECTS Credit of the Course			**2**

Contribution of Learning Outcomes to Programme Outcomes

	P01	P03	P04	P05
C01	1	5	1	2
C02	1	5	1	2
C03	1	5	1	2
C04	1	5	1	2
C05	1	5	1	2

Karabük University

Faculty of Engineering
Automotive Engineering

PHY196	General Physics II				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
2	PHY196	General Physics II	5	4	5

Mode of Delivery:
Face to Face
Language of Instruction:
English (%100)
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Required
Objectives of the Course:
To teach the electrical and magnetic fundamental laws and principles, their applications in daily life and modern technology.
Teaching Methods and Techniques:
Electric charge and electric fields, Gauss's law, Electric potential, Capacitance and dielectrics, Current and resistance, Direct current circuits, Magnetic fields and magnetic forces, Sources of the magnetic field, Faraday's law
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:
Prof.Dr. İsmail Atılgan
Assistants:

Recommended or Required Reading

Resources
Fen ve Mühendislik için Fizik I, Raymond Serway-Robert Beichner (Çeviri Ed.: Prof.Dr.Kemal Çolakoğlu), Palme Yayınevi, (2007).,Üniversite Fiziği, Cilt 1, H.D. Young ve R.
1. Physics for Scientists and Engineers, Raymond Serway-Robert Beichner, BROOKS/COLE CENGAGE Learning, (2010).

Course Category

Mathmatics and Basic Sciences	:	**Education**	:
Engineering	:	**Science**	:
Engineering Design	:	**Health**	:
Social Sciences	:	**Field**	:

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Electric charge and electric fields		
2	Gauss`s law		
3	Gauss`s law		
4	Electric potential		
5	Electric potential		
6	Capacitance and dielectrics		
7	Current and resistance		
8	Direct current circuits		
9	Direct current circuits		
10	Magnetic fields and magnetic forces		
11	Magnetic fields and magnetic forces		
12	Sources of the magnetic field		
13	Sources of the magnetic field		
14	Faraday`s law		

Course Learning Outcomes

No	Learning Outcomes
C01	Defines the basic concepts of electricity and magnetism
C02	States the electrical nature of single and many particle systems
C03	Expresses problems of electricity and magnetism via mathematical structures
C04	Solves the electrostatic and magnetostatic problems.
C05	Analyses simple electric circuits.
C06	Defines the relationship between the obtained physical results and technology.

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria		
In-Term Studies	**Quantity**	**Percentage**
Mid-terms	0	%25
Quizzes	0	%0
Assignment	0	%5
Attendance	0	%0
Practice	0	%10
Project	0	%0
Final examination	0	%60
Total		**%100**

ECTS Allocated Based on Student Workload			
Activities	**Quantity**	**Duration**	**Total Work Load**
Course Duration	14	3	42
Hours for off-the-c.r.stud	12	3	36
Assignments	12	1	12
Presentation	0	0	0
Mid-terms	1	10	10
Practice	14	1	14
Laboratory	14	1	14
Project	1	15	15
Final examination	0	0	0
Total Work Load			**143**
ECTS Credit of the Course			**6**

Contribution of Learning Outcomes to Programme Outcomes

Karabük University

Faculty of Engineering
Automotive Engineering

MAT194	Linear Algebra				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
2	MAT194	Linear Algebra	3	3	4

Mode of Delivery:
Face to Face
Language of Instruction:
Turkish
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Required
Objectives of the Course:
The aim of this course is to introduce the concepts of matrices, determinant, vector spaces and inner products.
Teaching Methods and Techniques:
Matrix Algebra, Elementary Row Operations on Matrices and Solution of Linear Equations, Special Types of Matrices, Elementary Matrices, Equivalent Matrices, nxn Determinants, properties of Determinants, Vector Spaces, Subspaces, Linear Independence, Basis and Dimension. Linear Transformation and matrix of a Linear Transformation, Eigenvalues and Eigenvectors, Diagonalization Inner Product Spaces
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:

Assistants:
Asist Prof.Dr. Mukaddes ÖKTEN TURACIProf.Dr. Ayşe NALLIUndefined İsmail BIYIKLIInstructor Mehmet BAKIRCIInstructor Ahmet Zahid KÜÇÜK

Recommended or Required Reading

Resources 1. A. O. Morris, "LinearAlgebra an Introduction", Chapman&Hall, London, 1982
2. SeymourLipschutz, "Theory and Problems of LinearAlgebra", 2nd Ed.,Schaum'sOutli

Course Category

Mathmatics and Basic Sciences	:	100	**Education**	:	0
Engineering	:	0	**Science**	:	0
Engineering Design	:		**Health**	:	0
Social Sciences	:	0	**Field**	:	0

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Matrix Algebra-I (Homework,Received date of homework : 9. week)		
2	Matrix Algebra-II		
3	Determinants		
4	Determinants and some properties		
5	Systems of Linear Equations		
6	Solution of Linear Equations		
7	Vector Spaces		
8	Linear Independent and Bases		
9	Mid-Term Exam		
10	Linear Transformations		
11	Matrix Representation of Linear Transformations		
12	Eigenvalues and Eigenvectors		
13	Diagonalization		
14	Inner Product Spaces-I		
15	Inner Product Spaces-II		
16	Final Exam		
17	Final Exam		

Course Learning Outcomes

No	Learning Outcomes
C01	Do operation on matrices.
C02	Solve the linear equations.
C03	Calculate the determinant of a matrix.
C04	Find the dimensions and bases of vector spaces.
C05	Operate on inner product spaces
C06	Determine eigenvalues and eigenvectors.
C07	Identify diagonalization of matrices and linear transformations.

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%30
Quizzes	0	%0
Assignment	1	%10
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	14	3	42
Hours for off-the-c.r.stud	10	1	10
Assignments	2	6	12
Presentation	0	0	0
Mid-terms	1	5	5
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	1	8	8
Total Work Load			**77**
ECTS Credit of the Course			**3**

Contribution of Learning Outcomes to Programme Outcomes

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P10	P11	P12
C01	3	2		3								
C02	3	2		3								
C03	3	2		3								
C04	3	2		3								
C05	3	2		3								
C06	3	2		3								
C07	3	2		3								

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CAL182	Mathematics II				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
2	CAL182	Mathematics II	4	4	5

Mode of Delivery:
Face to Face
Language of Instruction:
English (%100)
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Required
Objectives of the Course:
This course aims at giving students the concept of integral and series. Giving the ability of solving engineering problems by using mathematics knowledge.
Teaching Methods and Techniques:
Integral, Definite and İndefinite Integral, Integration rules, The Riemann integral, Mean-value theorems, The Newton-Leibniz formula, The estimates for sums and integrals, The improper integrals, The application of definite integrals, Series.
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:
Dr. Hakan Kutucu
Assistants:

Recommended or Required Reading

Resources

Thomas' Calculus, Addison-Wesley, 2005.,Genel Matematik I, Balcı Yayınları, 2008.,Analize Giriş I(2.Baskı), Grafiker Yayınları, 2007.,Genel Matematik, 3. Baskı, Nobel Yayı
Genel Matematik I, Balcı Yayınları, 2008.
Thomas' Calculus, Addison-Wesley, 2005.
Analize Giriş I(2.Baskı), Grafiker Yayınları, 2007.
Genel Matematik, 3. Baskı, Nobel Yayın Dağıtım Tic. Ltd. Şti., 2009.

Course Category

Mathmatics and Basic Sciences	:	**Education**	:
Engineering	:	**Science**	:
Engineering Design	:	**Health**	:
Social Sciences	:	**Field**	:

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Integral, indefinite integral and its main properties.		
2	Integration rules.		
3	Integral methods of trigonometric and irrational expressions, Elliptic integrals.		
4	The Riemann integral.		
5	Cluster of integral functions, The mean value theorem.		
6	The Newton-Leibniz formula for derivative of an integral.		
7	The estimates for sums and integrals: Young's inequality, Hölder's inequality, Minkowski's inequality.		
8	The improper integrals.		
9	Tests of the improper integrals.		
10	Areas in the definite integrals.		
11	Volume in the definite integrals.		
12	Arc Length and Surface Area of Revolution of definite integral.		
13	Series.		
14	Taylor and Maclaurin Series.		

Course Learning Outcomes

No	Learning Outcomes
C01	Define the concept of indefinite integral.
C02	Apply the methods of integration.
C03	Express the properties of the Riemann integral.
C04	Prove the theorems related to the Riemann integral.
C05	Solve the applications of definite integral.
C06	Identify the improper integral.
C07	State the basic properties of series and power series.

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria		
In-Term Studies	**Quantity**	**Percentage**
Mid-terms	0	%35
Quizzes	0	%0
Assignment	0	%5
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	0	%60
Total		**%100**

ECTS Allocated Based on Student Workload			
Activities	**Quantity**	**Duration**	**Total Work Load**
Course Duration	14	4	56
Hours for off-the-c.r.stud	12	4	48
Assignments	12	1	12
Presentation	0	0	0
Mid-terms	1	10	10
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	1	15	15
Total Work Load			**141**
ECTS Credit of the Course			**6**

Contribution of Learning Outcomes to Programme Outcomes

Karabük University

Faculty of Engineering
Automotive Engineering

MMT102	Statics				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
2	MMT102	Statics	4	4	4

Mode of Delivery:
Face to Face
Language of Instruction:
Turkish
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Required
Objectives of the Course:
The purpose of this course is to introduce a clear understanding of the principles of rigid body mechanics and the assumptions and idealizations and then to give students the knowledge about equilibrium and internal force concepts, related applications.
Teaching Methods and Techniques:
Statics of particles: forces in plane, forces in space, equilibrium. Moment of a force, moment of a couple. Equivalent systems of forces on rigid bodies. Equilibrium in two dimensions. Equilibrium in three dimensions. Distributed forces: centroids and center of gravity. Analysis of structures: trusses, frames and machines. Internal forces in beams and cables. Friction. Moments of inertia of areas, moments of inertia of masses. Method of virtual work.
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:
Dr. Mehmet Erdi Korkmaz
Assistants:

Recommended or Required Reading

Resources	Vector Mechanics for Engineers, Statics,9th Edition, Ferdinand P.Beer,E.Russel Jıhnstone JR, David Mazurek, Eliot R. Eısenberg; McGraw Hill,2010 .,Engineering Mechanics Engineering Mechanics, Statics;12th Edition; R.C.Hibbeler, Prentece Hall Pearson Education,2010. Vector Mechanics for Engineers, Statics,9th Edition, Ferdinand P.Beer,E.Russel Jıhnstone JR, David Mazurek, Eliot R. Eısenberg; McGraw Hill,2010. Engineering Mechanics,Statics,6th Edition, J.L.Meriam, L.G.Kraige,Wiley,2008.

Course Category

Mathmatics and Basic Sciences	:	**Education**	:
Engineering	:	**Science**	:
Engineering Design	:	**Health**	:
Social Sciences	:	**Field**	:

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	GENERAL PRINCIPLES: fundemental concepts, units of measurement.		
2	FORCE VECTORS: vector operations, cartesian vectors, position vectors, addition and subtraction of cartesian vectors		
3	FORCE VECTORS: vector operations, cartesian vectors, position vectors, addition and subtraction of cartesian vectors		
4	EQUILIBRIUM OF A PARTICLE: coplanar force systems, three dimensional force systems		
5	FORCE SYSTEM RESULTANTS: cross product, moment of a force, moment of a force about a specified		
6	FORCE SYSTEM RESULTANTS: cross product, moment of a force, moment of a force about a specified. Pop Quiz examinati		
7	FORCE SYSTEM RESULTANTS: Moment of a couple, resultant force and couple system. (Assignment will be given for collec		
8	STRUCTURAL ANALYSIS: simple trusses		
9	STRUCTURAL ANALYSIS: frames and machines.		
10	INTERNAL FORCES: internal forces developed in structural members, shear and moment diagrams.		
11	FRICTION: characteristics of dry friction, problems involving dry friction.		
12	FRICTION: Wedges, frictional forces on flat belts		
13	CENTER OF GRAVITY AND CENTROID: center of gravity, center of mass and centroid for a body		
14	Composite bodies		

Course Learning Outcomes

No	Learning Outcomes
C01	Apply theoretical and practical knowledge of mathematics, science, and engineering to mechanical engineering.
C02	Identify and solve complex mechanical engineering problems.
C03	Design a machine based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufactural
C04	Use the techniques, skills, and modern engineering tools necessary for mechanical engineering practice.
C05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for mechanical engineering problems.
C06	Work effectively in multidisciplinary teams to accomplish a common goal.
C07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
C08	Recognize the need for lifelong learning and follow up developments in mechanical field.
C09	Recognize the importance of professional and ethical responsibility.
C10	Appreciate the need for knowledge of contemporary issues.
C11	Assess the impact of mechanical engineering solutions in a global, economic, environmental, and societal context.
C12	Collect and classify the data in the applications of mechanical engineering

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%40
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	14	4	56
Hours for off-the-c.r.stud	10	2	20
Assignments	1	5	5
Presentation	0	0	0
Mid-terms	1	9	9
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	1	13	13
Total Work Load			**103**
ECTS Credit of the Course			**4**

Contribution of Learning Outcomes to Programme Outcomes

	P01
All	5

Karabük University

Faculty of Engineering
Automotive Engineering

TUR182	Turkish Language II				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
2	TUR182	Turkish Language II	2	2	2

Mode of Delivery:
Face to Face
Language of Instruction:
Turkish
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Required
Objectives of the Course:
This course aims at comprehending elements of sentences and their functions to form sentences; introducing and applying types of written and spoken expressions, differentiating and correcting the mistakes in language exercises; getting acquainted with the rules regarding the preperation of research articles; and developing students' writing and speaking skills via texts chosen from Turkish and World literature, and history of thought.
Teaching Methods and Techniques:
This course is designed to teach the definition of sentence and elements of sentence; sentence analysis and examples of sentence analysis; types of sentences; composition skills; planning of written composition; types of written and oral expression and examples; means of expression and brainstorming in forming paragraphs; ambiguities in sentences; and the rules employed in the conduction of reseach articles.
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:

Assistants:
Instructor Sena ÖZDEMİRAsist Prof.Dr. Nimet KARA KÜTÜKÇÜAsist Prof.Dr. Ahmet ÖKSÜZInstructor Ayşe TEPEBAŞIInstructor Mesut DOĞANAssociate Prof.Dr. Türkan GÖZÜTOK

Recommended or Required Reading

Resources 1. Muharrem Ergin, Üniversiteler İçin Türk Dili, Bayrak Yay. İstanbul,1994.
2. Editör Ceyhun Vedat Uygur, Yaşar Öztürk, Şerif Kutludağ, Şenel Çalışkan, Aliye Tokmak

Course Category

Mathmatics and Basic Sciences	:	0	**Education**	:	0
Engineering	:	0	**Science**	:	0
Engineering Design	:		**Health**	:	0
Social Sciences	:	100	**Field**	:	0

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Sentence: syntactical and semantical sentence categories.		
2	Sentence: Sentence categories according to the place and type of predicate.		
3	Orthographic rules.		
4	Orthographic rules.		
5	Punctuation rules.		
6	Ambiguity in sentences.		
7	Ambiguity in sentences.		
8	Midterm Exam		
9	Composition.		
10	Types of Expression.		
11	Brainstorming.		
12	Types of Written Expression.		
13	Types of Oral Expression.		
14	Types of Templates.		
15	Methods of Research Article Writing.		
16	Final Exam		
17	Final Exam		

Course Learning Outcomes

No	Learning Outcomes
C01	Comprehend and apply spelling rules and punctuation marks.
C02	Use Turkish language in a correct and elaborate manner.
C03	Apply methods and techniques used in research article writing.
C04	Classify sentences in accordance with their grammatical features
C05	Grasp and implement expression methods.

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%35
Quizzes	0	%0
Assignment	1	%5
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	14	2	28
Hours for off-the-c.r.stud	6	1	6
Assignments	1	6	6
Presentation	0	0	0
Mid-terms	1	5	5
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	1	7	7
Total Work Load			**52**
ECTS Credit of the Course			**2**

Contribution of Learning Outcomes to Programme Outcomes

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P10	P11	P12
C01							2		2		3	
C02							2		2		3	
C03							2		2		3	
C04							2		2		3	
C05							2		2		3	

Program Learning Outcomes	
No	**Learning Outcome**
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria		
In-Term Studies	**Quantity**	**Percentage**
Mid-terms	0	%0
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	0	%0
Total		**%0**

ECTS Allocated Based on Student Workload			
Activities	**Quantity**	**Duration**	**Total Work Load**
Course Duration	0	0	0
Hours for off-the-c.r.stud	0	0	0
Assignments	0	0	0
Presentation	0	0	0
Mid-terms	0	0	0
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	0	0	0
Total Work Load			**0**
ECTS Credit of the Course			**0**

Contribution of Learning Outcomes to Programme Outcomes

Karabük University

Faculty of Engineering
Automotive Engineering

AIT181	Atatürk S Principles and History Of Revolutions I				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
3	AIT181	Atatürk S Principles and History Of Revolutions I	2	2	2

Mode of Delivery:
Face to Face
Language of Instruction:
Turkish
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Required
Objectives of the Course:
This course teaches the spirit and significance of Atatürk s Revolution which aimed at achieving contemporary civilization.
Teaching Methods and Techniques:
Introduction, Fall of the Ottoman Empire, Tanzimat and Islahat Eras, Tripoli and Balkan Wars, World War I, The Armistice of Moudros, the Occupation of Anatolia and the National Reactions, The Birth of the Turkish Revolution, Turkish War of Independence, The Armistice of Mudanya, The Treaty of Lausanne
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:

Assistants:
Asist Prof.Dr. Hakan TÜRKKANAsist Prof.Dr. Sami AĞAOĞLUAsist Prof.Dr. Serdar ÖSENInstructor Hamza ÜZÜMCÜInstructor Mustafa KARACAAssociate ProfDr. Barış SARIKÖSE

Recommended or Required Reading

Resources 1. Armaoğlu, Fahir. (2004). 20. Yüzyıl Siyasi Tarihi. İstanbul: Alkım Yayınevi.
2. Berkes, Niyazi. (2012). Türkiye'de Çağdaşlaşma. İstanbul: YKY.
3. Candan, Ahme

Course Category

Mathmatics and Basic Sciences	:	0	**Education**	:	0
Engineering	:	0	**Science**	:	0
Engineering Design	:		**Health**	:	0
Social Sciences	:	100	**Field**	:	0

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Introduction to the History of Turkish Revolution, The Aim of the Course, The characteristics of Turkish Revolution.		
2	The Sources of Turkish Revolution (Internal Causes of the Collapse of the Ottoman Empire(XVII and XIX centurıes).		
3	The Sources of Turkish revolution (External Causes of the Collapse of the Ottoman Empire(XVII and XIX centurıes).		
4	Reform movements of Ottoman Empire in the XVIII and XIX Centuries (Selim III- Mahmut II- Tanzimat- Islahat Eras), I.Co		
5	The Ottoman Empire at the Beginning of 20th Century, The Establısment of İttihat Terakki (Committee of Union and Progre		
6	National Struggle Era, Internal Conditions after Armistice, Minority Movements, Separatist, Useful and harmful Committees.		
7	Turkish War of Independence, Prewar Conditions, (Occupation of Izmir, Mustafa Kemal Pasha s Movements, Mustafa Kema		
8	Amasya Protocol, The last Ottoman Parliament, the National Pact, Declaration of the Grand National Assembly, Occupation		
9	Insurrections, Entente States Actions: Parıs Peace Conference, Conference of London , Conference of San Remo, The Trea		
10	War Of Independence, (The Fronts, Battle of I.Inönü and results), Battle of II.Inönü, Battles of Kütahya-Eskişehir.		
11	The Battle of Sakarya, Treaty of Ankara, Büyük Taarruz (Great Offensive).		
12	The Armistice of Mudanya, The Problems Before the Lausanne Conference: The problem of mınority and Armenians, Capitu		
13	The Treaty of Lausanne and its Significance, Articles of the Treaty.		
14	Overview of National Struggle Era.		
15	Midterm Exam is given between the 7th and 15th weeks.		
16	Final Exam		
17	Final Exam		

Course Learning Outcomes

No	Learning Outcomes
C01	Explain the final Era of the Ottoman Empire.
C02	Appreciate the situation of the new Turkish state s establishment.
C03	Develop awareness to build a bridge between the past and the future
C04	Express opinion about the problems of Turkey, by valuing the past.
C05	Appreciate the significance of the Treaty of Lausanne.

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%30
Quizzes	0	%0
Assignment	1	%10
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	14	2	28
Hours for off-the-c.r.stud	6	1	6
Assignments	1	6	6
Presentation	0	0	0
Mid-terms	1	5	5
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	1	7	7
Total Work Load			**52**
ECTS Credit of the Course			**2**

Contribution of Learning Outcomes to Programme Outcomes

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P10	P11	P12
C01									2	3		
C02									2	3		
C03									2	3		
C04									2	3		
C05									2	3		

Karabük University

Faculty of Engineering
Automotive Engineering

MEE215	Differential Equations				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
3	MEE215	Differential Equations	4	4	4

Mode of Delivery:
Face to Face
Language of Instruction:
English (%100)
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Required
Objectives of the Course:
The main aims of this course are provide the student general knowledge about the usage of natural languace of mathematics as a toll for modeling, formulating and solving of engineering problems.
Teaching Methods and Techniques:
Classification of differential equations, obtaining of differential equations, first order differential equations, higher order linear differantial equations, Laplace transform.
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:

Assistants:
Prof.Dr. Ahmet DEMİR

Recommended or Required Reading

Resources Adi Diferansiyel Denklemler Prof.Dr. Mehmet Çağlıyan, Yrd.Doç.Dr.Nisa Çelik,Yrd.Doç.Dr. Setenay Doğan,Difansiyel Denklemler, Schaum s Outlines, Differential Equations

Course Category

Mathmatics and Basic Sciences	:	100	**Education**	:	0
Engineering	:	0	**Science**	:	0
Engineering Design	:		**Health**	:	0
Social Sciences	:	0	**Field**	:	0

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Forming of Differential Equations. Classification of Differential Equations. (Homework,Received date of homework : 9. weel		
2	First Order and First Degree Differential Equations. Separable Equations. Equations Reducible to the Separable Case.		
3	Homogeneous Equations, Equations Reducible to the Homogeneous Case.		
4	First Order Linear Equations. The Bernoulli Equation.		
5	Exact Differential Equations. Equations Reducible to the Exact Equation Case.		
6	The Integrating Factor.		
7	The Riccati Equation.		
8	The Clairauf Equation. The Lagrange Equation.		
9	Higher Order Linear Equations. Solution of Nonhomogeneous Equations with Constant Coefficients.		
10	The Method of Undetermined Coefficients for Solution of Nonhomogeneous Equations with Constant Coefficients.		
11	The Inverse Image Method for Solution of Nonhomogeneous Equations with Constant Coefficients.		
12	Factoring of the Operator for Linear Equations with Variable Coefficients.		
13	Reducing the Order of Linear Equations with Variable Coefficients, The Method of Variation of Parameters.		
14	The Cauchy-Euler Equation.		
15	Midterm exam is given between 7th and 15th weeks.		
16	Final exam.		
17	Final exam.		
50	Forming of Differential Equations. Classification of Differential Equations. (Homework,Received date of homework : 9. weel		
51	Final exam.		
52	Final exam.		
53	Midterm exam is given between 7th and 15th weeks.		
54	The Cauchy-Euler Equation.		
55	Reducing the Order of Linear Equations with Variable Coefficients, The Method of Variation of Parameters.		
56	Factoring of the Operator for Linear Equations with Variable Coefficients.		
57	The Inverse Image Method for Solution of Nonhomogeneous Equations with Constant Coefficients.		
58	The Method of Undetermined Coefficients for Solution of Nonhomogeneous Equations with Constant Coefficients.		
59	Higher Order Linear Equations. Solution of Nonhomogeneous Equations with Constant Coefficients.		
60	The Clairauf Equation. The Lagrange Equation.		
61	The Riccati Equation.		
224827	First Order and First Degree Differential Equations. Separable Equations. Equations Reducible to the Separable Case.		
224829	Homogeneous Equations, Equations Reducible to the Homogeneous Case.		
224831	First Order Linear Equations. The Bernoulli Equation.		
224833	Exact Differential Equations. Equations Reducible to the Exact Equation Case.		
224835	The Integrating Factor.		

Course Learning Outcomes

No	Learning Outcomes
C01	Use mathematics as a language of the nature for modelling.
C02	Identify and solve physical events and engineering problems.
C03	Establish relationship between mathematcis and other sciences.
C04	İkinci basamaktan değişken katsayılı lineer diferansiyel denklemleri çözer.
C05	Yüksek basamaktan sabit katsayılı denklemleri çözer.
C06	Laplace dönüşümü yardımıyla diferansiyel denklem çözer.

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.

P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%30
Quizzes	0	%0
Assignment	1	%10
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	15	4	60
Hours for off-the-c.r.stud	0	0	0
Assignments	3	10	30
Presentation	0	0	0
Mid-terms	1	3	3
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	1	3	3
Total Work Load			**96**
ECTS Credit of the Course			**4**

Contribution of Learning Outcomes to Programme Outcomes

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P10	P11
All	1	4									
C01	1	4									
C02	1	4									
C03	1	4									
C04	1	4									
C05	1	4									
C06	1	4									

Karabük University

Faculty of Engineering
Automotive Engineering

MMT213	Dynamics				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
3	MMT213	Dynamics	3	3	3

Mode of Delivery:
Face to Face
Language of Instruction:
Turkish
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Required
Objectives of the Course:
To teach motion of the particles.
Teaching Methods and Techniques:
Principles of Dynamics, Kinematics of Particles, Rectilinear Motion of a Line, Angular Motion of a Line, Plane Curvilinear Motion, Relative Motion in a Plane, Space Curvilinear Motion, Relative Motion in Space, Problems of Kinematics of Particles, Kinetics of Particles-Equation of Motion, Work and Energy, Impulse and Momentum, Centrifugal Force Motion, Problems of Kinetics of Particles
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:
Dr. CİHAN MIZRAK
Assistants:

Recommended or Required Reading

Resources Mechanical Dynamics for Engineers
J.L. MERIAM, Engineering Mechanics- DYNAMICS

Course Category

Mathmatics and Basic Sciences	:	70	**Education**	:	
Engineering	:	30	**Science**	:	
Engineering Design	:		**Health**	:	
Social Sciences	:		**Field**	:	

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Principles of Dynamics		

Course Learning Outcomes

No	Learning Outcomes
C01	Gaining the ability to apply the kinematics to the engineering problems for the particle
C02	Gaining the ability of relative motion to the engineering problems for the particles
C03	Gaining the ability to apply the work-energy principles to the engineering problems for the particle
C04	Gaining the ability to apply the impuls-momentum principles to the engineering problems for the particle

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%40
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	14	3	42
Hours for off-the-c.r.stud	14	4	56
Assignments	0	0	0
Presentation	0	0	0
Mid-terms	1	2	2
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	1	2	2
Total Work Load			**102**
ECTS Credit of the Course			**3**

Contribution of Learning Outcomes to Programme Outcomes

Karabük University

Faculty of Engineering
Automotive Engineering

MMT205	Materials Science				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
3	MMT205	Materials Science	4	3	4

Mode of Delivery:
Face to Face
Language of Instruction:
Turkish
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Required
Objectives of the Course:
To give information about basic materials and material selection. To gain knowledge and application skills about destructive and non-destructive inspection methods in the determination of mechanical and physical properties of materials. To improve the properties of materials and gain information about drawing and interpretation of equilibrium diagrams.
Teaching Methods and Techniques:
Classification of materials, Atomic structure, interatomic bonds, Brafis cage and lattice systems, Crystal mistakes, X-ray analysis method, Allotropy, Mechanical properties of metals, Mechanical tests applied to materials, Publishing, Solidification, Methods of improving properties of metals, Forming mechanisms, Fe-Fe3C equilibrium diagrams, Fe- Fe3C equilibrium diagrams, TTT and equilibrium diagrams, Eutectic, eutectoid and peritectic transformations, Equilibrium diagrams of eutectic systems, Fe
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:

Assistants:
Asist Prof.Dr. Yakup KAYAProf.Dr. Bilge DEMİRAsist Prof.Dr. Harun ÇUĞ

Recommended or Required Reading

Resources	Çeviri Dr. Mehmet Erdoğan, "", 1999

Course Category

Mathmatics and Basic Sciences	:	50	**Education**	:	0
Engineering	:	50	**Science**	:	0
Engineering Design	:		**Health**	:	0
Social Sciences	:	0	**Field**	:	0

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Materials science and engineering, Classification of materials, Material selection and design, Atomic structure, Atomic links,		
2	Crystal and crystal structures, Simple cubic, Surface center cubic, volume center cubic, Heggonal tight packings		
3	Bravis cage and crystal systems, X-ray diffraction pattern, Allotropy		
4	Crystal defects, Zero dimension, One dimensional, two and three dimensional faults, Dislocations		
5	Shaping mechanisms; Slip, twinning, grain boundary shift.		
6	Mechanical properties of materials, Destructive test methods, Tensile, compression and creep test		
7	Impact notch and toughness, bending, fatigue, hardness test methods and fracture		
8	Midterm		
9	Publishing and publishing mechanisms, Publishing and surface finishing methods		
10	Solidification of metals, nucleation and growth of crystals, solidification errors in metals,		
11	Mechanisms for improving the properties of metals Working hardening, Precipitation hardening, Grain hardening, Cold defc		
12	Gibbs phase law, Phase calculations, Evaluation of equilibrium diagrams		
13	Equilibrium diagrams of solid solutions, eutectic, eutectoid, peritectic systems		
14	Eutectic, eutectoid and peritectic transformations on Fe-Fe3C equilibrium diagram and equilibrium diagram		
15	TTT and CCT conversion curves and triple phase diagrams		
16	final exam		
17	final exam		

Course Learning Outcomes

No	Learning Outcomes
C01	Classify engineering materials.
C02	He knows the structure of the material and can explain the ties between the materials.
C03	Know the crystallographic structure, can calculate the atomic occupancy factor.
C04	Classify crystal defects.
C05	Knows and explains the mechanisms of strength enhancement.

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%40
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	0	0	0
Hours for off-the-c.r.stud	0	0	0
Assignments	0	0	0
Presentation	0	0	0
Mid-terms	0	0	0
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	0	0	0
Total Work Load			**0**
ECTS Credit of the Course			**0**

Contribution of Learning Outcomes to Programme Outcomes

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P10	P11
C01	5	5	2			1					
C02	5	5	2			1					
C03	5	5	2			1					
C04	5	5	2			1					
C05	5	5	2			1					

Karabük University

Faculty of Engineering
Automotive Engineering

OMT201	Engine Technologies				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
3	OMT201	Engine Technologies	4	3	4

Mode of Delivery:
Face to Face
Language of Instruction:
Turkish
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Required
Objectives of the Course:
The aim of this course is to introduce the students to the types of motors, to teach the operating systems, to gain the ability to disassemble and install the motors.
Teaching Methods and Techniques:
History of engines. Classification. Cycles. Combustion, efficiency, power. Engine parts. starter system. Ignition system. Fuel systems. Lubrication systems. Cooling systems. Engine malfunctions. Engine renewal. Preparation of revision reports.
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:
Associate Prof.Dr. Mehmet ÇELİK
Assistants:

Recommended or Required Reading

Resources Internal Combustion Engines Nobel Publications
Engine Technology Nobel Publications

Course Category

Mathmatics and Basic Sciences	:	10	**Education**	:	
Engineering	:	10	**Science**	:	10
Engineering Design	:	10	**Health**	:	
Social Sciences	:		**Field**	:	60

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	The history of engines.		Textbook
2	Classification of engines.		Textbook
3	Cycles.		Textbook
4	Combustion, efficiency, power.		Textbook
5	Engine parts.		Textbook
6	Starter system.		Textbook
7	Ignition system.		Textbook
8	Mid-terms		
9	Fuel systems.		Textbook
10	Lubrication systems.		Textbook
11	Cooling systems.		Textbook
12	Engine malfunctions.		Textbook
13	Engine renewal.		Textbook
14	Engine renewal.		Textbook

Recommended Optional Programme Components

AEE4014 Vehicles Manufacturing Systems

Course Learning Outcomes

No	Learning Outcomes
C01	Learns the history, classification and cycles of engines.
C02	Learns combustion and efficiency calculations in engines.
C03	Learns the engine starter system, ignition system, fuel systems, lubrication systems, cooling systems.
C04	Learns engine parts and engine failures.
C05	Learns engine renewal.

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%30
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	1	%20
Project	0	%0
Final examination	1	%50
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	1	10	10
Hours for off-the-c.r.stud	1	10	10
Assignments	0	0	0
Presentation	0	0	0
Mid-terms	1	30	30
Practice	1	20	20
Laboratory	0	0	0
Project	0	0	0
Final examination	1	40	40
Total Work Load			**110**
ECTS Credit of the Course			**4**

Contribution of Learning Outcomes to Programme Outcomes

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P11	P12
C01		3							4		3
C02	2		3		4						
C03				4			4			2	
C04		3				3		4		3	
C05	3					2					3

Karabük University

Faculty of Engineering
Automotive Engineering

MMT203	Strength Of Materials I				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
3	MMT203	Strength Of Materials I	3	3	4

Mode of Delivery:
Face to Face
Language of Instruction:
Turkish
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Required
Objectives of the Course:
This course aims to provide automotive engineering students with the ability to analyze the strength of materials' problems simply and logically and to solve them using the basic principles of mechanics.
Teaching Methods and Techniques:
Introduction, Concept of stress, Stress and deformation under axial loading, Stress and deformation under torsion, Stress and deformation under pure bending, Analysis and design of beams for bending
Prerequisites and co-requisities:

Course Coordinator:
Dr. Özden İŞBİLİR
Name of Lecturers:
Dr. Özden İŞBİLİR
Assistants:

Recommended or Required Reading

Resources Mechanics of Materials, 9th Edition, R.C. Hibbeler, 2013, Pearson, ISBN:978-0133254426,Mechanics of Materials, 6th Edition, Ferdinand P. Beer, E. Russell Johnston Jr., J
Cisimlerin Mukavemeti, 6. Basımdan Çeviri, Ferdinand P. Beer, E. Russell Johnston Jr., John T. Dewolf, David F. Mazurek, Çevirenler: Ayşe Soyuçok, Özgün Soyuçok, Litera

Course Category

Mathmatics and Basic Sciences	:	30	**Education**	:	
Engineering	:	30	**Science**	:	
Engineering Design	:	40	**Health**	:	
Social Sciences	:		**Field**	:	

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Introduction and Concept of Stress- Introduction- A Review of the Methods of Statics- Stresses in the Members of a Structu		
2	Introduction and Concept of Stress- Application to the analysis and design of simplestructures- Stress on an oblique plane-		
3	Stress and Deformation Under Axial Loading- Normal strain under axial loading- Engineering stress-strain diagram- True st		
4	Stress and Deformation Under Axial Loading- Deformation under axial loading- Statically indeterminate cases- Thermal stre		
5	Stress and Deformation Under Axial Loading- Shear stress and deformation- Relation among the material properties- Stress		
6	Torsion- Stresses in a Shaft- Elastic deformation under torsion- Stress in the elastic range		
7	Torsion- Statically indeterminate shafts- Design of shafts- Stress concentrations in shafts		
8	Torsion- Plastic deformations under torsion- Elasto-plastic deformation under torsion- Residual Stresses under torsion		
9	Pure Bending- Deformations in a symmetric member under pure bending- Stresses and deformations in the elastic Range		
10	Pure Bending- Deformations in a transverse cross section- Bending of composite members- Stress concentrations		
11	Pure Bending- Plastic deformation- Elasto-plastic deformation- Residual stresses		
12	Pure Bending- Eccentric axial loading- Unsymmetric bending		
13	Analysis and Design of Beams forBending- Shear and bending moment diagrams- Relations among diagrams		
14	Analysis and Design of Beams forBending- Design of prismatic beams for bending- Nonprismatic beams		

Course Learning Outcomes

No	Learning Outcomes
C01	Explains the stress, types of stress and deformation.
C02	Calculates stresses, elasto-plastic stress and residual stresses under axial loading.
C03	Determines shear stresses and twist angles in shafts under torsion.
C04	Calculates normal stresses in beams exposed to simple bending.
C05	Draws the shear force and the bending moment diagrams along the beam depending on the loading and supports.

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%20
Quizzes	5	%10
Assignment	5	%10
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	14	3	42
Hours for off-the-c.r.stud	12	2	24
Assignments	5	2	10
Presentation	0	0	0
Mid-terms	1	15	15
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	1	20	20
Total Work Load			**111**
ECTS Credit of the Course			**4**

Contribution of Learning Outcomes to Programme Outcomes

	P01	P02	P03	P04	P07
All	5	4	3	5	4
C01	5	4	3	5	4
C02	5	4	3	5	4
C03	5	4	3	5	4
C04	5	4	3	5	4
C05	5	4	3	5	4

Karabük University

Faculty of Engineering
Automotive Engineering

CEC205	Probability and Statistics				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
3	CEC205	Probability and Statistics	2	2	3

Mode of Delivery:
Face to Face
Language of Instruction:
English (%100)
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Required
Objectives of the Course:
To teach basic probability and statistics concepts at an applicable level to the engineering students.
Teaching Methods and Techniques:
Data type, Sampling and collecting data, Frequency tables, Visualizing data, Central tendency measures(mean, mod, median), Dispersion measures(variance and standart deviation), Introduction to probability, Conditional probability and independence, Probability density function, Random variables, expectation, moment generating functions. Distributions(Normal, Binom, Bernoulli, Uniform, Gaussian, Exponential, Poisson, Gamma).
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:
Associate Prof.Dr. İlker Türker
Assistants:

Recommended or Required Reading

Resources: Olasılık ve İstatistik - Prof. Dr. Fikri Akdeniz ,A Modern Introduction to Probability and Statistics - Dekking et al.
Probability and Statistics
Anwar Hossain and Oleg Makhnin

Course Category

Mathmatics and Basic Sciences	:	40	**Education**	:	30
Engineering	:	30	**Science**	:	40
Engineering Design	:	30	**Health**	:	20
Social Sciences	:	0	**Field**	:	20

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Basic concepts and axioms, sets, counting	Reading	Course note
2	Permutation and combination	Reading	Course Note
3	Probability	Reading	Course Note
4	Conditional probability, independence	Reading	Course Note
5	Random variables	Reading	Course Note
6	Continuous and discrete random variables	Obtaining a real-world dataset	Course Note
7	Probability distribution functions of random variables	Reading	Course Note
8	Probability density functions of random variables	Reading	Course Note
9	Midterm Exam	Studying	Course Note
10	Gauss, Binomial distributions	Preparing distribution of a real-world da	Course Note
11	Binomial, Poisson distributions	Reading	Course Note
12	Geometric and negative binomial distributions	Reading	Course Note
13	Expected value	Calculating expected value on a dataset	Course Note
14	Expected values of random variables	Reading	Course Note
15	Central Limit Theorem	Reading	Course Note

Course Learning Outcomes

No	Learning Outcomes
C01	Applies the fundamental concepts of probability and statistics to real-world engineering problems.
C02	Constructs the probability distributions of random variables based on real-life scientific scenarios and data sets, and then uses it to find expectation and variance.
C03	Explains the fundamental concepts of probability theory.
C04	Learns basic probability distributions and applies them to real-world problems

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%40
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	14	3	42
Hours for off-the-c.r.stud	14	5	70
Assignments	0	0	0
Presentation	1	5	5
Mid-terms	1	2	2
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	1	2	2
Total Work Load			**121**
ECTS Credit of the Course			**5**

Contribution of Learning Outcomes to Programme Outcomes

Karabük University

Faculty of Engineering
Automotive Engineering

FOL281	Technical Foreign Language I				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
3	FOL281	Technical Foreign Language I	2	2	2

Mode of Delivery:
Face to Face
Language of Instruction:
English (%100)
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Required
Objectives of the Course:
This course teaches engineering terminology in English and develops text comprehension, writing, reading and listening skills
Teaching Methods and Techniques:
The Concept and Basic definitions of science, technology, engineering, engineer. History of engineering. The methodology of engineering work The concept and steps of scientific method. The concept and steps of engineering design process. Problem solving techniques in engineering. Seven steps to problem solving in engineering. Fields of engineering: Aerospace Engineering,Biological Engineering, Civil Engineering, Computer Engineering, Electrical Engineering, Engineering Science, Financial Engineering,Industrial Engineering, Meterial Engineering, Mechanical Engineering,Military Engineering, Nuclear Engineering, Ocean Engineering,Petroleum Engineering, Reverse Engineering, Geoengineering,Textile Engineering, Safety Engineering
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:

Assistants:
Instructor Emine AYDINAsist Prof.Dr. Hakan TAHTACIProf.Dr. Ahmet DEMİR

Recommended or Required Reading

Resources Oxford English for Electrical and Mechanical Engineering, Oxford University Press, E. H. Glendinning and N. Glendinnig, 1995, The Language of Mechanical Engineering in

Course Category

Mathmatics and Basic Sciences	:	0	**Education**	:	0
Engineering	:	0	**Science**	:	0
Engineering Design	:		**Health**	:	0
Social Sciences	:	100	**Field**	:	0

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	The concept and basic definitions of science, technology, engineering, engineer		
2	History of engineering		
3	Basic methodologies in engineering work		
4	The concept and steps of scientific method		
5	The concept and steps of engineering design process		
6	Problem solving techniques in engineering		
7	Seven steps to problem solving in engineering		
8	Seven steps to problem solving in engineering		
9	Fields of engineering (Aerospace Engineering,Biological Engineering, Civil Engineering)		
10	Fields of engineering (Computer Engineering,Electrical Engineering, Engineering Science)		
11	Fields of engineering (Financial Engineering,Industrial Engineering, Meterial Engineering)		
12	Fields of engineering (Mechanical Engineering,Military Engineering, Nuclear Engineering)		
13	Fields of engineering (Ocean Engineering,Petroleum Engineering, Reverse Engineering)		
14	Fields of engineering (Geoengineering,Textile Engineering, Safety Engineering)		
15	Midterm exam is given between 7th and 15th weeks.		
16	Final Exam		
17	Final Exam		

Course Learning Outcomes

No	Learning Outcomes
C01	Define engineering concept, fields of engineering, technical aspects of them in English language.
C02	Improve their writing, reading and listening skills.
C03	Express themselves orally and in written forms.
C04	Öğrenciler teknik İngilizce metinleri anlama, yazma ve okuma becerilerini geliştirir.

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%30
Quizzes	0	%0
Assignment	1	%10
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	14	2	28
Hours for off-the-c.r.stud	10	1	10
Assignments	1	4	4
Presentation	0	0	0
Mid-terms	1	4	4
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	1	6	6
Total Work Load			**52**
ECTS Credit of the Course			**2**

Contribution of Learning Outcomes to Programme Outcomes

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P10	P11	P12
C01	1			1	2	2	3	3	3	1		
C02	1			1	2	2	3	3	3	1		
C03	1			1	2	2	3	3	3	1		
C04	1			1	2	2	3	3	3	1		

Karabük University

Faculty of Engineering
Automotive Engineering

MMT211	Thermodynamics I				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
3	MMT211	Thermodynamics I	3	3	4

Mode of Delivery:
Face to Face
Language of Instruction:
Turkish
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Required
Objectives of the Course:
Defining basic concepts for understanding the principles of thermodynamics. Transferring basic information about energy and transformations, gaining engineering perspective.
Teaching Methods and Techniques:
Introduction and basic concepts. Energy conversions and general energy analysis. Properties of pure substances. Energy analysis of closed systems. Mass and energy analysis for control volumes.
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:
Prof.Dr. Kamil ArslanDr. Erhan KayabaşıDr. Enes KılınçDr. Abdulrazzak Akroot
Assistants:

Recommended or Required Reading

Resources	Michael J. Moran, Howard N. Shapiro, Daisie D. Boettner, Margaret B. Bailey, "Fundamentals of Engineering Thermodynamics, 7th Edition" Y. A. Çengel and M. A. Boles, Thermodynamics: An Engineering Approach, 5th ed, McGraw-Hill, 2006.

Course Category

Mathmatics and Basic Sciences	:		**Education**	:	
Engineering	:	70	**Science**	:	
Engineering Design	:	30	**Health**	:	
Social Sciences	:		**Field**	:	

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	General information, units and definitions, system, forms of energy, properties of the system, state and balance.		
2	The zeroth law of thermodynamics, temperature, pressure, manometer, barometer and atmospheric pressure.		
3	Ideal gas laws, state changes		
4	Ideal gas laws, state changes		
5	Phase changes, property diagrams and tables of pure substances		
6	Phase changes, property diagrams and tables of pure sunstances		
7	Illustrate the P-v, T-v, and P-T property diagrams and P-v-T surfaces of pure substances		
8	Midterm Exam		
9	Specific heat, Internal energy, enthalpy and specific heat of ideal gases.		
10	Energy analysis of closed systems		
11	Internal energy enthalpy and specific heat of solids and liquids		
12	The principle of conservation of mass		
13	Flow work and fluid energy		
14	Energy analysis of continuous flow open systems		
15	Energy Analysis of Unsteady-Flow Processes		
16	Final Exam		

Course Learning Outcomes

No	Learning Outcomes
C01	Makes calculations about heat and temperature.
C02	Makes calculations related to concepts such as weight, specific gravity, mass, specific mass, pressure and absolute pressure.
C03	Makes calculations related to Ideal Gas Laws.
C04	Makes calculations related to the general equation of gases.
C05	create and analyze mathematical models for open and closed systems using basic conservation laws.

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria		
In-Term Studies	**Quantity**	**Percentage**
Mid-terms	1	%40
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload			
Activities	**Quantity**	**Duration**	**Total Work Load**
Course Duration	14	3	42
Hours for off-the-c.r.stud	14	5	70
Assignments	0	0	0
Presentation	0	0	0
Mid-terms	1	3	3
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	1	3	3
Total Work Load			**118**
ECTS Credit of the Course			**5**

Contribution of Learning Outcomes to Programme Outcomes

Program Learning Outcomes	
No	**Learning Outcome**
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
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P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria		
In-Term Studies	**Quantity**	**Percentage**
Mid-terms	0	%0
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	0	%0
Total		**%0**

ECTS Allocated Based on Student Workload			
Activities	**Quantity**	**Duration**	**Total Work Load**
Course Duration	0	0	0
Hours for off-the-c.r.stud	0	0	0
Assignments	0	0	0
Presentation	0	0	0
Mid-terms	0	0	0
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	0	0	0
Total Work Load			**0**
ECTS Credit of the Course			**0**

Contribution of Learning Outcomes to Programme Outcomes

Karabük University

Faculty of Engineering
Automotive Engineering

AIT182	Atatürk S Principles and History Of Revolutions II				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
4	AIT182	Atatürk S Principles and History Of Revolutions II	2	2	2

Mode of Delivery:
Face to Face
Language of Instruction:
Turkish
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Required
Objectives of the Course:
This course provides the Turkish youth with consciousness about Ataturk's Principles and Revolutions and educates them in accordance with Kemalism.
Teaching Methods and Techniques:
Political Reforms, Legal Reforms, Educational and Cultural Reforms, Economic Reforms, Social Reforms, Atatürk's Principles, Atatürk's Foreign Policy, Turkey in the World War II, The concept of Jeopolitics and Jeopolitics of Turkey.
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:

Assistants:
Prof.Dr. Nurgün KOÇInstructor Yunus GÖKInstructor Mustafa KARACAInstructor Fatma ERTENInstructor Hamza ÜZÜMCÜInstructor Yusuf TEKE

Recommended or Required Reading

Resources 1. Armaoğlu, Fahir. (2004). 20. Yüzyıl Siyasi Tarihi. İstanbul: Alkım Yayınevi.
2. Berkes, Niyazi. (2012). Türkiye'de Çağdaşlaşma. İstanbul: YKY.
3. Candan, Ahme

Course Category

Mathmatics and Basic Sciences	: 0	**Education**	: 0
Engineering	: 0	**Science**	: 0
Engineering Design	:	**Health**	: 0
Social Sciences	: 0	**Field**	: 0

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Revolutions in the field of political: Abolition of the Ottoman Sultanate; Proclamation of the Republic; Abolition of the Calipl		
2	Revolutions in the field of law; Revolutions in the field of education and culture		
3	Revolutions in the field of social life		
4	Revolutions in the field of economy and agriculture		
5	The establishment and development of the constitutional system		
6	Foreign policy and relations of Turkey (Turk foreign policy between 1923 to 1932)		
7	Foreign policy in the period of Republic: The Mosul Question, Exchange of population, Foreign school question, The entran		
8	Foreign policy in the period of Republic: The Balkan Entente, Sadabat Pact, The Montreux Convention of Straits, Hatay Que		
9	Principles of Atatürk: Republicanism, Nationalism, Populism		
10	Principles of Atatürk: Secularism, Etatism, Revolutionism		
11	Supplemental Principles		
12	Turkey after Atatürk		
13	Geopolitic and geopolitical position of Turkey		
14	General evaluation about Atatürk s Principles and History of Revolutions		
15	Mid-Term Exam		
16	Final Exam		
17	Final Exam		

Course Learning Outcomes

No	Learning Outcomes
C01	Appreciate the significance of Turkish Revolution.
C02	Estimate Atatürk's Principles in historical perspective.
C03	List the basic qualifications of Turkish foreign policy.
C04	Assess the recent Turkish history.
C05	Review current developments by comparing them with the historical conditions.

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%40
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	14	2	28
Hours for off-the-c.r.stud	12	1	12
Assignments	0	0	0
Presentation	0	0	0
Mid-terms	1	4	4
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	1	7	7
Total Work Load			**51**
ECTS Credit of the Course			**2**

Contribution of Learning Outcomes to Programme Outcomes

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P10
C01	3	3	1	3		1	1			4
C02	3	3	1	3		1	1			4
C03	3	3	1	3		1	1			4
C04	3	3	1	3		1	1			4
C05	3	3	1	3		1	1			4

Karabük University

Faculty of Engineering
Automotive Engineering

MEE216	Basic Electric and Electronics				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
4	MEE216	Basic Electric and Electronics	2	2	3

Mode of Delivery:
Face to Face
Language of Instruction:
English (%100)
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Required
Objectives of the Course:
The aim of this course is to give basic information about electronic elements and to teach students the structures, working principles and applications of these elements.
Teaching Methods and Techniques:
Electrical Units, series and parallel circuits, avometers and oscilloscope, resistors, capacitors and coils, diode, NPN and PNP type transistors, thyristor and triac, integrated circuits, operational amplifiers, timer integrated circuits.
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:
Prof.Dr. M. Bahattin Çelik
Assistants:

Recommended or Required Reading

Resources Automobile electrical and electoric systems Tom Denton Hodder Headline Group,1995.,Basic Electronics, A. Çolpan H. Vural N. Bölük Ankara 1997.
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Course Category

Mathmatics and Basic Sciences	:	10	**Education**	:	
Engineering	:	40	**Science**	:	
Engineering Design	:	20	**Health**	:	
Social Sciences	:		**Field**	:	30

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Electrical Units, Ohm law, Power, etc.	-	-
2	Series, parallel and mixed circuits	-	-
3	Avometres	-	-
4	Oscilloscope	-	-
5	Resistors	-	-
6	Capacitors and coils	-	-
7	RLC series circuits	-	-
8	Diodes	-	-
9	NPN and PNP type transistors	-	-
10	Studying of various circuits with transistors	-	-
11	Thyristor triac and diac	-	-
12	Operational amplifiers	-	-
13	Timer integrated circuits	-	-
14	Studing on various circuist	-	-

Course Learning Outcomes

No	Learning Outcomes
C01	Students make measurements in vehicles using basic electrical electronics knowledge and measuring instruments.
C02	Recognise the electrical and electronic systems in motor vehicles.
C03	Analysis the electric and electronic circuits.
C04	Perform electronic circuit applications.
C05	Diagnose the electric and electronic problems in the field of automotive engineering by using electrical and electronic knowledge.

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%20
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	1	%20
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	14	2	28
Hours for off-the-c.r.stud	14	4	56
Assignments	0	0	0
Presentation	0	0	0
Mid-terms	1	2	2
Practice	1	10	10
Laboratory	0	0	0
Project	0	0	0
Final examination	1	2	2
Total Work Load			**98**
ECTS Credit of the Course			**3**

Contribution of Learning Outcomes to Programme Outcomes

Karabük University

Faculty of Engineering
Automotive Engineering

OMT212	Manufacturing Processes I				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
4	OMT212	Manufacturing Processes I	4	3	4

Mode of Delivery:
Face to Face
Language of Instruction:
Turkish
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Required
Objectives of the Course:
Understanding of basic principles and capabilities of commonly used manufacturing processes in industry
Teaching Methods and Techniques:
Production of pig iron, cast iron and steel. Production of nonferrous metals. Foundry. Design of cast workparts. Contemporary casting processes, special and die casting. Conventional and modern welding processes. Hot and cold working of metals. Principles of plastic deformation. Powder metallurgy. Machinability, cutting tools; tool life, tool geometry and tool materials. Methods of metal cutting. Turning, milling, shaping, planing, broaching, drilling and grinding operations. Nontraditional machining and other special processes. Engineering metrology and quality control; basic terminology, some measuring instruments and errors of measurement.
Prerequisites and co-requisities:

Course Coordinator:
Prof.Dr. Mustafa GÜNAY
Name of Lecturers:

Assistants:

Recommended or Required Reading

Resources Degarmo, E. P., Black, J. T., Kohser, R. A., Klamecki, B. E. Materials and Processes in Manufacturing. New Jersy: John Wiley & Sons, (2003).,Aydın, M., Yaşar, M., Gavas,

Course Category

Mathmatics and Basic Sciences	:		**Education**	:	0
Engineering	:	40	**Science**	:	20
Engineering Design	:	20	**Health**	:	0
Social Sciences	:	0	**Field**	:	20

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Casting Techniques.		
2	Sand casting, die casting. (Given homework 1, After a week of delivery)		
3	Investment casting, centrifugal casting		
4	Welding: Classification, arc welding (Given homework 2, After a week of delivery)		
5	Welding: Resistance welding, oxy-gas welding, other welding processes		
6	Cold and Hot Working of Metals: Definitions, rolling, forging methods (Given homework 3, After a week of delivery)		
7	Cold and Hot Working of Metals: Extrusion, wire drawing, other plastic methods		
8	Sheet metal working: Drilling / blanking, deep drawing (Given homework 4, After a week of delivery)		
9	Powder Metallurgy: Powder production, pressing, sintering, applications		
10	Machining: Theory, cutting tools		
11	Machining: Chip formation, cutting fluids, machinability (Given homework 5, After a week of delivery)		
12	Machining: Lathe machine and use		
13	Machining: Milling machine and use (Given homework 6, After a week of delivery)		
14	Grinding machine and precision machining methods		
15	Midterm Exam, done between 7 and 15 weeks. Topics forward is taken a week after the exam.		
16	Final Exam		
17	Final Exam		

Course Learning Outcomes

No	Learning Outcomes
C01	Use casting techniques.
C02	Make metal forming.
C03	Apply the methods of machining.
C04	Identify methods of powder metallurgy.
C05	Use measuring devices.
C06	Select the most appropriate manufacturing procedure.
C07	Make basic calculations about manufacturing procedures.
C08	Select the operating parameters to be used for manufacturing procedure.

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%40
Quizzes	0	%0
Assignment	1	%10
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%50
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	14	3	42
Hours for off-the-c.r.stud	14	1	14
Assignments	1	10	10
Presentation	0	0	0
Mid-terms	1	20	20
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	1	25	25
Total Work Load			**111**
ECTS Credit of the Course			**4**

Contribution of Learning Outcomes to Programme Outcomes

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P10	P11	P12
C01	2	4	4	3	3	3	2	2	4	4	3	3
C02	2	4	4	3	3	3	2	2	4	4	3	3
C03	2	4	4	3	3	3	2	2	4	4	3	3
C04	2	4	4	3	3	3	2	2	4	4	3	3
C05	2	4	4	3	3	3	2	2	4	4	3	3
C06	2	4	4	3	3	3	2	2	4	4	3	3
C07	2	4	4	3	3	3	2	2	4	4	3	3
C08	2	4	4	3	3	3	2	2	4	4	3	3

Karabük University

Faculty of Engineering
Automotive Engineering

MMT214	Strength Of Materials II				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
4	MMT214	Strength Of Materials II	3	3	4

Mode of Delivery:
Face to Face
Language of Instruction:
Turkish
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Required
Objectives of the Course:
This course aims to provide mechanical engineering students with the ability to analyze stress and strain components in a structural member under different loading conditions, analyze displacement in a beam, analyze buckling in a column, and design and select suitable structural elements using the principles of mechanics.
Teaching Methods and Techniques:
Shearing Stresses in Beams and Thin-Walled Members, Transformations of Stress and Strain, Principal Stresses under a Given Loading, Deflection of Beams, Columns, Energy Methods.
Prerequisites and co-requisities:

Course Coordinator:
Dr. Özden İŞBİLİR
Name of Lecturers:
Dr. Özden İŞBİLİR
Assistants:

Recommended or Required Reading

Resources Mechanics of Materials, 9th Edition, R.C. Hibbeler, 2013, Pearson, ISBN:978-0133254426,Mechanics of Materials, 6th Edition, Ferdinand P. Beer, E. Russell Johnston Jr., J
Strength of Materials II course notes

Course Category

Mathmatics and Basic Sciences	:	30	**Education**	:	
Engineering	:	30	**Science**	:	
Engineering Design	:	40	**Health**	:	
Social Sciences	:		**Field**	:	

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Shear Stresses in Beams and Thin-Walled Members- Shear force on the horizontal face of a beam- Shear stress on on the l		
2	Shear Stresses in Beams and Thin-Walled Members- Longitudinal shear force on a beam with arbitrary shape- Shearing str		
3	Transformations of Stress and Strain- Transformation of plane stress- Principal stresses, maximum shearing stress- Mohr's		
4	Transformations of Stress and Strain- General state of stress- Application of Mohr's circle to the three-dimensional analysis		
5	Transformations of Stress and Strain- Stresses in thin-walled pressure vessels- Transformation of plane strain- Mohr's circle		
6	Principal Stresses under a Given Loading- Principal stresses in a beam- Design of transmission shafts		
7	Principal Stresses under a Given Loading- Stress analysis under combined loadings		
8	Deflection of Beams- Deformation of a beam under transverse loading- Equation of the elastic curve- Direct determination		
9	Deflection of Beams- Statically indeterminate beams- Method of superposition- Application of superposition to statically ind		
10	Deflection of Beams- Moment-area theorems - Bending-moment diagrams by parts- Use of moment-area theorems with st		
11	Columns- Stability of structures- Euler's formula		
12	Columns- Eccentric Loading; the Secant Formula- Design of Columns under a Centric Load- Design of Columns under an Ec		
13	Energy Methods- Strain energy- Elastic strain energy for normal stresses- Elastic strain energy for shear stresses- Strain en		
14	Energy Methods- Impact loading- Calculation of deflection using work and energy method- Calculation of deflection using C		

Recommended Optional Programme Components

MMT102 Statics
MMT203 Strength Of Materials I

Course Learning Outcomes

No	Learning Outcomes
C01	Defines stress and strain components on structural members in various directions.
C02	Determines stress and strain components under combined loading.
C03	Determines the equation of the elastic curve of a beam using different methods.
C04	Calculates buckling of a column and analyze stability.
C05	Solves mechanics problems using different energy methods.
C06	Designs and selects structural components under various loading conditions.

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%20
Quizzes	5	%10
Assignment	5	%10
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	14	3	42
Hours for off-the-c.r.stud	14	2	28
Assignments	5	1	5
Presentation	0	0	0
Mid-terms	1	15	15
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	1	20	20
Total Work Load			**110**
ECTS Credit of the Course			**4**

Contribution of Learning Outcomes to Programme Outcomes

Karabük University

Faculty of Engineering
Automotive Engineering

MEE222	Numerical Analysis				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
4	MEE222	Numerical Analysis	2	2	3

Mode of Delivery:
Face to Face
Language of Instruction:
English (%100)
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Required
Objectives of the Course:
To have students gain the ability of 1.Computing errors in numerical methods, 2.Solving non-linear equation systems, 3.Solving linear equation systems, 4.Computing diveded differences tables, 5.Solving interpolation problems, 6.Solving derivation and integration problems with mumerical analysis methods
Teaching Methods and Techniques:
The representation of number in computer system. Error concept, Taylor and Mclauren Series, Convergency methods to nonlinear equation system Lineer equation systems, Diveded difference, interpolation,Backward interpolation, Numerical derivative, Numerical integration, Euler, Taylor ve Runge-Kutta methods.
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:
Dr. Mehmet Bakırcı
Assistants:

Recommended or Required Reading

Resources	Numerical Methods for Engineers Seventh Edition by Steven C. Chapra and Raymond,Yakowitz S., Szidarovszky F.,An Introduction to Numerical Computations, Macmillan, Numerical Methods for Engineers Seventh Edition by Steven C. Chapra and Raymond

Course Category

Mathmatics and Basic Sciences	:	80	**Education**	:	
Engineering	:	20	**Science**	:	
Engineering Design	:		**Health**	:	
Social Sciences	:		**Field**	:	

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Review of Calculus: Limits and Continuity, Differentiability, Integral, Taylor Polynomial and Series		1. Richard Burden, Douglas Faires, Num
2	Round-off Errors and Computer Arithmetic		1. Richard Burden, Douglas Faires, Num
3	The Bisection Method, The Newton's Method		1. Richard Burden, Douglas Faires, Num
4	Fixed-Point Iteration Method		1. Richard Burden, Douglas Faires, Num
5	The Jacobi and Gauss-Siedel Iterative Techniques		1. Richard Burden, Douglas Faires, Num
6	Interpolation and the Lagrange Polynomial		1. Richard Burden, Douglas Faires, Num
7	Interpolation and Divided Differences		1. Richard Burden, Douglas Faires, Num
8	Midtern exam		1. Richard Burden, Douglas Faires, Num
9	Cubic Spline Interpolation, Least Squares Approximation		1. Richard Burden, Douglas Faires, Num
10	Numerical Differentiation, Richardson's Extrapolation		1. Richard Burden, Douglas Faires, Num
11	Numerical Integration, the Trapezoidal and Simpson's Rule, Romberg Integration		1. Richard Burden, Douglas Faires, Num
12	The Elementary Theory of Initial-Value Problems, Euler's Method		1. Richard Burden, Douglas Faires, Num
13	Higher-Order Taylor Methods, Runge-Kutta Methods		1. Richard Burden, Douglas Faires, Num
14	Final exam		1. Richard Burden, Douglas Faires, Num

Course Learning Outcomes

No	Learning Outcomes
C01	Perform error analysis.
C02	Calculate the roots of nonlinear equations.
C03	Compute numerical derivative and integration.
C04	Develop and Implement algorithms for numerical solutions of engineering problems.
C05	Apply numerical methods to engineering problems.

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%40
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	14	2	28
Hours for off-the-c.r.stud	14	2	28
Assignments	14	2	28
Presentation	0	0	0
Mid-terms	1	2	2
Practice	0	0	0
Laboratory	14	1	14
Project	0	0	0
Final examination	1	2	2
Total Work Load			**102**
ECTS Credit of the Course			**3**

Contribution of Learning Outcomes to Programme Outcomes

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P10	P11	P12
C01	5	5	3	3	3	3	3	3	3	3	3	5
C02	5	4	3	3	3	3	3	3	3	3	3	5
C03	5	3	3	3	3	3	3	3	3	3	3	5
C04	5	3	3	3	3	3	3	3	3	3	3	5
C05	5	3	3	3	3	3	3	3	3	3	3	5

Karabük University

Faculty of Engineering
Automotive Engineering

MMT212	Measurement Technique				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
4	MMT212	Measurement Technique	3	2	4

Mode of Delivery:
Face to Face
Language of Instruction:
Turkish
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Required
Objectives of the Course:
To teach students the principles of measurement technique and to gain measurement skills.
Teaching Methods and Techniques:
The measurement and control. The measurement techniques. Measurement of the size, angle and area. Classic measuring and control devices. Caliper, micrometer, marking gauge, comparator, indicator, gage. Surface roughness. Hardness measurement techniques. Coordinate measuring. Measurement of viscosity, speed, torque, power and vibration. Pressure, flow and temperature measuring. Energy productivity. Uncertainty analysis. Design and reporting of the experiments.
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:
Prof.Dr. M. Bahattin Çelik
Assistants:

Recommended or Required Reading

Resources Holman, J.P., Experimental Methods for Engineers, McGraw-Hill International Edition, Seventh Edition, 2001.
-
-
-
-

Course Category

Mathmatics and Basic Sciences	:	30	**Education**	:	
Engineering	:	30	**Science**	:	10
Engineering Design	:	10	**Health**	:	
Social Sciences	:		**Field**	:	20

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	The description of the measurement and control. The measurement techniques.	-	-
2	Measurement devices of the size, angle, area, and measurement process.	-	-
3	Classic measurement and control devices:Caliper, micrometer and marking gauge.	-	-
4	Comparator, indicator and gage.	-	-
5	The description of surface roughness and surface roughness measurement device	-	-
6	Hardness measurement techniques.	-	-
7	Coordinate measurement device.	-	-
8	Measurements of viscosity, speed, torque, power and vibration.	-	-
9	Pressure measurement. Devices used and their functions.	-	-
10	Flow measurement. Relevant devices and their functions.	-	-
11	Temperature measurement. Devices used and their functions.	-	-
12	Energy productivity devices.	-	-
13	Uncertainty analysis.	-	-
14	Design and reporting of the experiments. Presentation of the reports.	-	-

Course Learning Outcomes

No	Learning Outcomes
C01	Upon successful completion of this course, students/learners will be able to: Obtain the measurement ability in experimental studies
C02	Define the speed, torqu and power measurement techniques.
C03	Analyze the experimental data.
C04	compute the uncertainty analysis for experimental studies.
C05	report the experimental results.

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%40
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	14	3	42
Hours for off-the-c.r.stud	9	5	45
Assignments	0	0	0
Presentation	0	0	0
Mid-terms	1	2	2
Practice	0	0	0
Laboratory	3	3	9
Project	0	0	0
Final examination	1	2	2
Total Work Load			**100**
ECTS Credit of the Course			**4**

Contribution of Learning Outcomes to Programme Outcomes

	P01	P02	P03	P04	P05	P06	P07	P08	P12
C01	3		2	3		4	1	1	3
C02		2		3	1			4	1
C03	2	1		3		4	2		3
C04			3		4		2	1	
C05	3	2			3	2		2	4

Karabük University

Faculty of Engineering
Automotive Engineering

OMT204	Vehicle Technologies				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
4	OMT204	Vehicle Technologies	3	2	4

Mode of Delivery:
Face to Face
Language of Instruction:
Turkish
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Required
Objectives of the Course:
The aim of this course is to introduce powertrain structure, operation and design and to teach analysis and calculations of forces in powertrain.
Teaching Methods and Techniques:
Occupational safety and security measures, vehicle arrangements, clutches, gearboxes, Flexible joints and propeller shafts, Axles and differentials, tires and wheels, steering system, brake system, suspension system.
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:
Associate Prof.Dr. Selami SAĞIROĞLU
Assistants:

Recommended or Required Reading

Resources

Çetinkaya, S., Taşıt Mekaniği, 2013, Nobel Yayınevi, ISBN 978-605-133-463-9.
1. Abdullah Demir Lecture notes (https://www.abdullahdemir.net/ders-notlari/)
2. Hillier VAW, Fundemantels of Motor Vehicle Technology, 1991, The Bath Press, Avon, UK. ISBN 0 7487 0531 7.
3. Heisler H., Vehicle and Engine Technology, 1999, Edward Arnold Press, London, UK. , , 0000.

Course Category

Mathmatics and Basic Sciences	:	20	**Education**	:	
Engineering	:	50	**Science**	:	
Engineering Design	:	10	**Health**	:	
Social Sciences	:		**Field**	:	20

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Occupational safety and security measures, Vehicle regulations, Classification of vehicles		
2	Clutches, structure, parts, classification		
3	Gearboxes, gear principles, structure, classification, synchronous assembly.		
4	Automatic gearboxes, Cvt, double shaft gearboxes		
5	Flexible joints, shafts		
6	Axle and differentials		
7	Electronically controlled differential systems		
8	Tires and wheels		
9	Steering system, structure, operation, classification		
10	Hydraulic and electric assisted steering systems		
11	Brake system		
12	Hydraulic and compressed air assisted braking systems		
13	Suspension system, springs and shock absorbers		
14	Independent front and rear suspension systems		

Course Learning Outcomes

No	Learning Outcomes
C01	1. Defines vehicle technology, structure, operation and design
C02	Calculate gear ratios in driveline.
C03	Writes reports and makes presentations according to the rules
C04	Makes design and analysis using technological methods such as computer and computer software
C05	Understand and apply the importance of lifelong learning
C06	It deals with contemporary issues and values professional ethical responsibility

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%40
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	14	2	28
Hours for off-the-c.r.stud	14	3	42
Assignments	0	0	0
Presentation	0	0	0
Mid-terms	0	0	0
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	14	3	42
Total Work Load			**112**
ECTS Credit of the Course			**4**

Contribution of Learning Outcomes to Programme Outcomes

	P01	P05	P10
C02	4		
C03			3
C04	3	4	

Karabük University

Faculty of Engineering
Automotive Engineering

FOL282	Technical Foreign Language II				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
4	FOL282	Technical Foreign Language II	2	2	2

Mode of Delivery:
Face to Face
Language of Instruction:
English (%100)
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Required
Objectives of the Course:
In global world ,it is too important following developed technology and new acedemic studies.By this lecture, the students can learn technical English and this enables to beter understand of acedemic issue or new design techonology. Furthermore , their translation and communication skills can improve by this way.
Teaching Methods and Techniques:
Basic technical terms of mechatronic engineering, systems engineering, operations research, computer engineering, hardware and network software engineering, metallurgical engineering, iron and steel casting, ceramic engineering, mechanical engineering, mechatronics and mechanic,electrical engineering, automotive engineering in English
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:

Assistants:
Instructor Volkan AYDIN

Recommended or Required Reading

Resources Oxford English for Electrical and Mechanical Engineering, Oxford University Press, E. H. Glendinning and N. Glendinnig, 1995, The Language of Mechanical Engineering in

Course Category

Mathmatics and Basic Sciences	:	0	**Education**	:	0
Engineering	:	0	**Science**	:	0
Engineering Design	:	0	**Health**	:	0
Social Sciences	:	100	**Field**	:	0

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Basic technical terms of industrial engineering in English		
2	Basic technical terms of systems engineering in English		
3	Basic technical terms of operations research in English		
4	Basic technical terms of computer engineering in English		
5	Basic technical terms of hardware and network engineering in English		
6	Basic technical terms of software engineering in English		
7	Basic technical terms of metallurgical engineering in English		
8	Basic technical terms of iron and steel casting in English		
9	Basic technical terms of ceramic engineering in English		
10	Basic technical terms of mechanical engineering in English		
11	Basic technical terms of mechatronics and mechanic in English		
12	Basic technical terms of hydromechanic and hydrolic machines in English		
13	Basic technical terms of electrical engineering in English		
14	Basic technical terms of automotive engineering in English		
15	Midterm exam is given between 7th and 15th weeks.		
16	Final Exam		
17	Final Exam		

Course Learning Outcomes

No	Learning Outcomes
C01	Use different occupational terms
C02	Demostrate presentation skills by learning technological development with literature searching.
C03	Translate text from English to Turkish and from Turkish to English.

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%30
Quizzes	0	%0
Assignment	1	%10
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	14	2	28
Hours for off-the-c.r.stud	10	1	10
Assignments	1	4	4
Presentation	0	0	0
Mid-terms	1	4	4
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	1	6	6
Total Work Load			**52**
ECTS Credit of the Course			**2**

Contribution of Learning Outcomes to Programme Outcomes

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P10	P11
C01							3	3			
C02							3	3			
C03							3	3			

Karabük University

Faculty of Engineering
Automotive Engineering

MMT220	Thermodynamics II				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
4	MMT220	Thermodynamics II	3	3	4

Mode of Delivery:
Face to Face
Language of Instruction:
Turkish
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Required
Objectives of the Course:
To teach the concepts of second law such as energy quality, entropy and exergy. To teach the second law analysis. To teach the application of the laws of thermodynamics to power and cooling cycles.
Teaching Methods and Techniques:
Clausius inequality and the definition of entropy, the principle of the increase of entropy, entropy balance for closed and open systems. Adiabatic yields. Pure substances, liquids and solids, and entropy exchange of ideal gases. Exergy, second law analysis. Gas power cycles (Otto, Diesel, Stirling, Ericsson, Brayton), steam power cycles (Rankine), Cogeneration, combined gas-steam power cycles. Refrigeration cycles (vapor compression, gaseous, absorption and thermoelectric), heat pumps.
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:
Dr. Erhan KayabaşıProf.Dr. Kamil ArslanDr. Enes Kılınç
Assistants:

Recommended or Required Reading

Resources M.T. Moran and H.N. Shapiro, Fundamentals of Engineering Thermodynamics
Y.A. Çengel and M.A. Boles, "Thermodynamics: An engineering approach 5th edition", McGraw-Hill, New York.

Course Category

Mathmatics and Basic Sciences	:	30	**Education**	:	
Engineering	:	70	**Science**	:	
Engineering Design	:		**Health**	:	
Social Sciences	:		**Field**	:	

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Entropy		
2	Entropy		
3	Exergy		
4	Exergy		
5	Exergy Balance		
6	Gas power cycles		
7	Gas power cycles		
8	Midterm Exam		
9	Steam power cycles		
10	Steam power cycles		
11	Combined Power Cycles		
12	Combined Power Cycles		
13	Refrigeration cycles		
14	Refrigeration cycles		
15	Heat pumps		
16	Final Exam		
17	Final Exam		

Course Learning Outcomes

No	Learning Outcomes
C01	Calculate and interpret the second law efficiency of thermodynamics.
C02	Knows cooling and power systems in detail.
C03	Can make thermodynamic analysis in theoretical and real cycles.
C04	Can apply exergy model to power cycles.

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%40
Quizzes	0	%0
Assignment	2	%10
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%50
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	14	3	42
Hours for off-the-c.r.stud	10	4	40
Assignments	2	10	20
Presentation	0	0	0
Mid-terms	0	0	0
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	1	3	3
Total Work Load			**105**
ECTS Credit of the Course			**4**

Contribution of Learning Outcomes to Programme Outcomes

Program Learning Outcomes	
No	**Learning Outcome**
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria		
In-Term Studies	**Quantity**	**Percentage**
Mid-terms	0	%0
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	0	%0
Total		**%0**

ECTS Allocated Based on Student Workload			
Activities	**Quantity**	**Duration**	**Total Work Load**
Course Duration	0	0	0
Hours for off-the-c.r.stud	0	0	0
Assignments	0	0	0
Presentation	0	0	0
Mid-terms	0	0	0
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	0	0	0
Total Work Load			**0**
ECTS Credit of the Course			**0**

Contribution of Learning Outcomes to Programme Outcomes

Karabük University

Faculty of Engineering
Automotive Engineering

MMT301	Fluid Mechanics I				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
5	MMT301	Fluid Mechanics I	3	3	3

Mode of Delivery:
Face to Face
Language of Instruction:
Turkish
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Required
Objectives of the Course:
To introduce basic properties and importance of fluids in engineering applications. To teach and apply basic methods employed for analysis of engineering problems involving fluids.
Teaching Methods and Techniques:
Introduction fundamental concepts and fluid properties. Description and classification of fluid motion. Fluid statics. Buoyancy and stability. Concepts of system and control volume. Derivation and application of basic equations in integral form for a control volume. Motion of fluid elements (kinematics).
Prerequisites and co-requisities:

Course Coordinator:
Prof.Dr. Kamil ARSLAN
Name of Lecturers:
Dr. Ali CAN
Assistants:

Recommended or Required Reading

Resources Introduction to Fluid Mechanics, D. F. Young, B. R. Munson, T. H. Okiishi and W.W. Huebsch, John Wiley & Sons, Inc.,Fluid Mechanics Fundamentals and Applications, Y

Course Category

Mathmatics and Basic Sciences	:	30	**Education**	:	0
Engineering	:	50	**Science**	:	10
Engineering Design	:	10	**Health**	:	0
Social Sciences	:	0	**Field**	:	0

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	INTRODUCTION: Definition of fluid, fluid mechanics in engineering, scope of fluid mechanics, methods of analysis, dimensi		
2	INTRODUCTION: Definition of fluid, fluid mechanics in engineering, scope of fluid mechanics, methods of analysis, dimensi		
3	FUNDAMENTAL CONCEPTS: Definition of continuum, fluid as a continuum, velocity field, timeline,pathline, streakline and st		
4	FUNDAMENTAL CONCEPTS: Definition of continuum, fluid as a continuum, velocity field, timeline,pathline, streakline and st		
5	FUNDAMENTAL CONCEPTS: Viscosity, Newtonian and non-Newtonian fluids, vapor pressure and surface tension, descriptio		
6	FUNDAMENTAL CONCEPTS: Viscosity, Newtonian and non-Newtonian fluids, vapor pressure and surface tension, descriptio		
7	FLUID STATICS: The basic equation of fluid statics, analysis of hydrostatic force on plane submerged surfaces.		
8	FLUID STATICS: Analysis of hydrostatic force on curved submerged surfaces. Buoyancy and stability.		
9	FLUID STATICS: Analysis of hydrostatic force on curved submerged surfaces. Buoyancy and stability.		
10	FLUID STATICS: Analysis of fluids in rigid-body motion.		
11	FLUID STATICS: Analysis of fluids in rigid-body motion.		
12	DIFFERENTIAL ANALYSIS OF FLUID MOTION: Derivation of continuity equation. Stream function for two-dimensional incor		
13	DIFFERENTIAL ANALYSIS OF FLUID MOTION: Derivation of continuity equation. Stream function for two-dimensional incor		
14	DIFFERENTIAL ANALYSIS OF FLUID MOTION: Motion of fluid elements (kinematics), derivation of momentum equation.		

Course Learning Outcomes

No	Learning Outcomes
C01	Understanding of basic fluid properties and fundamental concepts of the fluid mechanics.
C02	Derivation and application of governing equation of fluid statics, and prediction of resultant hydrostatic force acting on submerged surfaces.
C03	Information about fluid particle motion (kinematic)

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%30
Quizzes	0	%0
Assignment	3	%10
Attendance	0	%0
Practice	7	%0
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	14	3	42
Hours for off-the-c.r.stud	14	1	14
Assignments	3	2	6
Presentation	0	0	0
Mid-terms	1	2	2
Practice	7	2	14
Laboratory	0	0	0
Project	0	0	0
Final examination	1	2	2
Total Work Load			**80**
ECTS Credit of the Course			**3**

Contribution of Learning Outcomes to Programme Outcomes

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P10	P11
All	4	5	3	1	2	1		1			1

Karabük University

Faculty of Engineering
Automotive Engineering

MMT327	Computer Aided Design				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
5	MMT327	Computer Aided Design	3	3	4

Mode of Delivery:
Face to Face
Language of Instruction:
English (%100)
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Elective
Objectives of the Course:
The main objective of this course is to teach the students the basics of AutoCAD programme in 2D and 3D.
Teaching Methods and Techniques:
This course is about learning a CAD software programme to be able to draw in 2 dimension. In this course the students will learn AutoCAD sofware programme to learn how to draw an architectural drawing or any other 2 and 3 dimensional drawings.
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:
Dr. Mehmet Erdi Korkmaz
Assistants:

Recommended or Required Reading

Resources Rooney Joe and Steadman P. Principles Of Computer Aided Design. UCL Press Ltd, The Open University, 1994 ISBN 1-85728-222-1, Library classmark T 353 P7 Shah J.J.
Rooney Joe and Steadman P. Principles Of Computer Aided Design. UCL Press Ltd, The Open University, 1994 ISBN 1-85728-222-1, Library classmark T 353 P7 Shah J.J.

Course Category

Mathmatics and Basic Sciences	:	20	**Education**	:	0
Engineering	:	30	**Science**	:	0
Engineering Design	:	30	**Health**	:	0
Social Sciences	:	0	**Field**	:	20

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Introduction, general information about CAD, basic drawing commands		
2	Layers, editing commands		
3	Drawing a simple floor plan		
4	Drawing a simple floor plan		
5	Block editor, Wblock, Hatch settings		
6	Block editor, Wblock, Hatch settings		
7	Text, Dimensions		
8	Plotting techniques, array, align, fillet		
9	Drawing section example		
10	Keyboard shortcut settings		
11	Dynamic blocks		
12	Dynamic blocks		
13	Layout sheets		
14	Presentation techniques		

Course Learning Outcomes

No	Learning Outcomes
C01	To use dimensions on an architectural drawing.
C02	To create Traditional Architectural Design Process steps in Digital Environment,
C03	To gain knowledge about 2D digital media
C04	To gain knowledge about 3D digital media

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%40
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	14	3	42
Hours for off-the-c.r.stud	14	5	70
Assignments	0	0	0
Presentation	0	0	0
Mid-terms	1	7	7
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	1	10	10
Total Work Load			**129**
ECTS Credit of the Course			**5**

Contribution of Learning Outcomes to Programme Outcomes

Karabük University

Faculty of Engineering
Automotive Engineering

DEG301	Values Education				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
5	DEG301	Values Education	2	2	2

Mode of Delivery:
Face to Face
Language of Instruction:
Turkish
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Elective
Objectives of the Course:
This course aims at providing some general information and evaluation about concepts of morals and values, literature on morals in terms of religion and philosphy, processes of getting values, models of values education and values of Turkish society.
Teaching Methods and Techniques:
The meaning of value, Definations of value and morals, brief literature on morals in terms of religion and philosophy,models of values education, schools and values education, development of ethics and character in child, values of Turkish National Education, teaching of values in schools, Values of Turkish society. Our individual values, our social values. Value erosion.
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:
Prof.Dr. M. Bahattin ÇELİK
Assistants:

Recommended or Required Reading

Resources

Hamdi Kızıler, Değerler Eğitimi, KBÜ yayınları, 2019.,Inglehard, R., Human Values and Social Changes, Leiden: Brill, 2003.
Inglehard, R., Human Values and Social Changes, Leiden: Brill, 2003.
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Course Category

Mathmatics and Basic Sciences	:	10	**Education**	:	30
Engineering	:	0	**Science**	:	0
Engineering Design	:	0	**Health**	:	0
Social Sciences	:	60	**Field**	:	0

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	The Meaning of Concept of Value The Significance of Values Education	-	-
2	The content of the values aducation		
3	The Source of Values and the Influential Factors in the Formation Process: Religion, Family and Society.	-	-
4	Culture, Education and Media.	-	-
5	Role Model in the Formation of Values. Impact of Values on Character Training	-	-
6	Individual Values (Humility, Forgiveness, Being Scientific, Courage, Generosity, Honesty, Friendship, Sensitivity, Trustworth	-	-
7	Individual Values (Credibility, Modesty, Tolerance, Virtue, Righteousness, Mercy, Hospitality, Moderation, the Spirit of Shari	-	-
8	Individual Values (Patience, Simplicity, Sincerity, Respect, Exchange Greetings, Love, Truthfulness, Thanksgiving, Thriftines	-	-
9	Social Values (Justice, Family, Freedom, Peace, Solidarity and Consciousness of Democracy).	-	-
10	Social Values (Public Consciousness of Earth's Environment, Aesthetics, Being a Ghazi, Brotherhood, Martyrdom, Public Cor	-	-
11	Erosion of Values and its Reflections Individual Reflections (Violence, Murder and Suicide, Drug Addiction, Sexuality, Ostrac	-	-
12	Erosion of Values and its Reflections Social Reflections (the Destruction of Traditional Family Structure and Alienation)	-	-
13	Erosion of Values and its Reflections Global Reflections (Social and Economic Injustice, Education and Health Inequalities)	-	-
14	Reflections on Islamic World. Reflections of Western World.	-	-

Course Learning Outcomes

No	Learning Outcomes
C01	The student realizes his own values.
C02	It forms its own value system.
C03	Understands the importance of the concept of value.
C04	Students understand that values for peace and tranquility should be respected in society.
C05	The student knows that there is a conflict environment and injustice in societies that do not protect their values.

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%40
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	14	2	28
Hours for off-the-c.r.stud	4	4	16
Assignments	0	0	0
Presentation	0	0	0
Mid-terms	1	2	2
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	1	2	2
Total Work Load			**48**
ECTS Credit of the Course			**2**

Contribution of Learning Outcomes to Programme Outcomes

	P08	P09	P10
All	3	5	3
C01	4	4	2
C02	4	4	2
C03	4	4	2
C04	5	5	4
C05	3	4	2

Karabük University

Faculty of Engineering
Automotive Engineering

OMT399	Industrial Practice I				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
5	OMT399	Industrial Practice I	0	0	4

Mode of Delivery:
Face to Face
Language of Instruction:
Turkish
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Required
Objectives of the Course:
Provided sufficient practical work in the field of application.
Teaching Methods and Techniques:
Predominantly working in the field of computer systems in a government agencies or private organizations which provide services in industrial practice
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:

Assistants:
Associate Prof.Dr. İbrahim ÇAYIROĞLU

Recommended or Required Reading

Resources Possessed resources during learning preriod,

Course Category

Mathmatics and Basic Sciences	:	30	**Education**	:	0
Engineering	:	30	**Science**	:	0
Engineering Design	:		**Health**	:	0
Social Sciences	:	10	**Field**	:	0

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Recognition of the plant		
2	Studies in relevant department		
3	Studies in relevant department		
4	Work experience		
5	Work experience		
6	Work experience		
7	Work experience		
8	Work experience		
9	Work experience		
10	Work experience		
11	Work experience		
12	Work experience		
13	Work experience		
14	Work experience		
15	Midterm exam is given between 7th and 15th weeks.		
16	Final Exam		
17	Final Exam		

Course Learning Outcomes

No	Learning Outcomes
C01	Providing industrial services in the field of computer systems and will have sufficient practical background in the field of practice.
C02	[illegible]
C03	To gain the ability of utilization of tecniques and modern means for engineering applications.
C04	To gain the ability of working in a interdisciplinary teams.
C05	To recognize the required knowledge about factory organization.

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	0	%0
Quizzes	0	%0
Assignment	1	%50
Attendance	0	%0
Practice	1	%50
Project	0	%0
Final examination	0	%0
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	0	0	0
Hours for off-the-c.r.stud	0	0	0
Assignments	1	16	16
Presentation	0	0	0
Mid-terms	0	0	0
Practice	4	34	136
Laboratory	0	0	0
Project	0	0	0
Final examination	0	0	0
Total Work Load			**152**
ECTS Credit of the Course			**5**

Contribution of Learning Outcomes to Programme Outcomes

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P10	P11	P12
C01	4	4	4	4	4	3	4	3	4	2	1	2
C02	4	4	4	4	4	3	4	3	4	2	1	2
C03	4	4	4	4	4	3	4	3	4	2	1	2
C04	4	4	4	4	4	3	4	3	4	2	1	2
C05	4	4	4	4	4	3	4	3	4	2	1	2

Karabük University

Faculty of Engineering
Automotive Engineering

MMT339	Energy Management				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
5	MMT339	Energy Management	3	3	4

Mode of Delivery:
Face to Face
Language of Instruction:
English (%100)
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Elective
Objectives of the Course:
Imparting fundamental knowledge on Energy Management
Teaching Methods and Techniques:
General definitions / General Energy Situation of Turkey and the world / General Structure of the Turkish Industry / Energy Management Principles / Energy Savings Study Methods / Energy Accounting / Measurement, Instrumentation and Process Control / Insulation / Combustion Systems of Boiler / Calculation of Boiler Efficiency / Steam Generation and Distribution Systems / Heat recovery from condensate and blowdown / Waste Heat and Environmental Impact
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:
Prof.Dr. Emrah DENİZ
Assistants:

Recommended or Required Reading

Resources Sustainable Energy Management,-

Course Category

Mathmatics and Basic Sciences	:	20	**Education**	:	
Engineering	:	60	**Science**	:	
Engineering Design	:		**Health**	:	
Social Sciences	:		**Field**	:	20

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	General definitions		
2	General Energy Situation of Turkey and the world / General Structure of the Turkish Industry		
3	Energy Management Principles		
4	Energy Savings Study Methods / Energy Accounting		
5	Measurement, Instrumentation and Process Control		
6	Insulation		
7	Combustion Systems of Boiler		
8	Midterm		
9	Efficiency Calculations in Boilers		
10	Steam Generation and Distribution Systems		
11	Steam Generation and Distribution Systems		
12	Heat recovery from condensate and blowdown		
13	Heat recovery from condensate and blowdown		
14	Waste Heat and Environmental Impact		
15	Final		

Course Learning Outcomes

No	Learning Outcomes
C01	Students shall gain knowledge on energy efficiency and sustainability.
C02	To gain knowledge of energy audit.
C03	To gain knowledge on importance of measurement.
C04	To gain knowledge on importance of energy efficiency.
C05	To gain knowledge on importance of heat recovery systems.

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria		
In-Term Studies	**Quantity**	**Percentage**
Mid-terms	1	%40
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload			
Activities	**Quantity**	**Duration**	**Total Work Load**
Course Duration	14	3	42
Hours for off-the-c.r.stud	14	5	70
Assignments	0	0	0
Presentation	0	0	0
Mid-terms	1	3	3
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	1	3	3
Total Work Load			**118**
ECTS Credit of the Course			**5**

Contribution of Learning Outcomes to Programme Outcomes

Karabük University

Faculty of Engineering
Automotive Engineering

CEC303	Engineering Economics				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
5	CEC303	Engineering Economics	2	2	3

Mode of Delivery:
Face to Face
Language of Instruction:
English (%100)
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Required
Objectives of the Course:
The aim is to evaluate alternatives through performing different economic evaluation methods.
Teaching Methods and Techniques:
Relationships between Time and Money, Assessment of Engineering Project Alternatives, Breakeven Analysis, Internal Rate of Return, Benefit/Cost Analysis
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:
Dr. Çağrı SEL
Assistants:

Recommended or Required Reading

Resources	Okka, O. (2006). Mühendislik Ekonomisi (4. Baskı). Ankara: Nobel Yayınevi.,Leland Blank, Anthony Tarquin, "Engineering Economy", McGraw-Hill, 2012. ,William G. Sulli
	1.Leland Blank, Anthony Tarquin, "Engineering Economy", McGraw-Hill, 2012. 2. William G. Sullivan, Elin M. Wicks, James T. Luxhoj, "Engin

Course Category

Mathmatics and Basic Sciences	:	30	**Education**	:	
Engineering	:	30	**Science**	:	30
Engineering Design	:	10	**Health**	:	
Social Sciences	:		**Field**	:	

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Basic Concepts in Engineering Economy		
2	Time Value of Money I: Simple and Compound Interest; Effective and Nominal Interest		
3	Time Value of Money II: Formulation		
4	Comparison between Alternatives I: Present Worth Analysis		
5	Comparison between Alternatives II: Annual Worth Analysis		
6	Case Study I		
7	Benefit/Cost Analysis		
8	Internal Rate of Return Analysis		
9	Case Study II		
10	Breakeven Analysis		
11	Tax and Depreciation		
12	Replacement Analysis I		
13	Uncertainty and Risk Analysis		
14	Case Study III		

Course Learning Outcomes

No	Learning Outcomes
C01	Establish relationship between money and time,
C02	Assess alternatives in terms of financial values,
C03	Execute feasibility study

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%20
Quizzes	1	%8
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	1	%12
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	14	3	42
Hours for off-the-c.r.stud	14	3	42
Assignments	0	0	0
Presentation	0	0	0
Mid-terms	0	0	0
Practice	0	0	0
Laboratory	0	0	0
Project	6	5	30
Final examination	1	5	5
Total Work Load			**119**
ECTS Credit of the Course			**4**

Contribution of Learning Outcomes to Programme Outcomes

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P10	P11	P12
All	2	4	1	1	1	1	1	1	1	1	1	1
C01	2	4	1	1	1	1	1	1	1	1	1	1
C02	2	4	1	1	1	1	1	1	1	1	1	1
C03	2	4	1	1	1	1	1	1	1	1	1	1

Karabük University

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Automotive Engineering

MSD305	Entrepreneurship				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
5	MSD305	Entrepreneurship	2	2	2

Mode of Delivery:
Face to Face
Language of Instruction:
Turkish
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Elective
Objectives of the Course:
To introduce set-up and development as well as knowledge of entrepreneurship on the historical and society level. The course offers students a good arena to understand what entrepreneurship is and if it is something for them.
Teaching Methods and Techniques:
The course introduces the students to the preceding and early phases of an enterprise. It provides the students with basic ideas about entrepreneurial orientation, opportunity recognition
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:

Assistants:
Prof.Dr. Yakup SEKMENAsist Prof.Dr. Celalettin BAYKARA

Recommended or Required Reading

Resources Çetindamar, Dilek, (2002) Türkiyede Girişimcilik, TÜSİAD Yayınları(Yayın No:TÜSİAD-T/2002-12/340,

Course Category

Mathmatics and Basic Sciences	:	0	**Education**	:	0
Engineering	:	0	**Science**	:	0
Engineering Design	:		**Health**	:	0
Social Sciences	:	100	**Field**	:	0

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Descriptionof the role of entrepreneurship.		
2	Research in the discipline of business.		
3	Research in the discipline of business.		
4	Nature of entrepreneurship.		
5	Entrepreneurial orientation.		
6	Entrepreneurial orientation.		
7	Entrepreneurial orientation.		
8	Development of an enterprise.		
9	Development of an enterprise.		
10	Development of an enterprise.		
11	Development of an enterprise.		
12	Launching a new venture.		
13	Launching a new venture.		
14	Stories on Enterpreneurship.		
15	Midterm exam is given between 7th and 15th weeks.		
16	Final Exam		
17	Final Exam		

Course Learning Outcomes

No	Learning Outcomes
C01	Describe the role of entrepreneurship research in the discipline of business.
C02	Comprehend the nature of entrepreneurship, entrepreneurship and entrepreneurial orientation.
C03	Comprehend entrepreneurship on EU and national level.
C04	Clarify and apply the basics of launching a new venture.
C05	Apply financial planing and product planing in the business plane.
C06	İş Planı İçinde Uretim Planları öğrenilir.

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%35
Quizzes	0	%0
Assignment	1	%5
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	14	2	28
Hours for off-the-c.r.stud	10	1	10
Assignments	1	4	4
Presentation	0	0	0
Mid-terms	1	4	4
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	1	6	6
Total Work Load			**52**
ECTS Credit of the Course			**2**

Contribution of Learning Outcomes to Programme Outcomes

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P10	P11	P12
C01		1	1				2	1	2	2	2	1
C02		1	1				2	1	2	2	2	1
C03		1	1				2	1	2	2	2	1
C04		1	1				2	1	2	2	2	1
C05		1	1				2	1	2	2	2	1
C06		1	1				2	1	2	2	2	1

Karabük University

Faculty of Engineering
Automotive Engineering

MMT305	Heat Transfer				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
5	MMT305	Heat Transfer	4	4	4

Mode of Delivery:
Face to Face
Language of Instruction:
Turkish
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Required
Objectives of the Course:
The aim of this course is to teach students the basics of conduction, convection and radiation heat transfer and to provide students to solve basic heat transfer problems using analytical solution techniques, feature tables, and related graphics.
Teaching Methods and Techniques:
Heat transfer mechanisms, general heat conduction equation, steady heat conduction, thermal resistance concept, heat transfer from finned surfaces, transient heat conduction, heat convection, and heat radiation.
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:
Prof.Dr. Kamil ARSLANDr. Enes KILINÇDr. Ali CAN
Assistants:

Recommended or Required Reading

Resources

Y. A. Çengel ve A. J. Ghajar, Isı ve Kütle Transferi: Esaslar ve Uygulamalar, 4. Basımdan Çeviri, Çeviri Editörü: Vedat Tanyıldızı, Palme Yayınevi, 2019. ,Y. A. Çengel and A
Y. A. Çengel ve A. J. Ghajar, Isı ve Kütle Transferi: Esaslar ve Uygulamalar, 4. Basımdan Çeviri, Çeviri Editörü: Vedat Tanyıldızı, Palme Yayınevi, 2019.
Y. A. Çengel and A. J. Ghajar, Heat and Mass Transfer: Fundamentals and Applications, 6th Ed., McGraw-Hill, 2020.
F. P. Incropera and D. P. DeWitt, Fundamentals of Heat and Mass Transfer, 6th Ed., John Wiley, 2007.

Course Category

Mathmatics and Basic Sciences	:	30	**Education**	:	
Engineering	:	50	**Science**	:	
Engineering Design	:	20	**Health**	:	
Social Sciences	:		**Field**	:	

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Introduction and basic concepts, heat transfer mechanisms: conduction, convection, and radiation.	-	-
2	One dimensional and general heat conduction equation.	-	-
3	Boundary and initial conditions, steady heat conduction in plane walls.	-	-
4	Thermal resistance concept and thermal resistance networks.	-	-
5	Heat conduction in cylinders and spheres.	-	-
6	Heat transfer from finned surfaces.	-	-
7	Transient heat conduction, lumped system analysis.	-	-
8	Midterm exam.	-	-
9	Transient heat conduction in large plane walls, long cylinders and spheres with spatial effects.	-	-
10	Fundamentals of convection.	-	-
11	External forced convection.	-	-
12	Internal forced convection.	-	-
13	Natural convection.	-	-
14	Fundamentals of thermal radiation.	-	-
15	Radiation heat transfer.	-	-

Course Learning Outcomes

No	Learning Outcomes
C01	Learns heat transfer mechanisms.
C02	Derives general heat conduction equations and reduces these equations to one and two dimensional heat transfer problems.
C03	Determines the boundary conditions for heat conduction problems and solves steady one-dimensional heat conduction problems.
C04	Gains knowledge about continuous heat conduction.
C05	Learns convection heat transfer.
C06	Learns fundamentals of radiation heat transfer.

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%40
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	14	4	56
Hours for off-the-c.r.stud	14	3	42
Assignments	0	0	0
Presentation	0	0	0
Mid-terms	1	2	2
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	1	3	3
Total Work Load			**103**
ECTS Credit of the Course			**4**

Contribution of Learning Outcomes to Programme Outcomes

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P10	P11	P12
All	4	4	2	4	3	1	1	2	1	2	1	1
C01	4	4	1	4	3	1	1	2	1	2	1	1
C02	4	4	2	4	1	1	1	2	1	2	1	1
C03	4	4	2	4	1	1	1	2	1	2	1	1
C04	4	4	2	4	2	1	1	1	1	2	1	1
C05	4	4	2	4	2	1	1	1	1	2	1	1
C06	4	4	2	4	2	1	1	1	1	2	1	1

Karabük University

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Automotive Engineering

MSD307	Communication Skills				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
5	MSD307	Communication Skills	2	2	2

Mode of Delivery:
Face to Face
Language of Instruction:
Turkish
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Elective
Objectives of the Course:
It is to give students the ability to communicate easily with other people and to make them understand the rules of behavior.
Teaching Methods and Techniques:
Communication, Purpose and Importance of Communication, Communication Process and Elements: Source / Transmitter, Message / Message, Channel / Gutter / Tool, The Concept of Effective Communication, Expressing Yourself Correctly, Listening to the Other Effective and Interestingly, Obstacles to Effective Communication, The Concept of Listening Types, Attitudes and Social Effects, Empathy Skill and Empathic Communication, Persuasive Communication, Persuasion Processes, Nonverbal Communication Skills, Body Language Concept and Basic Principles, Gesture and Mimics, Eye Contact and Chroxemia, Use of Personal Spaces / Proxemia and Use of Space, Behavior Rules in Social Life, Manners and Courtesy, Verbal / Nonverbal Communication Art and Applications.
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:
Prof.Dr. M. Bahattin Çelik
Assistants:

Recommended or Required Reading

Resources	Stubbs, Ron ve Hogan, Kevin, Etkili İletişimin Önündeki 8 Engel, İstanbul, Yakamoz Kitap, Çev. Özge Meliha Düzgün, 2012.,Taylor S.E., L.A.Peplau ve D.O. Sears Social Ps

Course Category

Mathmatics and Basic Sciences	:	0	**Education**	:	10
Engineering	:	0	**Science**	:	0
Engineering Design	:		**Health**	:	0
Social Sciences	:	90	**Field**	:	0

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Communication, Purpose and Importance of Communication.		
2	Communication Process and Its Elements: Source / Transmitter, Message / Message, Channel / Gutter / Vehicle.		
3	The Concept of Effective Communication, Expressing Yourself Correctly, Listening to Others Effectively and With Interest.		
4	Barriers to Effective Communication.		
5	The Concept of Listening, Types of Listening.		
6	Attitudes and Social Influences.		
7	Empathy Skill and Empathic Communication.		
8	Persuasive Communication, Persuasion Processes.		
9	Nonverbal Communication Skills, Non-Verbal Communication Channels.		
10	The Concept of Body Language and Its Basic Principles, Gestures and Mimics.		
11	Eye Contact and Chroxemia.		
12	Use of Personal Space / Proxemia and Space Use.		
13	Social Behavior Rules, Manners and Courtesy.		
14	Verbal / Nonverbal Communication Art and Applications.		

Course Learning Outcomes

No	Learning Outcomes
C01	Understands the basics and elements of communication.
C02	Expresses himself correctly and listens effectively.
C03	The student empathizes while communicating.
C04	Uses body language in communication.
C05	Knows and applies the rules of etiquette and courtesy in social life.

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%40
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	14	2	28
Hours for off-the-c.r.stud	10	1	10
Assignments	0	0	0
Presentation	0	0	0
Mid-terms	1	2	2
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	1	2	2
Total Work Load			**42**
ECTS Credit of the Course			**2**

Contribution of Learning Outcomes to Programme Outcomes

	P06	P09	P10
C01	4	1	4
C02	1	5	2
C03	5	2	3
C04	1	3	5
C05	3	3	2

Karabük University

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MSD301	Labor Law				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
5	MSD301	Labor Law	2	2	2

Mode of Delivery:
Face to Face
Language of Instruction:
Turkish
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Elective
Objectives of the Course:
To teach the basic concepts of labor law and employee-employer rights, basic properties of syndicates.
Teaching Methods and Techniques:
Individual Labour law: Concept of Labour Law, Sections of labour law, sources of labour law, Basics of labour law: employee, employer relationships, workplace, plant, Labor contracts and kinds, labour contracts making
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:

Assistants:
Asist Prof.Dr. Celalettin BAYKARA

Recommended or Required Reading

Resources Elder L. Richard P. 2003, Analytical Thinking,

Course Category

Mathmatics and Basic Sciences	:	0	**Education**	:	0
Engineering	:	0	**Science**	:	0
Engineering Design	:		**Health**	:	0
Social Sciences	:	100	**Field**	:	0

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Subject of Labor Law, basic concepts and history		
2	Application fields of individual labor law		
3	Labor contract, kinds and application		
4	Labor contract, kinds and application		
5	End of labor contract		
6	Results of end of labor contract		
7	Working regulation		
8	Specifically protected groups		
9	social security of labor		
10	Short term insurances		
11	Long term insurances		
12	Social security of free workers		
13	Social security of free workers		
14	Risk groups based on labor law		
15	Midterm exam is given between 7th and 15th weeks.		
16	Final Exam		
17	Final Exam		

Course Learning Outcomes

No	Learning Outcomes
C01	Explain labor law concepts
C02	Define concepts of labor safety and security
C03	Recognize employee-employer relationships
C04	Modify labour safest and job security
C05	Recognize labor contracts and kinds, labor contracts making
C06	İş sözleşmeleri nasıl yapılacağını açıklayabilir.

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%35
Quizzes	0	%0
Assignment	1	%5
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	14	2	28
Hours for off-the-c.r.stud	10	1	10
Assignments	1	4	4
Presentation	0	0	0
Mid-terms	1	4	4
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	1	6	6
Total Work Load			**52**
ECTS Credit of the Course			**2**

Contribution of Learning Outcomes to Programme Outcomes

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P10	P11	P12
C01									2	3	2	
C02									2	3	2	
C03									2	3	2	
C04									2	3	2	
C05									2	3	2	
C06									2	3	2	

Karabük University

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Automotive Engineering

OMD305	Occupational Health and Safety I				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
5	OMD305	Occupational Health and Safety I	2	2	2

Mode of Delivery:
Face to Face
Language of Instruction:
Turkish
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Required
Objectives of the Course:
Understand the importance of occupational health and safety in the context of the right to live. Emphasizing the importance of occupational health and safety in terms of employers and employees and presenting them in a structure combining theory and practice.
Teaching Methods and Techniques:
Basic concepts about Occupational Health and Safety (OHS). Basic working areas of ergonomics. Occupational safety concept. Causes of work accidents, prevention models, calculation of costs, investigation and reporting. Concept of occupational disease, types, prevention methods. Occupational safety methods in workshops and laboratories. Personal protectors and machine protectors. Fire and explosion prevention methods. Principles and objectives of first aid. OHS Legislation.
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:
Instructor İsmail TOPRAK
Assistants:

Recommended or Required Reading

Resources	Dal, J., Ergonomics For beginners, Taylor Francis, 2001.,Kroemer, K., Kroemer, H., Kroemer-Elbert, K., Ergonomics, Prentice Hall, 2nd Ed., 2000.,Kroemer, K., Office Ergo

Course Category

Mathmatics and Basic Sciences	:	0	**Education**	:	0
Engineering	:	0	**Science**	:	0
Engineering Design	:	0	**Health**	:	0
Social Sciences	:	10	**Field**	:	0

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Introduction to occupational health and safety.		
2	Fundamentals of occupational health and safety.		
3	Factors that are harmful in the workplace.		
4	Occupational safety management systems.		
5	Chemical risk factors.		
6	Physical risk factors.		
7	Biological risk factors.		
8	Material Safety Data Sheets and Preparation.		
9	Occupational accidents and prevention policies.		
10	Risk assessment and analysis methods.		
11	Risk assessment and analysis methods.		
12	Explosions and fires: Types of combustion and fire.		
13	Types of explosion and explosion.		
14	Preparing emergencies and emergency action plan.		

Course Learning Outcomes

No	Learning Outcomes
C01	Define basic concepts related to occupational health and safety.
C02	Express the importance of occupational health and safety in the framework of the right to live.
C03	Apply legal rules and principles to existing occupational health and safety disputes.
C04	Analyze occupational health and safety problems.
C05	Can solve problems related to occupational health and safety in the workplace.
C06	Learns the principles and objectives of first aid.

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%40
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	14	2	28
Hours for off-the-c.r.stud	12	1	12
Assignments	0	0	0
Presentation	0	0	0
Mid-terms	1	4	4
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	1	6	6
Total Work Load			**50**
ECTS Credit of the Course			**2**

Contribution of Learning Outcomes to Programme Outcomes

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P10	P11
All	5	5	5	5	5	5	5	5	5	5	5

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MSD311	Crucial Analytical Thought Tech.				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
5	MSD311	Crucial Analytical Thought Tech.	2	2	2

Mode of Delivery:
Face to Face
Language of Instruction:
Turkish
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Elective
Objectives of the Course:
The aim of this lecture is to educate student to think in a critical way.
Teaching Methods and Techniques:
Definitions, brain as the thinking organ, Grouping thinking, optional thinking and properties, Critical and Analytical thinking.
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:
Undefined Dekanlık
Assistants:

Recommended or Required Reading

Resources Elder L., Richard P., "", 2003

Course Category

Mathmatics and Basic Sciences	:	0	**Education**	:	0
Engineering	:	0	**Science**	:	0
Engineering Design	:		**Health**	:	0
Social Sciences	:	100	**Field**	:	0

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	What is the critical and analytical thinking		
2	The brain: Organ of thought		
3	Classification of thinking		
4	The properties of voluntary and involuntary thinking		
5	The methods of voluntary and involuntary thinking		
6	Content of critical and analytical thinking		
7	Stages of critical and analytical thinking		
8	Stages of critical and analytical thinking		
9	Factors affecting critical and analytical thinking		
10	How should critical and analytical thinking be done		
11	The problem solving in critical and analytical thinking		
12	Development problem solving strategies in critical and analytical thinking		
13	Application problem solving strategies in critical and analytical thinking		
14	Providing solution to problems in critical and analytical thinking		
15	Midterm exam is given between 7th and 15th weeks.		
16	Final Sınavı Final exam		
17	Final exam		

Course Learning Outcomes

No	Learning Outcomes
C01	Ability for CAT.
C02	Increaing communication skills.
C03	Having info of CAT.
C04	CAT applications.
C05	CAT applications at mechanical engineering.
C06	Learning of thinking of voluntary.

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%40
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	14	2	28
Hours for off-the-c.r.stud	10	1	10
Assignments	1	4	4
Presentation	0	0	0
Mid-terms	1	4	4
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	1	6	6
Total Work Load			**52**
ECTS Credit of the Course			**2**

Contribution of Learning Outcomes to Programme Outcomes

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P10	P11	P12
C01								3		4	2	
C02								3		4	2	
C03								3		4	2	
C04								3		4	2	
C05								3		4	2	
C06								3		4	2	

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MMT303	Machine Elements I				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
5	MMT303	Machine Elements I	3	3	3

Mode of Delivery:
Face to Face
Language of Instruction:
Turkish
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Required
Objectives of the Course:
The ability of understanding basic static and streght information, classifying machine elements with their properties, understanding working mechanisms of systems, Selectinh the proper mechine element.
Teaching Methods and Techniques:
General concepts, Fatigue, Material selection, Riveted, welded, soldered connections. Force and torque load. Connectivity and power screws. Shafts. Two-dimensional analysis. Anchor bolts, springs. Oils, sliding and rolling bearings. The worm gears, helical and worm gear. Couplings and clutches. Belt - pulley systems. Chain - gear mechanisms. Friction gears.
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:

Assistants:
Associate Prof.Dr. İbrahim ÇAYIROĞLU

Recommended or Required Reading

Resources • Makine Elemanları Mustafa Akkurt,Cilt I-II, Birsen Yayınevi, İstanbul, 2005. • Makine Elemanları ve Konstrüksiyon Örnekleri Fatih C. Babalık,Uludağ Üni, 1997,

Course Category

Mathmatics and Basic Sciences	:	30	**Education**	:	0
Engineering	:	30	**Science**	:	0
Engineering Design	:		**Health**	:	0
Social Sciences	:	0	**Field**	:	0

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	General concepts		
2	Fatigue		
3	Material selection		
4	Riveted, welded and soldered joints		
5	Force and torque load shafts.		
6	Screws		
7	Two-dimensional analysis		
8	Wedges and springs		
9	Friction and oils		
10	Sliding and rolling bearings		
11	Gears and worm gear mechanisms		
12	Couplings, clutches and brakes		
13	V - belt mechanisms (Giving Project 1, Turn 16 week)		
14	Chain mechanism, friction wheels (Giving Project 2, Turn 16 week)		
15	Midterm Exam, done between 7 and 15 weeks. Topics forward is taken a week after the exam.		
16	Final exam week		
17	Final exam week		

Course Learning Outcomes

No	Learning Outcomes
C01	Identify machine components and systems.
C02	Chose machine elements together with the manufacturing and desing stages.
C03	Describe welding, soldering, adhesive bonded and riveted connections.
C04	Recongize elements using in shaft-hub, pins and pin connections.
C05	Do bolt sizing and connections calculations
C06	Recognize friction, lubrication.
C07	Describe sliding bearings and rolling bearings.
C08	Describe worm gears, wormsystems,couplings, brakes, clutches, mechanisms of belt pulley.
C09	Calculate on the chain mechanisms and friction wheels

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%40
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	14	3	42
Hours for off-the-c.r.stud	14	2	28
Assignments	0	0	0
Presentation	0	0	0
Mid-terms	1	8	8
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	1	16	16
Total Work Load			**94**
ECTS Credit of the Course			**4**

Contribution of Learning Outcomes to Programme Outcomes

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MMT307	Mechanisms				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
5	MMT307	Mechanisms	3	3	3

Mode of Delivery:
Face to Face
Language of Instruction:
Turkish
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Required
Objectives of the Course:
Solving the problems of mechanisms with the basic principles of kinematics.
Teaching Methods and Techniques:
Mechanism Technique Main Concepts, Element Pairs, Kinematic Chains, Degrees of Freedom, Mobility, Four Bar Mechanism and Grashoff's Theorem, Binding Angles, Velocities and Accelerations, Cam Mechanisms, Motion Charts, Profiles Determination of Cam, Cam mechanisms and constructions, mechanisms, Power Transmission, Special Mechanisms
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:
Associate Prof.Dr. İsmail ESEN
Assistants:

Recommended or Required Reading

Resources Makina Teorisi,(Mekanizmalar ve Makina Dinamiği),Özgür Turhan,Nobel Yayın Dağıtım ,Makine Teorisi 1 Mekanizma Tekniği / Eres Söylemez, Birsen Yayınevi,Mechanisms,

Course Category

Mathmatics and Basic Sciences	:	20	**Education**	:	
Engineering	:	50	**Science**	:	10
Engineering Design	:	10	**Health**	:	
Social Sciences	:		**Field**	:	10

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Introduction to the main concepts of pairs of elements.		
2	According to the classification of construction of mechanisms, four bar linkage, slider-crank mechanism.		
3	Arm-slide mechanism, kinematics, kinematic chain, the definitions of degrees of freedom .		
4	Applications.		
5	Grubler Criteria and determining the degree of freedom of mechanisms, kinematic chain .		
6	Grashof's theorem and four-bar mechanisms.		
7	Applications.		
8	Midterm 1.		
9	Slider-Crank Mechanism, Inverted Slider-Crank Mechanism.		
10	Slider-Crank Mechanism, Inverted Slider-Crank Mechanism.		
11	Vector Loop Equations, Raven's Method, The Freudenstein Equation.		
12	Vector Loop Equations, Raven's Method, The Freudenstein Equation.		
13	General planar motion velocity and acceleration.		
14	General planar motion velocity and acceleration .		
15	Final exam.		

Course Learning Outcomes

No	Learning Outcomes
C01	To ensure the selection, development and design skills of a machine, part or process, the expected performance, manufacturing characteristics, affordability and efficiency
C02	To learn mechanism to analyze the problems encountered.
C03	To learn engineering design and analysis, such as computer software and modern methods of achieving the ability to use modern engineering techniques and knowledge
C04	To learn determination of the mechanisms in terms of high efficiency.
C05	Solving mechanism problems based on basic principles.

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%20
Quizzes	0	%0
Assignment	1	%20
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	14	3	42
Hours for off-the-c.r.stud	13	1,50	19,50
Assignments	1	12	12
Presentation	0	0	0
Mid-terms	1	2	2
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	1	2	2
Total Work Load			**77,50**
ECTS Credit of the Course			**3**

Contribution of Learning Outcomes to Programme Outcomes

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P10	P11	P12
All	3	4	5	4	4	4	4	5	5	5	3	5
C01	2	4	3	4	4	4	4	3	3	3	5	3
C02	4	4	3	4	4	5	5	5	3	3	3	5
C03	3	4	5	5	4	4	3	3	3	5	3	4
C04	2	5	3	5	4	5	5	3	3	5	3	5
C05	2	4	4	3	4	4	4	3	5	3	3	3

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OMT303	Engine Dynamics				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
5	OMT303	Engine Dynamics	3	3	4

Mode of Delivery:
Face to Face
Language of Instruction:
Turkish
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Elective
Objectives of the Course:
To enable automotive students to understand the kinematics and dynamics of piston engines and to strengthen their knowledge. Graphical solution methods used in solving more difficult problems facilitate students' understanding of these issues that were not included in previous lessons.
Teaching Methods and Techniques:
Piston engine kinematics. Inertia forces, gas forces and moments of rotating and translational masses affecting the engine. Variation of engine torque and torque dependent on crank angle. The forces and moments to be balanced in the engine, static and dynamic balance, 1st and 2nd order inertia forces and moments, analysis of forces and moments affecting engine balance. Definition and types of vibration, vibrations affecting the engine.
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:
Associate Prof.Dr. Mehmet ÇELİK
Assistants:

Recommended or Required Reading

Resources	Heisler, H., "Vehıcle and Engine Technology",1999

Course Category

Mathmatics and Basic Sciences	:		**Education**	:	
Engineering	:	100	**Science**	:	
Engineering Design	:		**Health**	:	
Social Sciences	:		**Field**	:	

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Piston engine kinematics, calculation of piston path, velocity and acceleration according to crank angle, piston travel, veloc		
2	Piston engine kinematics, calculation of piston path, velocity and acceleration according to crank angle, piston travel, veloc		
3	Piston engine kinematics, calculation of piston path, velocity and acceleration according to crank angle, piston travel, veloc		
4	Calculation of inertia forces, gas forces and moments of rotating and shifting masses affecting the engine by defining mass		
5	Calculation of inertia forces, gas forces and moments of rotating and shifting masses affecting the engine by defining mass		
6	Calculation of inertia forces, gas forces and moments of rotating and shifting masses affecting the engine by defining mass		
7	Calculation of inertia forces, gas forces and moments of rotating and shifting masses affecting the engine by defining mass		
8	Engine rotational force dependent on crank angle, energy stored in flywheel, flywheel calculation, gyroscopic force, inertial		
9	Engine rotational force dependent on crank angle, energy stored in flywheel, flywheel calculation, gyroscopic force, inertial		

Course Learning Outcomes

No	Learning Outcomes
C01	Can calculate the piston travel, velocity and acceleration depending on the crank angle.
C02	Analyze the forces and moments affecting the crank connecting rod mechanism depending on the crank angle.
C03	Define the function of the flywheel and calculate the flywheel.
C04	Analyze the forces and moments that affect engine balance.
C05	Can make basic analysis about vibration.

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%40
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	14	3	42
Hours for off-the-c.r.stud	5	5	25
Assignments	5	5	25
Presentation	0	0	0
Mid-terms	1	10	10
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	1	10	10
Total Work Load			**112**
ECTS Credit of the Course			**4**

Contribution of Learning Outcomes to Programme Outcomes

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P10	P11	P12
All	4	4	5	5	4	5	4	5	4	4	5	4

Karabük University

Faculty of Engineering
Automotive Engineering

MSD303	Patent and Industrial Design				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
5	MSD303	Patent and Industrial Design	2	2	2

Mode of Delivery:
Face to Face
Language of Instruction:
Turkish
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Elective
Objectives of the Course:
This course explores intellectual property rights, patent application for the industrial design and its examination, rights derived from industrial patents, protection of the rights of designer and patent owners, and international agreements. This course is to train student's capacity in the thinking, method, and skill in industrial design. It is expected that the students will be able to understand and grasp the logic of design process for industrial artefacts.
Teaching Methods and Techniques:
Introduction to intellectual property rights, Product design and development, Industrial design, General provisions, Patent application for the industrial design and its examination. Industrial design patent, Rights derived from industrial patents, Industrial design use, Protection of the rights of designer and patent owners, International agreements, Examination of sample patents, Preparation of a sample patent.
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:

Assistants:
Asist Prof. Dr. Cemal ÖZCAN

Recommended or Required Reading

Resources Eric Baker, "", Chronicle Books, 1990,Jim Lesko, "", 2007,Richard Stim Attorney, "", 2012

Course Category

Mathmatics and Basic Sciences	:	0	**Education**	:	0
Engineering	:	80	**Science**	:	0
Engineering Design	:		**Health**	:	0
Social Sciences	:	10	**Field**	:	0

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Introduction to intellectual property rights		
2	Product design and development		
3	Industrial design		
4	General provisions		
5	Patent application for the industrial design and its examination		
6	Industrial design patent		
7	Rights derived from industrial patents		
8	Industrial design use		
9	Protection of the rights of designer and patent owners		
10	International agreements		
11	Examination of sample patents I		
12	Examination of sample patents II		
13	Preparation of a sample patent I		
14	Preparation of a sample patent II		
15	Mid-term exam for this course is done between 7-15th weeks. The weekly course schedule is postponed a week for the ex		
16	Final Exam		
17	Final Exam		

Course Learning Outcomes

No	Learning Outcomes
C01	Explain quality and manufacturing relations in design
C02	Express design strategies.
C03	Classify technology production and R&D studies.
C04	Invent new idea and compose a product.
C05	Evaluate Industrial design and patent.

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%20
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	1	%20
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	14	2	28
Hours for off-the-c.r.stud	10	1	10
Assignments	1	4	4
Presentation	0	0	0
Mid-terms	4	1	4
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	1	6	6
Total Work Load			**52**
ECTS Credit of the Course			**2**

Contribution of Learning Outcomes to Programme Outcomes

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P10	P11	P12
C01				3		4			4		4	
C02				3		4			4		4	
C03				3		4			4		4	
C04				3		4			4		4	
C05				3		4			4		4	

Karabük University

Faculty of Engineering
Automotive Engineering

MMT343	Project Design Principles				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
5	MMT343	Project Design Principles	2	1	2

Mode of Delivery:
Face to Face
Language of Instruction:
Turkish
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Required
Objectives of the Course:
The aim of this course is to teach students the basics of conduction, convection and radiation heat transfer and to provide students to solve basic heat transfer problems using analytical solution techniques, feature tables, and related graphics.
Teaching Methods and Techniques:
Heat transfer mechanisms, general heat conduction equation, steady heat conduction, thermal resistance concept, heat transfer from finned surfaces, transient heat conduction, heat convection, and heat radiation.
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:
Prof.Dr. Kamil ARSLANDr. Enes KILINÇ
Assistants:

Recommended or Required Reading

Resources

F. P. Incropera and D. P. DeWitt, Fundamentals of Heat and Mass Transfer, 6th Ed., John Wiley, 2007. ,Y. A. Çengel ve A. J. Ghajar, Isı ve Kütle Transferi: Esaslar ve Uyg
Y. A. Çengel ve A. J. Ghajar, Isı ve Kütle Transferi: Esaslar ve Uygulamalar, 4. Basımdan Çeviri, Çeviri Editörü: Vedat Tanyıldızı, Palme Yayınevi, 2019.
Y. A. Çengel and A. J. Ghajar, Heat and Mass Transfer: Fundamentals and Applications, 6th Ed., McGraw-Hill, 2020.
F. P. Incropera and D. P. DeWitt, Fundamentals of Heat and Mass Transfer, 6th Ed., John Wiley, 2007.

Course Category

Mathmatics and Basic Sciences	:	30	**Education**	:	
Engineering	:	50	**Science**	:	
Engineering Design	:	20	**Health**	:	
Social Sciences	:		**Field**	:	

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Introduction and basic concepts, heat transfer mechanisms: conduction, convection, and radiation.	-	-
2	One dimensional and general heat conduction equation.	-	-
3	Boundary and initial conditions, steady heat conduction in plane walls.	-	-
4	Thermal resistance concept and thermal resistance networks.	-	-
5	Heat conduction in cylinders and spheres.	-	-
6	Heat transfer from finned surfaces.	-	-
7	Transient heat conduction, lumped system analysis.	-	-
8	Midterm exam.	-	-
9	Transient heat conduction in large plane walls, long cylinders and spheres with spatial effects.	-	-
10	Fundamentals of convection.	-	-
11	External forced convection.	-	-
12	Internal forced convection.	-	-
13	Natural convection.	-	-
14	Fundamentals of thermal radiation.	-	-
15	Radiation heat transfer.	-	-

Course Learning Outcomes

No	Learning Outcomes
C01	Learns heat transfer mechanisms.
C02	Derives general heat conduction equations and reduces these equations to one and two dimensional heat transfer problems.
C03	Determines the boundary conditions for heat conduction problems and solves steady one-dimensional heat conduction problems.
C04	Gains knowledge about continuous heat conduction.
C05	Learns convection heat transfer.
C06	Learns fundamentals of radiation heat transfer.

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%40
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	14	4	56
Hours for off-the-c.r.stud	14	3	42
Assignments	0	0	0
Presentation	0	0	0
Mid-terms	1	2	2
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	1	3	3
Total Work Load			**103**
ECTS Credit of the Course			**4**

Contribution of Learning Outcomes to Programme Outcomes

Karabük University

Faculty of Engineering
Automotive Engineering

MMT321	Refrigeration Technology				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
5	MMT321	Refrigeration Technology	3	3	4

Mode of Delivery:
Face to Face
Language of Instruction:
Turkish
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Elective
Objectives of the Course:
Students learn to cooling methods, cooling systems, cooling system components and refrigerants.
Teaching Methods and Techniques:
Cooling methods, basic mechanical refrigeration systems, cooling system, auxiliary elements, refrigerants and oils, household-type coolers.
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:
Prof.Dr. Emrah DENİZ
Assistants:

Recommended or Required Reading

Resources 1: KARADENİZ Y.,HOROZ İ.,COŞKUN S.,"Soğutma Tekniği ve Uygulamaları", 2: ÖZKOL N.,"Uygulamalı Soğutma Tekniği", TMMOB Makine Mühendisleri Odası 115 No'lu Ya
1: KARADENİZ Y.,HOROZ İ.,COŞKUN S.,"Soğutma Tekniği ve Uygulamaları", 2: ÖZKOL N.,"Uygulamalı Soğutma Tekniği", TMMOB Makine Mühendisleri Odası 115 No'lu Ya

Course Category

Mathmatics and Basic Sciences	: 25		**Education**	:	
Engineering	: 25		**Science**	: 20	
Engineering Design	: 30		**Health**	:	
Social Sciences	:		**Field**	:	

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Definition of Refrigeration Cycles and Basic Concepts		
2	Thermodynamics II. Law and the Reverse Carnot Cycle		
3	Steam Compressed Cooling Systems		
4	Superheating and Overcooling in Vapor Compression Refrigeration Systems		
5	Progressive Compression Cooling Systems		
6	Real Cooling Cycles and Application Examples		
7	Steam Compressed Cooling System Elements and Capacity Determination		
8	Midtherm		
9	Cooling Devices and Equipment		
10	Cooling Devices and Equipment		
11	Thermoelectric and Absorption Cooling		
12	Water Chillers and Evaporative Cooling		
13	Industrial and Household Cooling Devices		
14	Vehicle Air Conditioners and Refrigerated Cooling Systems		
15	Final		

Course Learning Outcomes

No	Learning Outcomes
C01	Student knows and explains the methods of cooling.
C02	Basic Mechanical Refrigeration staff know their duties and locations are used.
C03	Knows the structure and elements of the household type of commercial coolers.
C04	Knows characteristics of refrigerant gases.
C05	Knows protective properties of oils used in refrigeration devices and the locations used in.
C06	Learning household-type coolers.

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%40
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	14	3	42
Hours for off-the-c.r.stud	14	4	56
Assignments	0	0	0
Presentation	0	0	0
Mid-terms	0	0	0
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	1	2	2
Total Work Load			**100**
ECTS Credit of the Course			**3**

Contribution of Learning Outcomes to Programme Outcomes

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P10	P11	P12
All	5	5	4	4	3	5	5	5	5	5	5	5

Karabük University

Faculty of Engineering
Automotive Engineering

SEC-II	Social Elective Course				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
5	SEC-II	Social Elective Course	2	2	2

Mode of Delivery:
Face to Face
Language of Instruction:
Turkish
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Elective
Objectives of the Course:

Teaching Methods and Techniques:

Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:

Assistants:

Recommended or Required Reading

Resources

Course Category

Mathmatics and Basic Sciences	:	**Education**	:
Engineering	:	**Science**	:
Engineering Design	:	**Health**	:
Social Sciences	:	**Field**	:

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria		
In-Term Studies	**Quantity**	**Percentage**
Mid-terms	0	%0
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	0	%0
Total		**%0**

ECTS Allocated Based on Student Workload			
Activities	**Quantity**	**Duration**	**Total Work Load**
Course Duration	0	0	0
Hours for off-the-c.r.stud	0	0	0
Assignments	0	0	0
Presentation	0	0	0
Mid-terms	0	0	0
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	0	0	0
Total Work Load			**0**
ECTS Credit of the Course			**0**

Contribution of Learning Outcomes to Programme Outcomes

Karabük University

Faculty of Engineering
Automotive Engineering

SEC-I	Technical Elective Course				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
5	SEC-I	Technical Elective Course	3	3	4

Mode of Delivery:
Face to Face
Language of Instruction:
Turkish
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Elective
Objectives of the Course:

Teaching Methods and Techniques:

Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:

Assistants:

Recommended or Required Reading

Resources

Course Category

Mathmatics and Basic Sciences	:	**Education**	:
Engineering	:	**Science**	:
Engineering Design	:	**Health**	:
Social Sciences	:	**Field**	:

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria		
In-Term Studies	**Quantity**	**Percentage**
Mid-terms	0	%0
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	0	%0
Total		**%0**

ECTS Allocated Based on Student Workload			
Activities	**Quantity**	**Duration**	**Total Work Load**
Course Duration	0	0	0
Hours for off-the-c.r.stud	0	0	0
Assignments	0	0	0
Presentation	0	0	0
Mid-terms	0	0	0
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	0	0	0
Total Work Load			**0**
ECTS Credit of the Course			**0**

Contribution of Learning Outcomes to Programme Outcomes

Karabük University

Faculty of Engineering
Automotive Engineering

MSD309	International Communication				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
5	MSD309	International Communication	2	2	2

Mode of Delivery:
Face to Face
Language of Instruction:
Turkish
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Elective
Objectives of the Course:
The aim of this lecture is to educate students how to communicate in the conditions of globalizing world.
Teaching Methods and Techniques:
Definiton of international communication, Purpose and Progress of International communication, a short history of international communication. Relationship between international communication to basic definitions such as economy, culture, politics. The relevance of the communication process with the process of globalization, international, technology, raw material, organization, and the transfer of the law.
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:

Assistants:
Prof.Dr. Emrah DENİZ

Recommended or Required Reading

Resources Bülbül A.R. (2000), Uluslar arası iletişim, İstanbul, Nobel Yayın Dağıtım,

Course Category

Mathmatics and Basic Sciences	:	0	**Education**	:	0
Engineering	:	0	**Science**	:	0
Engineering Design	:		**Health**	:	0
Social Sciences	:	100	**Field**	:	0

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Introduction to international communicetion		
2	Communication techniques		
3	Communication techniques		
4	Using foreign languages for communication		
5	Using foreign languages for communication		
6	Using foreign languages for communication		
7	Communication Methods		
8	Communication Methods		
9	Communication Methods		
10	Communication Methods		
11	Dialogue Skills		
12	Dialogue Skills		
13	Dialogue Skills		
14	Discussions		
15	Midterm exam is given between 7th and 15th weeks.		
16	Final Exam		
17	Final Exam		

Course Learning Outcomes

No	Learning Outcomes
C01	Define what international communication is.
C02	Improve communication skills.
C03	Explain international trading laws.
C04	Express the communication processes with the process of globalization.
C05	Uluslar arası iletişim becerisi kazanır.
C06	Küreselleşme süreci ile uluslar arası iletişim sürecini öğrenmek.

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%35
Quizzes	0	%0
Assignment	1	%5
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	14	2	28
Hours for off-the-c.r.stud	10	1	10
Assignments	1	4	4
Presentation	0	0	0
Mid-terms	1	4	4
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	1	6	6
Total Work Load			**52**
ECTS Credit of the Course			**2**

Contribution of Learning Outcomes to Programme Outcomes

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P10	P11	P12
C01	1		2	1	4	5	2	3	3	5	5	5
C02	1		2	1	4	5	2	3	3	5	5	5
C03	1		2	1	4	5	2	3	3	5	5	5
C04	1		2	1	4	5	2	3	3	5	5	5
C05	1		2	1	4	5	2	3	3	5	5	5
C06	1		2	1	4	5	2	3	3	5	5	5

Program Learning Outcomes	
No	**Learning Outcome**
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria		
In-Term Studies	**Quantity**	**Percentage**
Mid-terms	0	%0
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	0	%0
Total		**%0**

ECTS Allocated Based on Student Workload			
Activities	**Quantity**	**Duration**	**Total Work Load**
Course Duration	0	0	0
Hours for off-the-c.r.stud	0	0	0
Assignments	0	0	0
Presentation	0	0	0
Mid-terms	0	0	0
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	0	0	0
Total Work Load			**0**
ECTS Credit of the Course			**0**

Contribution of Learning Outcomes to Programme Outcomes

Karabük University

Faculty of Engineering
Automotive Engineering

ATU302	Academic Turkish				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
6	ATU302	Academic Turkish	2	2	2

Mode of Delivery:
Face to Face
Language of Instruction:
Turkish
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Elective
Objectives of the Course:
The differences between teaching Turkish as a mother tongue and teaching it as a foreign language; educational environments in teaching Turkish as a foreign language, measurement and evaluation in teaching Turkish as a foreign language; developing activities in teaching Turkish as a foreign language; Analysis of various textbooks used in teaching Turkish as a foreign language.
Teaching Methods and Techniques:
Teaching Turkish as a foreign language is associated with the cultural dimension of language teaching. Comparisons are made with the teaching method of other languages. The theory of teaching Turkish to foreigners and the discussions on this subject are emphasized.
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:
Undefined Dekanlık
Assistants:

Recommended or Required Reading

Resources Bayyurt, Y.; Yaylı, D.(2008). Yabancılara Türkçe Öğretimi. Ankara: Anı Yay.,Mehmet Hengirmen-Nurettin Koç, Türkçe Öğreniyoruz, 1,2,3,,4,5,6, Engin Yay. Ank.1998,Akyü

Course Category

Mathmatics and Basic Sciences	:	**Education**	:
Engineering	:	**Science**	:
Engineering Design	:	**Health**	:
Social Sciences	:	**Field**	:

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Dersin amaç, içerik, kapsam ve kaynaklarının tanıtılması		
2	Dil nedir? (Ana dil ve İkinci dil kavramları		
3	Yabancı Dil Öğretimi Nasıl Olmalıdır?		
4	Yabancılara Türkçe Öğretiminin tarihi gelişi ve bugünkü durumu		
5	Basamaklı Tur Sistemi nedir?Önemi nedir? Niçin gereklidir?		
6	Yabancılara Türkçe Öğretiminde seviye tespit sınavının hazırlanışı ve uygulamasının zorunluluğu. Yabancılara Türkçe Öğreti		
7	Ara sınavı haftası		
8	Ara Sınav 1		
9	Yabancı dil öğretiminde temel ve genel ilkeler		
10	Yabancılara Türkçe Öğretiminde temel ve genel ilkeler nelerdir?		
11	Dil öğretim yöntemleri ve bu yöntemlerin Yabancılara Türkçe Öğretiminde Kullanılması		
12	Yabancılara Türkçe Öğretiminde dört temel becerilerin (dinleme-okuma-konuşma ve yazma) geliştirilmesine yönelik yapılac		
13	Yabancılara Türkçe Öğretiminde dört temel becerilerin (dinleme-okuma-konuşma ve yazma) geliştirilmesine yönelik yapılac		
14	Final		

Course Learning Outcomes

No	Learning Outcomes
C01	To determine how best to teach Turkish to foreigners with different methods, techniques and materials than mother tongue teaching and to present this as applied with activities to be done.
C02	Designing materials that can be used in teaching Turkish to foreigners
C03	Creating texts that can be used in teaching Turkish to foreigners.

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%40
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	14	2	28
Hours for off-the-c.r.stud	2	3	6
Assignments	0	0	0
Presentation	0	0	0
Mid-terms	1	4	4
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	2	7	14
Total Work Load			**52**
ECTS Credit of the Course			**2**

Contribution of Learning Outcomes to Programme Outcomes

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P10
C01	5	5	4	3	4	3	4	4	5	4
C02	5	5	4	3	4	3	4	4	5	4
C03	5	5	4	3	4	3	4	4	5	4

Karabük University

Faculty of Engineering
Automotive Engineering

MMT302	Fluid Mechanics II				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
6	MMT302	Fluid Mechanics II	3	3	3

Mode of Delivery:
Face to Face
Language of Instruction:
Turkish
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Required
Objectives of the Course:
Teach derivation and application of basic equations in differential form governing the fluid motion, solution of differential equations to find velocity distribution, calculation of forces exerted by flows on bodies.
Teaching Methods and Techniques:
Bernoulli and energy equations. Momentum equations. Dimensional analysis and modeling. Incompressible viscous flow, Navier-Stokes equations. Boundary layer in laminar and turbulent flow. Incompressible flows and solutions in ducts. Flow around immersed bodies. Introduction to compressible flow.
Prerequisites and co-requisities:

Course Coordinator:
Prof.Dr. Kamil ARSLAN
Name of Lecturers:

Assistants:

Recommended or Required Reading

Resources	Introduction to Fluid Mechanics, D. F. Young, B. R. Munson, T. H. Okiishi and W.W. Huebsch, John Wiley & Sons, Inc.,Fluid Mechanics Fundamentals and Applications, Y

Course Category

Mathmatics and Basic Sciences	:	30	**Education**	:	0
Engineering	:	50	**Science**	:	10
Engineering Design	:	10	**Health**	:	0
Social Sciences	:	0	**Field**	:	0

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	BERNOULLI EQUATION		
2	ENERGY EQUATION		
3	LINEAR MOMENTUM EQUATION		
4	LINEAR MOMENTUM EQUATION		
5	ANGULAR MOMENTUM EQUATION		
6	ANGULAR MOMENTUM EQUATION		
7	DIMENSIONAL ANALYSIS AND MODELING		
8	DIMENSIONAL ANALYSIS AND MODELING		
9	INTERNAL FLOW		
10	INTERNAL FLOW		
11	INTERNAL FLOW		
12	EXTERNAL FLOW: DRAG AND L		
13	EXTERNAL FLOW: DRAG AND L		
14	COMPRESSIBLE FLOW		

Course Learning Outcomes

No	Learning Outcomes
C01	Learns to use Bernoulli and Energy equations.
C02	Calculate the forces and moments applied to the body by the fluid.
C03	Have knowledge about the compressible flow subject.
C04	Gains knowledge of dimensional analysis and modeling.

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%30
Quizzes	0	%0
Assignment	3	%10
Attendance	0	%0
Practice	7	%0
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	14	3	42
Hours for off-the-c.r.stud	14	1	14
Assignments	3	2	6
Presentation	0	0	0
Mid-terms	1	2	2
Practice	7	2	14
Laboratory	0	0	0
Project	0	0	0
Final examination	1	2	2
Total Work Load			**80**
ECTS Credit of the Course			**3**

Contribution of Learning Outcomes to Programme Outcomes

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P10	P11
All	4	5	3	1	2	1		1			1

Karabük University

Faculty of Engineering
Automotive Engineering

MSD302	Research and Presentation Technics				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
6	MSD302	Research and Presentation Technics	2	2	2

Mode of Delivery:
Face to Face
Language of Instruction:
Turkish
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Elective
Objectives of the Course:
The aim of this course is to teach scientific research and analysizing techniques and to teach the use of obtaining data and presentation of obtaining data.
Teaching Methods and Techniques:
Scientific research and analysis techniques. Data collecting and data analyisis according to scientific research techniques. Reporting the results of researchs according to report writing techniques. Presentation of research subjects. The use of presentation equipments and technologies.
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:

Assistants:
Prof.Dr. Bülent ÖZDALYANAssociate Prof.Dr. Yaşar YETİŞKENAsist Prof.Dr. Meral TOPCU SULAKAsist Prof.Dr. Murat ALAN

Recommended or Required Reading

Resources Karasar, Niyazi. (1996) Bilimsel Araştırma Yöntemleri, 8. Bs, Ankara, 3 A Araş. Yayını. Kaptan, Saim. (1973). Bilimsel Araştırma Teknikleri, Ankara, Ayyıldız Mat. Rıkan, Rau

Course Category

Mathmatics and Basic Sciences	: 0	**Education**	: 0
Engineering	: 0	**Science**	: 0
Engineering Design	:	**Health**	: 0
Social Sciences	: 100	**Field**	: 0

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Scientific research and analysis techniques		
2	Scientific research and analysis techniques		
3	Scientific research and analysis techniques		
4	Data collecting and data analyisis according to scientific research techniques		
5	Data collecting and data analyisis according to scientific research techniques		
6	Data collecting and data analyisis according to scientific research techniques		
7	Reporting the results of researchs according to report writing techniques		
8	Reporting the results of researchs according to report writing techniques		
9	Reporting the results of researchs according to report writing techniques		
10	Reporting the results of researchs according to report writing techniques		
11	Presentation of research subjects		
12	Presentation of research subjects		
13	The use of presentation equipments and technologies		
14	The use of presentation equipments and technologies		
15	Midterm exam is given between 7th and 15th weeks.		
16	Final Exam		
17	Final Exam		

Course Learning Outcomes

No	Learning Outcomes
C01	Carry out scientific research and analysis.
C02	Represent effectively obtaning results both in school life and business life.
C03	Recognize ethics in research activities.
C04	Use literatür for scientific research.
C05	Prepare an effective presentation.
C06	Present research subjects

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%40
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	14	2	28
Hours for off-the-c.r.stud	12	1	12
Assignments	0	0	0
Presentation	0	0	0
Mid-terms	1	4	4
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	1	6	6
Total Work Load			**50**
ECTS Credit of the Course			**2**

Contribution of Learning Outcomes to Programme Outcomes

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P10	P11	P12
C01						1	4	1		3		
C02						1	4	1		3		
C03						1	4	1		3		
C04						1	4	1		3		
C05						1	4	1		3		
C06						1	4	1		3		

Karabük University

Faculty of Engineering
Automotive Engineering

MSD318	Recent Topics				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
6	MSD318	Recent Topics	2	2	2

Mode of Delivery:
Face to Face
Language of Instruction:
Turkish
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Elective
Objectives of the Course:
To teach students the importance of biomedical engineering in terms of science, technology and society and to aim students to be scientific literate individuals.
Teaching Methods and Techniques:
New techniques and application areas used in biomedical engineering, the basis of personalized treatment approaches, stem cell therapy and application areas, nanotube, genetic testing and ethical paradoxes.
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:
Prof.Dr. İdris KABALCI
Assistants:

Recommended or Required Reading

Resources N.H.C. Hwang, S.L-Y. Woo,Frontiers in Biomedical Engineering: Proceedings of the World Congress for Chinese Biomedical Engineers,Springer, 2003.,J.D. Enderle, J.D. Br

Course Category

Mathmatics and Basic Sciences	:	10	**Education**	:	10
Engineering	:	10	**Science**	:	10
Engineering Design	:	10	**Health**	:	10
Social Sciences	:	10	**Field**	:	10

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	History of biomedical science.		
2	Interaction with other disciplines.		
3	Biomedical engineering in developed and developing countries.		
4	Biomedical engineering in our country.		
5	Special applications in biomedical engineering.		
6	Brain secrets, Live copy.		
7	Genetically modified organisms (GMO), Genetic copying.		
8	Viruses, Cancer biology.		
9	The importance of organ transplantation and organ donation.		
10	Chemical substances and natural chemicals, their development processes and their effects on nature.		
11	Use of nanotechnology in biomedical engineering.		
12	Use of polymer technologies in biomedical engineering.		
13	Bioinformatics.		
14	Bioinformatics.		

Course Learning Outcomes

No	Learning Outcomes
C01	Understand the importance of biomedical engineering in terms of science, technology and society.
C02	Learn the connection of biomedical engineering with current life.
C03	Students will be interested in Biomedical Engineering and will be able to follow developments in biology, medicine and engineering and gain critical thinking skills.
C04	Describes the fields of application of individual drug therapy and nanoparticles.
C05	List the new techniques and application areas used in Biomedical Engineering.

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%40
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	14	2	28
Hours for off-the-c.r.stud	10	1	10
Assignments	1	1	1
Presentation	0	0	0
Mid-terms	1	4	4
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	1	6	6
Total Work Load			**49**
ECTS Credit of the Course			**2**

Contribution of Learning Outcomes to Programme Outcomes

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P10	P11
All	5	5	5	5	5	5	5	5	5	5	5

Karabük University

Faculty of Engineering
Automotive Engineering

MMT342	Hydraulics and Pneumatics				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
6	MMT342	Hydraulics and Pneumatics	3	3	4

Mode of Delivery:
Face to Face
Language of Instruction:
English (%100)
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Elective
Objectives of the Course:
The use of a technological necessity of hydraulic and elektrohidrolik in the sector of many systems of recognition of closely, the theoretical and practical information system design, design and make it available.
Teaching Methods and Techniques:
Introduction to hydraulics, basic principles in hydraulics, standard symbols in hydraulics, hydraulic pipes and hoses, hydraulic pumps, hydraulic motors, hydraulic cylinders, sealing elements, hydraulic valves, oil reservoir, filters, hydraulic accumulators, hydraulic fluids, electro-hydraulic systems, error in hydraulic systems search, application areas of hydraulic systems in industry, hydraulic and electrohydraulic circuit applications.
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:
Prof.Dr. M. Bahattin Çelik
Assistants:

Recommended or Required Reading

Resources D. Merkle, B. (1996). Hydraulics, İstanbul: Festo Didactic Türkiye. ,H.Exner, R.-İ. (1991). Basic Principles And Components Of Fluid Technology. Lohr: Mannesmann Rexrc

Course Category

Mathmatics and Basic Sciences	:	10	**Education**	:	0
Engineering	:	30	**Science**	:	10
Engineering Design	:	20	**Health**	:	0
Social Sciences	:	0	**Field**	:	30

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Introduction to hydraulic.		
2	Basic principles of hydraulic.		
3	Hydraulic standard symbols.		
4	Hydraulic pipes and hoses.		
5	Hydraulic pumps.		
6	Hydraulic motors.		
7	Hydraulic cylinders, sealing elements.		
8	Midterm exam.		
9	Hydraulic valves, oil tank and filters.		
10	Hydraulic accumulator and fluid.		
11	Electro-hydraulic systems.		
12	Hydraulic systems fault search.		
13	Hydraulic systems application areas in the industry.		
14	Hydraulic and electro-hydraulic circuit applications.		
15	Hydraulic and electro-hydraulic circuit applications.		
16	Final exam.		

Course Learning Outcomes

No	Learning Outcomes
C01	They know the basic principles of hydraulic.
C02	They recognize the standard symbols of hydraulic.
C03	Categorize hydraulic pumps.
C04	Chooses suitable hydraulic motors for the job.
C05	They make hydraulic and electro-hydraulic circuit applications.

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%30
Quizzes	0	%0
Assignment	1	%10
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	14	3	42
Hours for off-the-c.r.stud	14	3	42
Assignments	1	10	10
Presentation	0	0	0
Mid-terms	1	3	3
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	1	3	3
Total Work Load			**100**
ECTS Credit of the Course			**3**

Contribution of Learning Outcomes to Programme Outcomes

	P01	P02	P03	P04	P05	P06	P07	P08	P12
C01	5	5	5	5	5	4	1	3	1
C02	5		5		5	4		3	
C03	5	5	5	5	5		1		2
C04		5	5	5		4	1	3	
C05	5	5	5	5	5	4	1	3	1

Karabük University

Faculty of Engineering
Automotive Engineering

MMT340	Basics of Heating Ventilation and Air Conditioning				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
6	MMT340	Basics of Heating Ventilation and Air Conditioning	3	3	4

Mode of Delivery:
Face to Face
Language of Instruction:
Turkish
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Elective
Objectives of the Course:
Basic information about Heating ventilation and air conditioning. Installation of air conditioning systems must be considered, air velocity, temperature and relative humidity measurements conduct disclosure and explanation of concepts. To give the basics of air conditioning and project rules.
Teaching Methods and Techniques:
Thermal Comfort. Heating, ventilation and air-conditioning the relationship between. Psychrometric diagram and applications. Air conditioning. Central air conditioning units and parts. Design and calculation of air ducts. Aeration project application examples.
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:
Prof.Dr. Emrah DENİZ
Assistants:

Recommended or Required Reading

Resources R. Yamankaradeniz, İ.Horuz, S.Coşkun, Ö.Kaynaklı, N.Yamankaradeniz, İklimlendirme esasları ve Uygulamaları, Dora Yayınları, 2012. ,Klima Tesisatı, Isısan Çalıçmaları N

Course Category

Mathmatics and Basic Sciences	:	20	**Education**	:	
Engineering	:	20	**Science**	:	
Engineering Design	:	30	**Health**	:	
Social Sciences	:		**Field**	:	30

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	The principles of the ventilation system, indoor air quality, hygiene rules and the necessity of air conditioning.		
2	Concepts and relations related to thermal comfort and psychometry		
3	Basic Psychrometry Applications and Living Spaces and Industrial Facilities for Indoor Weather Conditions		
4	Components and Working Principles of Air Conditioning Facilities		
5	Heating Systems Components and Working Principles		
6	Psychrometric Applications of Summer Air Conditioner		
7	Psychrometric Applications of Summer Air Conditioner		
8	Midtherm Exam		
9	Psychrometric Applications of Winter Air Conditioner		
10	Psychrometric Applications of Winter Air Conditioner		
11	Heat Loss Calculation		
12	Heat Loss Calculation		
13	Heat Gain Calculation		
14	Heat Gain Calculation		
15	According to Heat Gain Calculation; Determination of Air Flow, Air Channel and System Element Capacities		

Course Learning Outcomes

No	Learning Outcomes
C01	İklimlendirmeyle learned about the basic definitions.
C02	Equipment selection and design of air-conditioning system is learned.
C03	Ventilation systems and variations learned.
C04	Ventilation can be prepared project.
C05	Air Conditioning project can draw.

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%30
Quizzes	0	%0
Assignment	1	%10
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	14	3	42
Hours for off-the-c.r.stud	14	4	56
Assignments	1	20	20
Presentation	0	0	0
Mid-terms	1	2	2
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	1	2	2
Total Work Load			**122**
ECTS Credit of the Course			**4**

Contribution of Learning Outcomes to Programme Outcomes

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P10	P11	P12
All	5	5	4	4	3	5	5	5	5	5	5	5
C01	5	5	4	4	3	5	5	5	5	5	5	5
C02	5	5	4	4	3	5	5	5	5	5	5	5
C03	5	5	4	4	3	5	5	5	5	5	5	5
C04	5	5	4	4	3	5	5	5	5	5	5	5
C05	5	5	4	4	3	5	5	5	5	5	5	5

Karabük University

Faculty of Engineering
Automotive Engineering

OMT304	Internal Combustion Engines				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
6	OMT304	Internal Combustion Engines	3	3	3

Mode of Delivery:
Face to Face
Language of Instruction:
Turkish
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Required
Objectives of the Course:
The aim of this course is to teach basic information about the structure, operation and cycles of internal combustion engines.
Teaching Methods and Techniques:
Working principles of engines. Thermodynamic cycles of internal combustion engines, engine performance parameters, friction force in the cylinder and lubrication system, combustion in engines, alternative fuels, mixture formation. Emissions in engines. Engine tests, engine characteristics, new technologies. Thermal losses in engines.
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:
Associate Prof.Dr. Mehmet ÇELİK
Assistants:

Recommended or Required Reading

Resources
Internal Combustion Engines Nobel Publications
Internal Combustion Engines Birsen Publications

Course Category

Mathmatics and Basic Sciences	:	10	**Education**	:	
Engineering	:	20	**Science**	:	10
Engineering Design	:	10	**Health**	:	
Social Sciences	:		**Field**	:	40

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Working principles of engines.		Textbook
2	Working principles of engines.		Textbook
3	Thermodynamic cycles of internal combustion engines.		Textbook
4	Thermodynamic cycles of internal combustion engines.		Textbook
5	Engine performance parameters.		Textbook
6	Combustion in engines.		Textbook
7	Combustion in engines.		Textbook
8	Mid-terms		
9	Alternative fuels.		Textbook
10	Alternative fuels.		Textbook
11	Mixture formation.		Textbook
12	Emissions in engines.		Textbook
13	Engine tests, engine characteristics, new technologies.		Textbook
14	Thermal losses in engines.		Textbook
15	Final examination		

Recommended Optional Programme Components

OMT201 Engine Technologies
AEE4011 Vehicle Emission and Control

Course Learning Outcomes

No	Learning Outcomes
C01	Learns the working principles of engines.
C02	Learns the thermodynamic cycles of internal combustion engines.
C03	Learns engine performance parameters.
C04	Learns the friction force and lubrication system in the cylinder.
C05	Learns the burning phenomenon in engines.
C06	Learns alternative fuels and mixture formation.
C07	Learns the emissions and causes of engines.
C08	Learns engine tests, engine characteristics and new technologies.

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria		
In-Term Studies	**Quantity**	**Percentage**
Mid-terms	1	%40
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload			
Activities	**Quantity**	**Duration**	**Total Work Load**
Course Duration	1	10	10
Hours for off-the-c.r.stud	1	10	10
Assignments	0	0	0
Presentation	0	0	0
Mid-terms	1	25	25
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	1	35	35
Total Work Load			**80**
ECTS Credit of the Course			**3**

Contribution of Learning Outcomes to Programme Outcomes

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P10	P11	P12
C01	4		3			4					2	
C02									3			
C03	3			3								
C04		3				4			3			
C05												3
C06							2			4		
C07		4						4				
C08					4	4						4

Karabük University

Faculty of Engineering
Automotive Engineering

MSD304	Human Resources Management				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
6	MSD304	Human Resources Management	2	2	2

Mode of Delivery:
Face to Face
Language of Instruction:
Turkish
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Elective
Objectives of the Course:
It is aimed that students have recognition of principles like conditionality, being scientific and being historical while evaluating cases and problems. •It is aimed that students have ability to function on a project as a team member or leader. •Improving the ability of oral and written communication. •It is aimed that students have recognition of universal values like reconciliation, change and sharing. •It is aimed that students have ability to analyze, explain and solve the problems
Teaching Methods and Techniques:
Personnel management, definitions and scope. Relationship with other sciences. Personnel problems and solutions. Personnel control. Human resources (internal resourcing and outsourcing). Work load analysis. Workforce analysis. Personnel evaluation methods. Personnel education and development. Work evaluation techniques. Wage systems. Motivation. Leardership. Complaint mechanism. Communication. Discipline. Health and protection.
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:

Assistants:
Asist Prof.Dr. Hakan TAHTACI

Recommended or Required Reading

Resources 1. Yıldız,. Gültekin. İnsan Kaynakları Yönetimi,
2. International Finance Investment Management Consulting CO. (FCC), Ankara -Sabuncuoğlu,
3. İnsan Kaynakla

Course Category

Mathmatics and Basic Sciences	:	0	**Education**	:	0
Engineering	:	0	**Science**	:	0
Engineering Design	:		**Health**	:	0
Social Sciences	:	100	**Field**	:	0

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Personnel management, definitions and scope. Relationship with other sciences.		
2	Personnel problems and solutions.		
3	Personnel function organization.		
4	Personnel control.		
5	Human resources (internal resourcing and outsourcing)		
6	Work load analysis		
7	Work load analysis		
8	Personnel evaluation methods		
9	Personnel education and development		
10	Work evaluation techniques		
11	Wage systems		
12	Motivation. Leardership		
13	Complaint mechanism. Communication. Discipline		
14	Health and protection		
15	Midterm exam is given between 7th and 15th weeks.		
16	Final Exam		
17	Final Exam		

Course Learning Outcomes

No	Learning Outcomes
C01	Explain development and purpose of human resources concept.
C02	Recognize of basic functions of human resources management.
C03	Identify of human resources information systems.
C04	Comprehending the importance of human resources management for organizations.
C05	Explain and solve the problems related to human resources.
C06	Explain health and protection.

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%35
Quizzes	0	%0
Assignment	1	%5
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	14	2	28
Hours for off-the-c.r.stud	10	1	10
Assignments	1	4	4
Presentation	0	0	0
Mid-terms	1	4	4
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	1	6	6
Total Work Load			**52**
ECTS Credit of the Course			**2**

Contribution of Learning Outcomes to Programme Outcomes

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P10	P11	P12
C01					5	5	4	4	3	5	3	3
C02					5	5	4	4	3	5	3	3
C03					5	5	4	4	3	5	3	3
C04					5	5	4	4	3	5	3	3
C05					5	5	4	4	3	5	3	3
C06					5	5	4	4	3	5	3	3

Karabük University

Faculty of Engineering
Automotive Engineering

OMD306	Occupational Health and Safety II				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
6	OMD306	Occupational Health and Safety II	2	2	2

Mode of Delivery:
Face to Face
Language of Instruction:
Turkish
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Required
Objectives of the Course:
Understand the importance of occupational health and safety in the context of the right to live. Emphasizing the importance of occupational health and safety in terms of employers and employees and presenting them in a structure combining theory and practice.
Teaching Methods and Techniques:
Basic concepts about Occupational Health and Safety (OHS). Basic working areas of ergonomics. Occupational safety concept. Causes of work accidents, prevention models, calculation of costs, investigation and reporting. Concept of occupational disease, types, prevention methods. Occupational safety methods in workshops and laboratories. Personal protectors and machine protectors. Fire and explosion prevention methods. Principles and objectives of first aid. OHS Legislation.
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:
Instructor İsmail TOPRAK
Assistants:

Recommended or Required Reading

Resources	Dal, J., Ergonomics For beginners, Taylor Francis, 2001.,Karwowski, W., Marras, W. S., Occupational Ergonomics, CRC Press, 2003.,Kroemer, K., Kroemer, H., Kroemer-El

Course Category

Mathmatics and Basic Sciences	:	0	**Education**	:	0
Engineering	:	0	**Science**	:	0
Engineering Design	:	0	**Health**	:	0
Social Sciences	:	10	**Field**	:	0

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Basics of occupational safety, occupational safety culture, related laws and regulations.		
2	Legal rights and responsibilities.		
3	Danger-Risk concept, protection of accidents.		
4	Major industrial accidents and large industrial enterprises: Examples of major industrial accidents related to fire, explosion		
5	Occupational diseases.		
6	Occupational health, work safety committees and duties established in the workplaces, SSK and health services.		
7	Toxicology: Toxic substances to be taken into the body, excretion and effects.		
8	Ergonomics and parameters.		
9	Working at height.		
10	Personal protective equipment.		
11	First aid and emergency.		
12	Working with display tools.		
13	Ventilation and air conditioning principles.		
14	OHS ethics.		

Course Learning Outcomes

No	Learning Outcomes
C01	Define basic concepts related to occupational health and safety.
C02	Express the importance of occupational health and safety in the framework of the right to live.
C03	Apply legal rules and principles to existing occupational health and safety disputes.
C04	Analyze occupational health and safety problems.
C05	Can solve problems related to occupational health and safety in the workplace.
C06	Learns the principles and objectives of first aid.

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%40
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	14	2	28
Hours for off-the-c.r.stud	12	1	12
Assignments	0	0	0
Presentation	0	0	0
Mid-terms	1	4	4
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	1	6	6
Total Work Load			**50**
ECTS Credit of the Course			**2**

Contribution of Learning Outcomes to Programme Outcomes

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P10	P11
All	5	5	5	5	5	5	5	5	5	5	5

Karabük University

Faculty of Engineering
Automotive Engineering

MSD310	Institutive Behavior				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
6	MSD310	Institutive Behavior	2	2	2

Mode of Delivery:
Face to Face
Language of Instruction:
Turkish
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Elective
Objectives of the Course:
The aim of this course is to introduce technical and humanistic aspects of industrial R&D and R&D management and to explain importance of technology, impacts of technology and permanent development of technology.
Teaching Methods and Techniques:
Configuration of technology and industry. Adventages of technology and competition. Technologic options, strategies and analitic tools. Partnerships and strategic agreements. Technology and structure. Technology and process. Technology and culture. Technology and total quality. Technology transfers. R&D management. R&D productivity. National politics and and R&D. Technoparks and innovational organizastions. University-industry R&D association. Patents and legal regulations. R&D trends.
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:

Assistants:
Asist Prof. Dr. Ozan BÜYÜKYILMAZ

Recommended or Required Reading

Resources 1. ÖRGEV M., ŞENTURAN Ş. , (2007),
2. Temel İşletmecilik Bilgileri, İstanbul,. Türkmen Kitabevi. MUCUK İ., (2003)
3. Modern İşletmecilik, İstanbul, Türkmen K

Course Category

Mathmatics and Basic Sciences	:	0	**Education**	:	0
Engineering	:	0	**Science**	:	0
Engineering Design	:		**Health**	:	0
Social Sciences	:	100	**Field**	:	0

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Configuration of technology and industry		
2	Adventages of technology and competition		
3	Technologic options, strategies and analitic tools		
4	Partnerships and strategic agreements		
5	Technology and structure		
6	Technology and process		
7	Technology and culture		
8	Technology and total quality		
9	Technology transfers		
10	Creativeness and change		
11	Creativeness and change		
12	National politics and and R&D		
13	Technoparks and innovational organizastions. University-industry R&D association.		
14	Patents and legal regulations. R&D trends		
15	Midterm exam is given between 7th and 15th weeks.		
16	Final Exam		
17	Final Exam		

Course Learning Outcomes

No	Learning Outcomes
C01	Recognize R&D, R&D management and R&D techniques.
C02	Explain R&D concepts and differences between R&D concepts.
C03	Memorize princeples for establishing R&D management system.
C04	Employ in-house R&D management.
C05	Recognize patents and legal regulations

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%35
Quizzes	0	%0
Assignment	1	%5
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	14	2	28
Hours for off-the-c.r.stud	10	1	10
Assignments	1	4	4
Presentation	0	0	0
Mid-terms	1	4	4
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	1	6	6
Total Work Load			**52**
ECTS Credit of the Course			**2**

Contribution of Learning Outcomes to Programme Outcomes

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P10	P11	P12
C01					3	4	5	5	5	5	4	4
C02					3	4	5	5	5	5	4	4
C03					3	4	5	5	5	5	4	4
C04					3	4	5	5	5	5	4	4
C05					3	4	5	5	5	5	4	4

Karabük University

Faculty of Engineering
Automotive Engineering

MMT348	Machine Elements II				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
6	MMT348	Machine Elements II	3	3	3

Mode of Delivery:
Face to Face
Language of Instruction:
Turkish
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Required
Objectives of the Course:
The aim of the course is providing basics of designing, construction and analysis of mechanical elements in manufacturing of machines.
Teaching Methods and Techniques:
Couplings and Clutches, Gear Mechanisms, Tribology, Journal Bearings, Rolling Bearings
Prerequisites and co-requisities:

Course Coordinator:
Associate Prof.Dr. Okan ÜNAL
Name of Lecturers:

Assistants:

Recommended or Required Reading

Resources
Fundamentals of Machine Elements: Schmid, Steven R,Shigley's Mechanical Engineering Design
Shigley's Mechanical Engineering Design
Shigley's Mechanical Engineering Design Book

Course Category

Mathmatics and Basic Sciences	:	30	**Education**	:	
Engineering	:	40	**Science**	:	
Engineering Design	:	30	**Health**	:	
Social Sciences	:		**Field**	:	

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Couplings and Clutches / Couplings		
2	Couplings and Clutches / Classification of Clutches		
3	Couplings and Clutches / Force-Torque Analysis of Clutches		
4	Gear Mechanisms / Classifications and Characteristics		
5	Gear Mechanisms / Force-Torque Analysis		
6	Gear Mechanisms / Spur Gears		
7	Gear Mechanisms / Helical Gears		
8	Gear Mechanisms / Bevel and Worm Gears		
9	Midterm Exam		
10	Tribology / Friction		
11	Wear and Lubrication		
12	Journal Bearings / Fundamentals of Journal Bearings		
13	Journal Bearings / Computational Methods of Journal Bearings		
14	Rolling Bearings / Fundamentals of Rolling Bearings		
15	Rolling Bearings / Computational Methods of Rolling Bearings		
16	Final Exam		

Course Learning Outcomes

No	Learning Outcomes
C01	Ability of stress analysis of machine elements
C02	Designing of machine elements
C03	Making connections between machine elements
C04	Investigating tribological behaviours of machine elements
C05	Improving mechanical properties of materials of machine elements
C06	Preparing machine element projects and technical drawings
C07	Manufacturing prototypes of machine elements for industrial applications
C08	Ability of computer aided modelling of machine elements and software applications

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%40
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	14	4	56
Hours for off-the-c.r.stud	4	6	24
Assignments	0	0	0
Presentation	0	0	0
Mid-terms	1	10	10
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	1	20	20
Total Work Load			**110**
ECTS Credit of the Course			**4**

Contribution of Learning Outcomes to Programme Outcomes

Karabük University

Faculty of Engineering
Automotive Engineering

MMT350	Engineering Ethics				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
6	MMT350	Engineering Ethics	2	2	2

Mode of Delivery:
Face to Face
Language of Instruction:
Turkish
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Required
Objectives of the Course:
This course aims to provide students an interactive study of ethical theory and development of engineering ethics
Teaching Methods and Techniques:
The basics of engineering ethics and professional ethics, Roots of ethics in philosophy, A brief history of ethical though, The ethical dilemma of engineering, Resolving ethical problems, Responsibility and organization in Engineering, Engineers and environment
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:
Associate Prof.Dr. İlker TÜRKER
Assistants:

Recommended or Required Reading

Resources	M.W. Martin and R.Schinzinger, Ethics in Engineering, McGraw Hill Inc., 2004,Eğitim ve Öğretimde Etik, İnayet Aydın, Servet Kitabevi, 2013

Course Category

Mathmatics and Basic Sciences	:	**Education**	:
Engineering	:	**Science**	:
Engineering Design	:	**Health**	:
Social Sciences	:	**Field**	:

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Introduction to Engineering Ethics		
2	Why study engineering ethics? Why professional ethics? Roots of ethics in philosophy		
3	A brief history of ethical thought		
4	Engineering ethics: what? Why? How? When?		
5	The ethical dilemma of engineering		
6	Resolving ethical problems		
7	Engineering in organizations		
8	Responsibility in engineering		
9	Code of ethics of engineers		
10	Engineers and the society		
11	Professional and ethical duty		
12	Engineers and environment		
13	Examples from organizations		
14	Presentations		

Course Learning Outcomes

No	Learning Outcomes
C01	Describe a clear definition of engineering ethics.
C02	To develop understanding of the ethical issues that engineers often face in professional practice.
C03	To develop appreciation and ability about ethical issues.
C04	Explain the importance of professional ethics as an engineer.
C05	To develop the need for professional registration.

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria		
In-Term Studies	**Quantity**	**Percentage**
Mid-terms	1	%30
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	1	%10
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload			
Activities	**Quantity**	**Duration**	**Total Work Load**
Course Duration	2	14	28
Hours for off-the-c.r.stud	1	14	14
Assignments	1	4	4
Presentation	0	0	0
Mid-terms	3	1	3
Practice	0	0	0
Laboratory	0	0	0
Project	2	2	4
Final examination	6	1	6
Total Work Load			**59**
ECTS Credit of the Course			**2**

Contribution of Learning Outcomes to Programme Outcomes

Karabük University

Faculty of Engineering
Automotive Engineering

OMT312	Automotive Mechatronics				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
6	OMT312	Automotive Mechatronics	3	3	4

Mode of Delivery:
Face to Face
Language of Instruction:
Turkish
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Elective
Objectives of the Course:
To give students the concept of mechatronics, to introduce mechatronic systems and components, to show control structures, to give automotive applications of mechatronic systems.
Teaching Methods and Techniques:
Mekatroniğe giriş, analog ve sayısal devreler, mekatronik sistemler, sensörler, mikrodenetleyiciler, hareketlendiriciler, otomotiv mekatronik sistemleri
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:
Associate Prof.Dr. Selami SAĞIROĞLU
Assistants:

Recommended or Required Reading

Resources	David G.A, Alciatore Michael, B. Histand, "Introduction to Mechatronics and Measurement Systems" Mcgraw-hill 2nd edition 2003,William B. Ribbens, Ph.D., Norman P. Ma Rıdvan AARSLAN, Ali SÜRMEN, AUTOMOTIVE MECHATRONICS, Alfa Aktüel Publications, 2007

Course Category

Mathmatics and Basic Sciences	:	20	**Education**	:	
Engineering	:	30	**Science**	:	
Engineering Design	:	10	**Health**	:	
Social Sciences	:		**Field**	:	40

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Introduction to Mechatronics		
2	Basic concepts of electricity and electronics. Homework 1 (due to the 7th week)		
3	Microprocessor control systems. Project 1 (Delivery date 13th week)		
4	Sensors		
5	Sensors, continued		
6	Mobility elements		
7	Electronic ignition systems		
8	Electronically controlled fuel injection systems		
9	Electronically controlled Diesel fuel injection systems		
10	Motion control and security systems		
11	Security, information, motor and comfort systems		
13	Automotive electronics developments		
14	Mechatronic systems and control structures		
15	Midterm exam for this course is held between the 7th and 15th weeks. Subjects are advanced one week when the exam is		
16	Final examination		

Course Learning Outcomes

No	Learning Outcomes
C01	Can define mechatronics
C02	Can explain analog and digital circuits
C03	Can diagnose electrical-electronic systems used in vehicles
C04	Use mechanical, electrical-electronic knowledge in the field of automotive engineering
C05	Can diagnose mechatronic systems

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%20
Quizzes	0	%0
Assignment	1	%10
Attendance	0	%0
Practice	0	%0
Project	1	%10
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	3	14	42
Hours for off-the-c.r.stud	2	12	24
Assignments	10	1	10
Presentation	0	0	0
Mid-terms	10	1	10
Practice	0	0	0
Laboratory	0	0	0
Project	10	1	10
Final examination	20	1	20
Total Work Load			**116**
ECTS Credit of the Course			**5**

Contribution of Learning Outcomes to Programme Outcomes

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P10	P11	P12
C01	5	5	5	5	5	5	5	5	5	5	5	
C02	4		4		4		4		4		4	4
C03	3		3		3		3		3		3	
C04	5	5	5	5	5	5	5	5	5	5	5	5
C05		2		2			2			2		

Karabük University

Faculty of Engineering
Automotive Engineering

MMT346	Robotics				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
6	MMT346	Robotics	3	3	4

Mode of Delivery:
Face to Face
Language of Instruction:
English (%100)
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Elective
Objectives of the Course:
The objective of this course is to educate mechanical engineering students on fundamentals of robot construction, robot mechanisms and solving kinematic and dynamic equations belong to them.
Teaching Methods and Techniques:
The objective of this course is to educate mechanical engineering students on fundamentals of robot construction, robot mechanisms and solving kinematic and dynamic equations belong to them.
Prerequisites and co-requisities:

Course Coordinator:
Associate Prof.Dr. İsmail ESEN
Name of Lecturers:

Assistants:

Recommended or Required Reading

Resources Robotics for Engineers, Yoram Koren, McGraw Hill

Course Category

Mathmatics and Basic Sciences	: 20		**Education**	:	
Engineering	: 50		**Science**	: 10	
Engineering Design	: 10		**Health**	:	
Social Sciences	:		**Field**	: 10	

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Robot Description and Types of Robot Controlling		
2	Classification of Robots.		
3	Usage of Robots in the Industry.		
4	Manipulation Methods in Robot Construction.		
5	Motion Transport Parts.		
6	Wrist Mechanisms and Other Construction Parts.		
7	Classification and Selection of Robot Sensors.		
8	Midterm exam.		
9	Kinematic Analysis.		
10	Kinematic Analysis.		
11	Inverse Kinematic Analysis.		
12	Inverse Kinematic Analysis.		
13	Path Planning.		
14	Controlling of Robots.		
15	Final exam.		

Course Learning Outcomes

No	Learning Outcomes
C01	It can make mechanical design for industrial robotic systems.
C02	Knows kinematic and dynamic properties of mechanical, hydraulic and pneumatic motion elements.
C03	It can select the driving, transmitting and laying elements used in robotic systems.
C04	t makes kinematic analysis of robotic manipulators with all kinds of open and closed kinematic chains.
C05	It can do end and joint trajectory planning of robotic systems.

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria		
In-Term Studies	**Quantity**	**Percentage**
Mid-terms	1	%20
Quizzes	0	%0
Assignment	1	%10
Attendance	0	%0
Practice	1	%10
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload			
Activities	**Quantity**	**Duration**	**Total Work Load**
Course Duration	14	2	28
Hours for off-the-c.r.stud	14	3	42
Assignments	1	36	36
Presentation	0	0	0
Mid-terms	1	4	4
Practice	14	1	14
Laboratory	0	0	0
Project	0	0	0
Final examination	1	4	4
Total Work Load			**128**
ECTS Credit of the Course			**5**

Contribution of Learning Outcomes to Programme Outcomes

Karabük University

Faculty of Engineering
Automotive Engineering

OMT314	System Dynamics and Control				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
6	OMT314	System Dynamics and Control	3	3	4

Mode of Delivery:
Face to Face
Language of Instruction:
English (%100)
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Elective
Objectives of the Course:
To teach mathematical and dynamical models of engineering systems and their control.
Teaching Methods and Techniques:
Basic concepts, definitions, classification of control systems, the establishment of mathematical models and simulation of physical systems, transfer functions, frequency response, the control circuit stability, root locus method, transient and steady state response analysis of systems, the use of Matlab and Simulink, the block diagrams
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:

Assistants:
Asist Prof.Dr. Zafer ALBAYRAKInstructor Dr. Kenan IŞIKAsist Prof.Dr. Cihan MIZRAKAsist Prof.Dr. Aytül BOZKURT

Recommended or Required Reading

Resources • İbrahim Yüksel, Otomatik Kontrol / Sistem Dinamiği ve Denetim Sistemleri, Nobel Yayınları, Ankara, 2009
• Eronini I. Umez-Eronini, System Dynamics and Control,<

Course Category

Mathmatics and Basic Sciences	:	30	**Education**	:	0
Engineering	:	30	**Science**	:	0
Engineering Design	:		**Health**	:	0
Social Sciences	:	0	**Field**	:	0

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Introduction to control systems		
2	Mathematical modeling of engineering systems		
3	Mathematical modeling of engineering systems (Homework 1 Delivery date: Week 5)		
4	Time response of systems		
5	Time response of systems (Homework 2 Delivery date: Week 7)		
6	Simulation and mathematical modeling of physical systems		
7	Simulation and mathematical modeling of physical systems		
8	Block diagrams (Homework 3 Delivery date: Week 10)		
9	Transfer functions		
10	Stability analysis (Homework 4 Delivery date: Week 12)		
11	Stability analysis		
12	Transient and steady response analysis of systems (Homework 5 Delivery date: Week 12)		
13	Using MATLAB and Simulink		
14	Using MATLAB and Simulink		
15	Midterm exam is given between 7th and 15th weeks.		
16	Final Exam		
17	Final Exam		

Course Learning Outcomes

No	Learning Outcomes
C01	Define the structure of control systems.
C02	Explain the fundamental concepts,terminology and purpose of control sysyems.
C03	Compose mathematical models of various physical systems.
C04	Analyse the time domain transient and steady state response of zero, first and second order systems.
C05	Perform the simulation of mechatronic systems.

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria		
In-Term Studies	**Quantity**	**Percentage**
Mid-terms	1	%30
Quizzes	0	%0
Assignment	1	%10
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload			
Activities	**Quantity**	**Duration**	**Total Work Load**
Course Duration	14	3	42
Hours for off-the-c.r.stud	12	2	24
Assignments	5	3	15
Presentation	0	0	0
Mid-terms	1	8	8
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	1	14	14
Total Work Load			**103**
ECTS Credit of the Course			**3**

Contribution of Learning Outcomes to Programme Outcomes

Karabük University

Faculty of Engineering
Automotive Engineering

MMT330	Introduction To Finite Element Analysis				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
6	MMT330	Introduction To Finite Element Analysis	3	3	4

Mode of Delivery:
Face to Face
Language of Instruction:
English (%100)
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Elective
Objectives of the Course:
To teach different methods of solution of engineering problems by finite elements method.
Teaching Methods and Techniques:
Introduction to the finite element method, Element types, Spring and beam elements, Plane stress and plane strain elements. Expression of the geometry and element behavior function. Theory of interpolation functions and acquisition methods.Addition procedures and Joining the boundary conditions to system equations, Error and convergence analysis. Developing the stiffness matrix and load vector. Isoparametric finite elements, Computer applications. Developing progam in FORTRAN and computer application.Presentation of ANSYS finite element analysis program. Solution of various type of construction problems with the help of this program (Static analysis of beams and plates, static analysis of plane and space frame system).
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:

Assistants:
Prof.Dr. Ahmet DEMİR

Recommended or Required Reading

Resources • M.YASAR "ANSYS 11.0 Notes", Karabük • Erdogan Madenci,Ibrahim Guven, "THE FINITE ELEMENT METHOD AND APPLICATIONS IN ENGINEERING USING ANSYS", The

Course Category

Mathmatics and Basic Sciences	:	30	**Education**	:	0
Engineering	:	30	**Science**	:	0
Engineering Design	:		**Health**	:	0
Social Sciences	:	0	**Field**	:	0

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Fundamentals of Finite Element Method		
2	Element Types and Shape Functions (Submission homework 1)		
3	Parametric Elements (Submission homework 2)		
4	Time-dependent problems (Submission homework 3)		
5	Finite Element Formulation (Submission homework 4)		
6	Adaptation of the Finite Element Method to PC (Submission homework 5)		
7	Addition procedures (Submission homework 6)		
8	Joining the boundary conditions to system equations		
9	Addition procedures and Joining the boundary conditions to system equations (Submission homework 7)		
10	Error and convergence analysis. (Submission homework 8)		
11	Developing the stiffness matrix and load vector (Submission homework 9)		
12	Isoparametric finite elements (Submission homework 10)		
13	Developing progam in C# and computer application. (Given project 1)		
14	Ansys package program presentation (Given project 2)		
15	Midterm Exam, done between 7 and 15 weeks. Topics forward is taken a week after the exam.		
16	Final exam week (Submission projects)		
17	Final exam week		

Course Learning Outcomes

No	Learning Outcomes
C01	Recognize the finite element method used in various engineering fields.
C02	Solve various engineering problems using finite element method.
C03	Develop computer programmes needed in the application of this method.
C04	Sonlu Elemanlar Yöntemi ile çözüm yapan paket programları kullanabilir.
C05	Kullanılan Paket programlar ile proje geliştirebilir.

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%20
Quizzes	0	%0
Assignment	1	%20
Attendance	0	%0
Practice	0	%0
Project	1	%20
Final examination	1	%40
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	14	3	42
Hours for off-the-c.r.stud	0	0	0
Assignments	10	2	20
Presentation	0	0	0
Mid-terms	1	8	8
Practice	0	0	0
Laboratory	0	0	0
Project	2	8	16
Final examination	1	16	16
Total Work Load			**102**
ECTS Credit of the Course			**3**

Contribution of Learning Outcomes to Programme Outcomes

Karabük University

Faculty of Engineering
Automotive Engineering

MSD316	Social Media				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
6	MSD316	Social Media	2	2	2

Mode of Delivery:
Face to Face
Language of Instruction:
Turkish
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Elective
Objectives of the Course:
The purpose of this course is required for a media plan is to learn the steps and strategies.
Teaching Methods and Techniques:
In this course, it will be examine important of media planning, using media planning in PR and advertising, planning goals and methods.
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:

Assistants:
Undefined Dekanlık

Recommended or Required Reading

Resources Mehmet Özkundakçı, "", İstanbul:Hayat Yay., 2009,Arnold Barban, Steven M.Cristol, Frank J.Kopec, "", İstanbul: Epsilon Yay., 1995,Bilgen Başal, "", İstanbul: Çantay Yay.

Course Category

Mathmatics and Basic Sciences	: 0	**Education**	: 0
Engineering	: 0	**Science**	: 0
Engineering Design	:	**Health**	: 0
Social Sciences	: 0	**Field**	: 0

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Introduction to media planning and Media term		
2	Media planning term, Media kinds, Advantages and disadvantages of media		
3	Main terms about media planning (Reach, frequency, GRPs, CPM, CPP)		
4	Marketing strategy and media planning		
5	Media planning in PR and Media planning in advertising		
6	Media buying and planning in mass media		
7	Buying and planning in digital media		
8	Midterm		
9	Buying and planning in local media.		
10	Buying and planning in social media.		
11	Media buying and planning in outdoor advertising.		
12	Media planning process		
13	Determination of marketing goals Determination of target market/audience.		
14	Determination of geographical region,Determination of timing		
15	Campaign period Continuous pattern Flight pattern Pulsing pattern		
16	Final		
17	Final		

Course Learning Outcomes

No	Learning Outcomes
C01	Distinguish medias in terms of PR and advertising effects.
C02	Recognize main terms of media planning.
C03	Describe tools and methods for using media planning.
C04	Evaluate a media planning of a firm.

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%40
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	14	1	14
Hours for off-the-c.r.stud	12	1	12
Assignments	0	0	0
Presentation	0	0	0
Mid-terms	1	8	8
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	1	16	16
Total Work Load			**50**
ECTS Credit of the Course			**2**

Contribution of Learning Outcomes to Programme Outcomes

	P01	P02	P03	P04	P05	P06	P07	P08	P10	P11	P12
C01	5	5	5	5	4	5	5	4	5	5	5
C02	5	5	5	5	4	5	5	4	5	5	5
C03	5	5	5	5	4	5	5	4	5	5	5
C04	5	5	5	5	4	5	5	4	5	5	5

Karabük University

Faculty of Engineering
Automotive Engineering

SEC - IV	Social Elective Course				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
6	SEC - IV	Social Elective Course	2	2	2

Mode of Delivery:
Face to Face
Language of Instruction:
Turkish
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Elective
Objectives of the Course:

Teaching Methods and Techniques:

Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:

Assistants:

Recommended or Required Reading

Resources

Course Category

Mathmatics and Basic Sciences	:	**Education**	:
Engineering	:	**Science**	:
Engineering Design	:	**Health**	:
Social Sciences	:	**Field**	:

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria		
In-Term Studies	**Quantity**	**Percentage**
Mid-terms	0	%0
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	0	%0
Total		**%0**

ECTS Allocated Based on Student Workload			
Activities	**Quantity**	**Duration**	**Total Work Load**
Course Duration	0	0	0
Hours for off-the-c.r.stud	0	0	0
Assignments	0	0	0
Presentation	0	0	0
Mid-terms	0	0	0
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	0	0	0
Total Work Load			**0**
ECTS Credit of the Course			**0**

Contribution of Learning Outcomes to Programme Outcomes

Karabük University

Faculty of Engineering
Automotive Engineering

MSD312	Standardizasyon				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
6	MSD312	Standardizasyon	2	2	2

Mode of Delivery:
Face to Face
Language of Instruction:
English (%100)
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Elective
Objectives of the Course:
Propose of this course is to teach policies and international applications of standardization.
Teaching Methods and Techniques:
Standardization Policies, the standardization, International Standardization in trade in Turkey, the implementation of the mandatory Standards in Turkey
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:
Undefined Dekanlık
Assistants:

Recommended or Required Reading

Resources 1. Orhan Küçük, Standardizasyon ve Kalite, 2004
,

Course Category

Mathmatics and Basic Sciences	:	0	**Education**	:	0
Engineering	:	0	**Science**	:	0
Engineering Design	:		**Health**	:	0
Social Sciences	:	100	**Field**	:	0

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Historical development and standardization		
2	Turkish standards institution (TSE) and standardization		
3	Quality concept and elements of the		
4	Total Quality Management		
5	Total quality control		
6	Quality assurance and quality assurance Systems		
7	Quality assurance and quality assurance Systems		
8	ISO 9000 Quality Assurance Systems		
9	ISO 9000 Quality Assurance Systems		
10	The concept of the week: Vocational Standards and Turkey Applications		
11	Instance Profession Standard		
12	The basics of quality manual		
13	Editing Documents and Liabilities		
14	Sample quality manual		
15	Midterm exam is given between 7th and 15th weeks.		
16	Final Exam		
17	Final Exam		
50	Historical development and standardization		
51	Final Exam		
52	Final Exam		
53	Midterm exam is given between 7th and 15th weeks.		
54	Sample quality manual		
55	Editing Documents and Liabilities		
56	The basics of quality manual		
57	Instance Profession Standard		
58	The concept of the week: Vocational Standards and Turkey Applications		
59	ISO 9000 Quality Assurance Systems		
60	ISO 9000 Quality Assurance Systems		
61	Quality assurance and quality assurance Systems		
225130	Turkish standards institution (TSE) and standardization		
225132	Quality concept and elements of the		
225134	Total Quality Management		
225136	Total quality control		
225138	Quality assurance and quality assurance Systems		

Course Learning Outcomes

No	Learning Outcomes
C01	Explain the importance and need of standardization.
C02	Explain Quality and Quality Concepts.
C03	Express the importance of Quality Assurance.
C04	Determine the International Standards.
C05	Explain the Occupational Standards.

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.

P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%30
Quizzes	0	%0
Assignment	1	%10
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	14	2	28
Hours for off-the-c.r.stud	0	0	0
Assignments	1	12	12
Presentation	0	0	0
Mid-terms	1	5	5
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	1	7	7
Total Work Load			**52**
ECTS Credit of the Course			**2**

Contribution of Learning Outcomes to Programme Outcomes

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P10	P11
All					2	2			3	2	2
C01					2	2			3	2	2
C02					2	2			3	2	2
C03					2	2			3	2	2
C04					2	2			3	2	2
C05					2	2			3	2	2

Karabük University

Faculty of Engineering
Automotive Engineering

OMT302	Vehicle Dynamics				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
6	OMT302	Vehicle Dynamics	3	3	3

Mode of Delivery:
Face to Face
Language of Instruction:
Turkish
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Required
Objectives of the Course:
Purpose of this course is to advance knowledge the students about vehicle mechanics and to calculate and analysis forces acting on a vehicle
Teaching Methods and Techniques:
Forces acting on a vehicle, resistances, tractive force, adhesion force and slide net tractive force, Sideways sliding in cornering, steering, vehicle suspension system Definition of vibration and its types, vibrations affecting engines.
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:
Asist Prof.Dr. Mustafa KARAGÖZ
Assistants:

Recommended or Required Reading

Resources	Prof.Dr. Selim ÇETİNKAYA, "", 2010

Course Category

Mathmatics and Basic Sciences	:	0	**Education**	:	0
Engineering	:	0	**Science**	:	0
Engineering Design	:		**Health**	:	0
Social Sciences	:	0	**Field**	:	0

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	History of vehicles		
2	Vehicle performance		
3	Engine performance		
4	Clutches		
5	Transmissions		
6	Differential and axles		
7	Tires, types, lateral forces		
8	Vehicle aerodynamics, air resistance		
9	Hill and acceleration resistance		
10	Forces acting on a vehicle while driving		
11	Forces acting on a vehicle while driving		
12	Forces acting on a vehicle during braking, stopping distance, passes		
13	Braking performance analysis and calculations		
14	Suspension, bend upset		
15	Midterm exam is given between 7th and 15th weeks.		
16	Final Exam		
17	Final Exam		

Course Learning Outcomes

No	Learning Outcomes
C01	Students attended this course are able to analyse and vehicle mechanic subjects and design vehicle

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%30
Quizzes	0	%0
Assignment	1	%10
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	14	4	56
Hours for off-the-c.r.stud	1	6	6
Assignments	1	3	3
Presentation	0	0	0
Mid-terms	1	8	8
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	1	10	10
Total Work Load			**83**
ECTS Credit of the Course			**3**

Contribution of Learning Outcomes to Programme Outcomes

	P02	P04	P09	P10
C01	1	1	5	5

Karabük University

Faculty of Engineering
Automotive Engineering

SEC - III	Technical Elective Course				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
6	SEC - III	Technical Elective Course	3	3	4

Mode of Delivery:
Face to Face
Language of Instruction:
Turkish
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Elective
Objectives of the Course:

Teaching Methods and Techniques:

Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:

Assistants:

Recommended or Required Reading

Resources

Course Category

Mathmatics and Basic Sciences	:	**Education**	:
Engineering	:	**Science**	:
Engineering Design	:	**Health**	:
Social Sciences	:	**Field**	:

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria		
In-Term Studies	**Quantity**	**Percentage**
Mid-terms	0	%0
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	0	%0
Total		**%0**

ECTS Allocated Based on Student Workload			
Activities	**Quantity**	**Duration**	**Total Work Load**
Course Duration	0	0	0
Hours for off-the-c.r.stud	0	0	0
Assignments	0	0	0
Presentation	0	0	0
Mid-terms	0	0	0
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	0	0	0
Total Work Load			**0**
ECTS Credit of the Course			**0**

Contribution of Learning Outcomes to Programme Outcomes

Program Learning Outcomes	
No	**Learning Outcome**
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria		
In-Term Studies	**Quantity**	**Percentage**
Mid-terms	0	%0
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	0	%0
Total		**%0**

ECTS Allocated Based on Student Workload			
Activities	**Quantity**	**Duration**	**Total Work Load**
Course Duration	0	0	0
Hours for off-the-c.r.stud	0	0	0
Assignments	0	0	0
Presentation	0	0	0
Mid-terms	0	0	0
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	0	0	0
Total Work Load			**0**
ECTS Credit of the Course			**0**

Contribution of Learning Outcomes to Programme Outcomes

Karabük University

Faculty of Engineering
Automotive Engineering

MMT336	Renewable Energy Resources				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
6	MMT336	Renewable Energy Resources	3	3	4

Mode of Delivery:
Face to Face
Language of Instruction:
Turkish
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Elective
Objectives of the Course:
The aim of this course is about the scientific understanding of renewable energy sources and related analysis to teach
Teaching Methods and Techniques:
Principles of renewable energy, Essentials of fluid Dynamics, Solar Energy, Photovoltaic systems, Hydro energy, Wind energy, Biomass and Biofuels, Wave energy, Geotermal energy, Energy systems, storoge and transmission
Prerequisites and co-requisities:

Course Coordinator:
Dr. Mehmet BAKIRCI
Name of Lecturers:

Assistants:

Recommended or Required Reading

Resources J Twidell and T. Weir, 2006, "Renewable Energy Resources",Taylor &Francis -Edited by Godfrey Boyle, 2004, "Renewable Energy: Power for a Sustainable Future", Oxforf
J Twidell and T. Weir, 2006, "Renewable Energy Resources",Taylor &Francis -Edited by Godfrey Boyle, 2004, "Renewable Energy: Power for a Sustainable Future", Oxforf

Course Category

Mathmatics and Basic Sciences	:	20	**Education**	:	0
Engineering	:	20	**Science**	:	20
Engineering Design	:	20	**Health**	:	0
Social Sciences	:	10	**Field**	:	10

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Introduction to principles of renewable energy, specific principles of renewable energy		
2	Introduction to essentials of fluids dynamics, conservation of energy, conservation of momentum		
3	Viscosity, flow in pipe		
4	Heat transfer, heat circuit analysis and terminology		
5	Heat conduction, convection, heat transfer by mass transport		
6	Introduction to solar cell, extraterrestrial solar radiation, geometry of Earth and Sun		
7	Geometry of collector, Effects of the Earth's atmosphere, measurement of solar radiation		
8	Midterm		
9	Introduction to photovoltaic systems, photovoltaic systems and applications		
10	Introduction to hydro-energy, principles, Hydroelectric systems, social and environmental aspects.		
11	Introduction to wind power energy, turbine types, electricity generation and mechanical power		
12	Biomass and biofuels, biofuels classification, biomass production, social and environmental aspects		
13	Wave energy, wave motion, wave power		
14	Geothermal energy; energy systems, storage		
15	Biological and chemical storage, Heat storage, electrical storage: batteries and accumulator, distribution energy, electrical		
16	Final exam		

Course Learning Outcomes

No	Learning Outcomes
C01	Being able to learn energy concept and energy sustainability.
C02	Being able to the apply basic principles of physics to renewable energy technology
C03	Being able to learn the basic concepts of fluid mechanics
C04	Being able to learn the basic concepts of conservation of energy
C05	Being able to understand the relationship between energy resources and the environment

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%20
Quizzes	0	%0
Assignment	1	%20
Attendance	0	%0
Practice	1	%0
Project	1	%20
Final examination	1	%40
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	3	14	42
Hours for off-the-c.r.stud	0	0	0
Assignments	0	0	0
Presentation	0	0	0
Mid-terms	1	30	30
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	1	30	30
Total Work Load			**102**
ECTS Credit of the Course			**3**

Contribution of Learning Outcomes to Programme Outcomes

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P10	P11	P12
All	4	3	3	4	4	3	2	3	3	4	4	4
C01	4	3	3	4	4	3	2	3	3	4	4	4
C02	4	3	3	4	4	3	2	3	3	4	4	4
C03	4	3	3	4	4	3	2	3	3	4	4	4
C04	4	3	3	4	4	3	2	3	3	4	4	4
C05	4	3	3	4	4	3	2	3	3	4	4	4

Karabük University

Faculty of Engineering
Automotive Engineering

MSD306	Management Systems				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
6	MSD306	Management Systems	2	2	2

Mode of Delivery:
Face to Face
Language of Instruction:
Turkish
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Elective
Objectives of the Course:
To teach scientific knowledge and abilities for managing production and service systems
Teaching Methods and Techniques:
Definition of management. Historical development of management concept. Definition, and types of organization. Organization charts. Managemant of information, learning, culture, structure, continuity, power and politics in organizations. Management etics. Gender and management. Management functions (planning, organising, carrying out, coordination, auditing). New management techniques. Management with objectives. Management according to exceptions. Quality control chambers. Benchmarking. Management of change. Strategic management. Relationships between organizations.
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:
Undefined Dekanlık
Assistants:

Recommended or Required Reading

Resources 1. Chelsom, J. V., Payne, A. C., Reavill, R. P., Management for Engineers, Scientists and Technologists, 2004,
2. Salvendy, G., Handbook og Industrial Engineering, V

Course Category

Mathmatics and Basic Sciences	:	0	**Education**	:	0
Engineering	:	0	**Science**	:	0
Engineering Design	:		**Health**	:	0
Social Sciences	:	100	**Field**	:	0

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Definition of management.		
2	Historical development of management concept.		
3	Definition, and types of organization. Organization charts and divisions		
4	Definition, and types of organization. Organization charts and divisions		
5	Managemant of information, learning, culture, structure, continuity, power and politics in organizations		
6	Management etics		
7	Management functions (planning, organising, carrying out, coordination, auditing)		
8	Management functions (planning, organising, carrying out, coordination, auditing)		
9	New management techniques		
10	Management with objectives		
11	Management according to exceptions		
12	Quality control chambers		
13	Benchmarking. Management of change. Strategic management		
14	Relationships between organizations		
15	Midterm exam is given between 7th and 15th weeks.		
16	Final Exam		
17	Final Exam		

Course Learning Outcomes

No	Learning Outcomes
C01	Attain capability of managing production and service systems.
C02	Solve the problems about managing production and service systems.
C03	Form authority and responsibility consciousness.
C04	Explain leader skills, manager skills.
C05	Distinguish relationships between organizations.
C06	[illegible]

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%35
Quizzes	0	%0
Assignment	1	%5
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	14	2	28
Hours for off-the-c.r.stud	10	1	10
Assignments	1	4	4
Presentation	0	0	0
Mid-terms	1	4	4
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	1	6	6
Total Work Load			**52**
ECTS Credit of the Course			**2**

Contribution of Learning Outcomes to Programme Outcomes

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P10	P11	P12
C01					5	5	5	5	5	5	4	4
C02					5	5	5	5	5	5	4	4
C03					5	5	5	5	5	5	4	4
C04					5	5	5	5	5	5	4	4
C05					5	5	5	5	5	5	4	4
C06					5	5	5	5	5	5	4	4

Karabük University

Faculty of Engineering
Automotive Engineering

MEE4058	Additive Manufacturing				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
7	MEE4058	Additive Manufacturing	3	3	5

Mode of Delivery:
Face to Face
Language of Instruction:
English (%100)
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Elective
Objectives of the Course:
To have information about additive manufacturing methods, the usage area, purpose of this technology and the advantages it brings compared to conventional manufacturing technologies, providing information about the variety of materials used in software, equipment and methods and part design criteria, support design, material selection criteria, final processes It is aimed to give information about the manufacturing criteria.
Teaching Methods and Techniques:
Introduction to additive manufacturing (IR) technologies / Reverse engineering in additive manufacturing - (3D digitization, data generation, data capture, point cloud, filtering) / Software and STL files in additive manufacturing / Orientation and slicing strategies / Toolpath creation / Supports in IR and minimum volume support usage model, cost model / Photopolymerization (FP) technique based additive manufacturing methods, process parameters / Photopolymerization process (curing depth) model / FP laser scanning models (Weave, Aces etc.) and self-shrinkage model / FP technique based additive design criteria and finishing processes in manufacturing / Powder bed melting (TYE); Powder bed melting mechanisms depending on the materials and materials used / Solid state sintering- Partial melting- Full melting- Chemical bonding / SLS, SLM, EBM methods, parameters, energy model / Design criteria and finishing processes in TYE / Extrusion based (EB) additive production; parameters, materials, cartesian 3d printer, delta 3b printer, polar 3b printer, scara 3b printer / design criteria and finishing processes in EB additive manufacturing / Polyjet, Inkjet methods / Direct energy accumulation method, principles and basic principles, hybrid additive manufacturing methods
Prerequisites and co-requisities:

Course Coordinator:
Associate Prof.Dr. Selami Sağıroğlu
Name of Lecturers:

Assistants:

Recommended or Required Reading

Resources

Gibson, Ian, David W. Rosen, and Brent Stucker ," Additive Manufacturing Technologies Rapid Prototyping to Direct Digital Manufacturing. Springer, 2010. Andreas Gebha
Gibson, Ian, David W. Rosen, and Brent Stucker ," Additive Manufacturing Technologies Rapid Prototyping to Direct Digital Manufacturing. Springer, 2010.
Andreas Gebhardt, " Understanding Additive Manufacturing", Hanser Verlag, 2015
Srivatsan, T. S., and T. S. Sudarshan, "Additive Manufacturing: Innovations, Advances, and Applications". CRC Press, 2015.
Chee Kai Chua, Kah Fa, Leong, "3D Printing and Additive Manufacturing, World Scientific", 2014
Amit Bandyopadhyay, Susmita Bose, "Additive Manufacturing", 2015, CRC Press
Carneiro, O.S., Silva, A.F. ve Gomes, R., 2015, "Fused deposition modeling with polypropylene", Materials & Design, 83, 768– 776

Course Category

Mathmatics and Basic Sciences	:	25	**Education**	:	
Engineering	:	25	**Science**	:	25
Engineering Design	:	25	**Health**	:	
Social Sciences	:		**Field**	:	

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Introduction to additive manufacturing, principles, classification and basic concepts		
2	Reverse engineering in additive manufacturing, (3D digitization, data generation, data capture, point cloud, filtering)		
3	Software in additive manufacturing, STL files, data development in STL and topological problems in STL		
4	Orientation and slicing strategies in additive manufacturing, step effect		
5	Toolpath creation, support development and minimum volume support usage model in additive manufacturing, cost model		
6	Additive manufacturing methods based on photopolymerization technique; material, process parameters		
7	Photopolymerization process (curing depth) model, scanning models (Weave, Aces etc.), self-shrinkage model		
8	Midterm Exam 1		
9	Powder bed melting methods; Powder bed melting mechanisms depending on the materials and materials used		
10	Powder bed melting; SLS, SLM, EBM, method-dependent parameters, energy model		
11	Extrusion based additive manufacturing method; parameters, materials, cartesian 3d printer, delta 3b printer, polar 3b prin		
12	Manufacturing methods, principles and basic principles with Inkjet and Binder jet		
13	Direct energy storage method, principles and fundamentals, Hybrid additive manufacturing methods		
14	Final		

Course Learning Outcomes

No	Learning Outcomes
C01	To have knowledge about additive manufacturing technologies
C02	To gain the ability to choose the appropriate additive manufacturing method for the purpose
C03	To learn part and support design criteria in additive manufacturing methods
C04	Learning the effects of process parameters on part quality in additive manufacturing methods

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%30
Quizzes	0	%0
Assignment	1	%10
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	14	3	42
Hours for off-the-c.r.stud	15	4	60
Assignments	1	20	20
Presentation	1	20	20
Mid-terms	1	20	20
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	1	20	20
Total Work Load			**182**
ECTS Credit of the Course			**6**

Contribution of Learning Outcomes to Programme Outcomes

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P10	P11	P12
All	5	4	4	3	4	3	4	2	3	2	3	3
C01	5	4	4	3	4	3	4	3	3	2	3	2
C02	5	4	4	3	4	3	4	3	3	2	3	4
C03	5	4	4	3	4	3	4	4	3	2	3	4
C04	5	4	4	3	4	3	4	5	3	2	3	3

Karabük University

Faculty of Engineering
Automotive Engineering

MEE4044	Agricultural Machinery				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
7	MEE4044	Agricultural Machinery	3	3	5

Mode of Delivery:
Face to Face
Language of Instruction:
English (%100)
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Elective
Objectives of the Course:
The aim of this course is to teach the agricultural mechanization system, general features of agricultural equipment and machinery for agricultural production, agricultural tractors and energy resources in agriculture.
Teaching Methods and Techniques:
In this course, agricultural tools and machinery using in agricultural production will be explained as theoretical and applied.
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:
Prof.Dr. Refik Polat
Assistants:

Recommended or Required Reading

Resources

1. Roth O. Lawrence ve H. L. Field. 1991. Introduction to Agricultural Engineering: A Problem Solving Approach. Van Nostrand Reeinhold, 115 Fifth Avenue, New York NY,
Advances in Agricultural Machinery and Technologies, Editor: Guangnan Chen
Agricultural Machinery & Mechanization, Editor: Segun R. Bello

Course Category

Mathmatics and Basic Sciences	:	15	**Education**	:	
Engineering	:	30	**Science**	:	10
Engineering Design	:	30	**Health**	:	
Social Sciences	:		**Field**	:	15

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Mechanization in Agriculture and Agricultural Mechanization	-	-
2	The Physical, Chemical and Biological Properties of Soil	-	-
3	Soil Tillage Equipment and Machinery, Moldboard Plow and Disc Plow	-	-
4	Cultivators, Harrows, Subsoiler	-	-
5	Cultivators, Harrows, Subsoiler	-	-
6	Rototillers and Rollers	-	-
7	Sowing-Planting Machines, Mechanical Sowing Machines and Pneumatic Sowing Machines	-	-
8	Sowing Norm and Settings	-	-
9	Fertilizing Machinery	-	-
10	Agricultural War Machinery	-	-
11	Reaping-Harvest Machinery	-	-
12	Reaping-Harvest Machinery	-	-
13	Seed Cleaning and Classification Machinery	-	-
14	Agricultural Machinery Management	-	-

Course Learning Outcomes

No	Learning Outcomes
C01	Recognize agricultural machinery.
C02	Identify Turkey's General Characteristics of Agricultural, Agricultural Mechanization Status, Level of Mechanization of Turkey and Comparison with the world.
C03	Explain definitions and Concepts Related to Mechanization Management And Planning.
C04	Calculate mechanical performance, power performance, driver performance, capacity and values.
C05	Explain expense Forecasting Methods (Purchasing Costs, Fixed Costs, Operating Expenses, Indirect Expenses machine).
C06	Makes the choice of size and power for the tractor. Chooses the working width for agricultural machinery. Learns the rent or purchase decision criteria.

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%20
Quizzes	0	%0
Assignment	1	%20
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	14	3	42
Hours for off-the-c.r.stud	14	1	14
Assignments	1	35	35
Presentation	0	0	0
Mid-terms	1	14	14
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	1	14	14
Total Work Load			**119**
ECTS Credit of the Course			**4**

Contribution of Learning Outcomes to Programme Outcomes

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P10	P11	P12
All	4	4	5	3	2	4	2	4	5	4	4	4
C01				5			2					
C02			4					4		4		
C03											4	
C04		5			4							4
C06						3						

Program Learning Outcomes	
No	**Learning Outcome**
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria		
In-Term Studies	**Quantity**	**Percentage**
Mid-terms	0	%0
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	0	%0
Total		**%0**

ECTS Allocated Based on Student Workload			
Activities	**Quantity**	**Duration**	**Total Work Load**
Course Duration	0	0	0
Hours for off-the-c.r.stud	0	0	0
Assignments	0	0	0
Presentation	0	0	0
Mid-terms	0	0	0
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	0	0	0
Total Work Load			**0**
ECTS Credit of the Course			**0**

Contribution of Learning Outcomes to Programme Outcomes

Karabük University

Faculty of Engineering
Automotive Engineering

AEE4001	Alternative Fuels				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
7	AEE4001	Alternative Fuels	3	3	5

Mode of Delivery:
Face to Face
Language of Instruction:
English (%100)
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Elective
Objectives of the Course:
To explain the conversion of energy to mechanical work using the laws of thermodynamics. To be able to classify alternative energy sources by considering the areas of use. Alternative that can be used in internal combustion engines To be able to explain the types of energy and the way of using it. Hybrid (hybrid) engines and working principles of fuel cells be able to explain To be able to explain the working principles of external heat machines and the energy sources used in them.
Teaching Methods and Techniques:
Energy, types of energy, energy conversion, work, 1st law of thermodynamics, 2nd law of thermodynamics, efficiency, usability. Renewable energy sources (solar energy, vegetable-based fuels, wind energy), nuclear energy, fossil-based energy sources, geothermal energy. Alternative energy types used in gasoline engines, gas fuels (hydrogen, LPG, natural gas, bio gas), liquid fuels (ethyl alcohol, methyl alcohol), alternative fuels used in diesel engines. Hybrid engines, fuel batteries. Solar powered engines, Stirling engines and types of energy used, Ericson machines and used energy types, steam engines.
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:
Associate Prof.Dr. Selami SAĞIROĞLU
Assistants:

Recommended or Required Reading

Resources
Kith Owen, Trevor Coley, 1995, Automotiv e Fuels Reference Book, ASE, US.
1-Mustafa ACAROĞLU, 2003, Alternative Energy Sources, Nobel Yayın Dağıtım, Ankara

Course Category

Mathmatics and Basic Sciences	:	20	**Education**	:	
Engineering	:	60	**Science**	:	
Engineering Design	:		**Health**	:	
Social Sciences	:		**Field**	:	20

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Energy, types of energy, energy conversion, work, 1st law of thermodynamics, 2nd law of thermodynamics, efficiency, ava		
2	Renewable energy sources (solar energy, wind energy)		
3	Renewable energy sources (vegetable based fuels)		
4	Nuclear energy, geothermal energy		
5	Fossil-based energy sources		
6	Alternative energy types used in gasoline engines, gas fuels (hydrogen, LPG, natural gas, bio gas)		
7	Alternative energy types used in gasoline engines, gas fuels (LPG, natural gas		
8	Alternative energy types used in gasoline engines, gas fuels (biogas)		
9	Alternative energy types used in gasoline engines, liquid fuels (ethyl alcohol, methyl alcohol),		
10	Alternative fuels (natural gas and LPG) used in diesel engines		
11	Alternative fuels (natural gas and LPG) used in diesel engines		
12	Hybrid engines, Solar powered engines		
13	Fuel cells		
14	Types of energy used in Stirling engines, Ericson machines and steam engines.		
15	Midterm Exam for this course is held between the 7th and 15th weeks. From the date of the exam, the subjects are advan		
16	Final week		
17	Final week		

Course Learning Outcomes

No	Learning Outcomes
C01	Explain the conversion of energy to mechanical work using the laws of thermodynamics.
C02	Categorize alternative energy sources by considering their usage areas.
C03	Can interpret the advantages and disadvantages of alternative energy types that can be used in internal combustion engines.
C04	Can reach information about alternative energy sources.
C05	Interpret the global and social effects of alternative energy sources on health, environment and safety.

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%40
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	2	14	28
Hours for off-the-c.r.stud	0	0	0
Assignments	0	0	0
Presentation	0	0	0
Mid-terms	3	14	42
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	6	10	60
Total Work Load			**130**
ECTS Credit of the Course			**5**

Contribution of Learning Outcomes to Programme Outcomes

	P01	P02	P04	P07	P08	P09	P10	P11	P12
All	3	4	4	3	5	5	4	4	4

Karabük University

Faculty of Engineering
Automotive Engineering

MEE4020	Applications of Finite Element Analysis				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
7	MEE4020	Applications of Finite Element Analysis	3	3	5

Mode of Delivery:
Face to Face
Language of Instruction:
English (%100)
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Elective
Objectives of the Course:
To teach different methods of solution of engineering problems by finite elements method.
Teaching Methods and Techniques:
Introduction to the finite element method, Element types, Spring and beam elements, Plane stress and plane strain elements. Expression of the geometry and element behavior function. Theory of interpolation functions and acquisition methods.Addition procedures and Joining the boundary conditions to system equations, Error and convergence analysis. Developing the stiffness matrix and load vector. Isoparametric finite elements, Computer applications. Developing progam in FORTRAN and computer application.Presentation of ANSYS finite element analysis program. Solution of various type of construction problems with the help of this program (Static analysis of beams and plates, static analysis of plane and space frame system).
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:

Assistants:
Prof.Dr. Ahmet DEMİR

Recommended or Required Reading

Resources • M.YASAR "ANSYS 11.0 Notes", Karabük • Erdogan Madenci,Ibrahim Guven, "THE FINITE ELEMENT METHOD AND APPLICATIONS IN ENGINEERING USING ANSYS", The

Course Category

Mathmatics and Basic Sciences	:	30	**Education**	:	0
Engineering	:	30	**Science**	:	0
Engineering Design	:		**Health**	:	0
Social Sciences	:	0	**Field**	:	0

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Fundamentals of Finite Element Method		
2	Element Types and Shape Functions (Submission homework 1)		
3	Parametric Elements (Submission homework 2)		
4	Time-dependent problems (Submission homework 3)		
5	Finite Element Formulation (Submission homework 4)		
6	Adaptation of the Finite Element Method to PC (Submission homework 5)		
7	Addition procedures (Submission homework 6)		
8	Joining the boundary conditions to system equations		
9	Addition procedures and Joining the boundary conditions to system equations (Submission homework 7)		
10	Error and convergence analysis. (Submission homework 8)		
11	Developing the stiffness matrix and load vector (Submission homework 9)		
12	Isoparametric finite elements (Submission homework 10)		
13	Developing progam in C# and computer application. (Given project 1)		
14	Ansys package program presentation (Given project 2)		
15	Midterm Exam, done between 7 and 15 weeks. Topics forward is taken a week after the exam.		
16	Final exam week (Submission projects)		
17	Final exam week		

Course Learning Outcomes

No	Learning Outcomes
C01	Recognize the finite element method used in various engineering fields.
C02	Solve various engineering problems using finite element method.
C03	Develop computer programmes needed in the application of this method.
C04	Sonlu Elemanlar Yöntemi ile çözüm yapan paket programları kullanabilir.
C05	Kullanılan Paket programlar ile proje geliştirebilir.

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%20
Quizzes	0	%0
Assignment	1	%20
Attendance	0	%0
Practice	0	%0
Project	1	%20
Final examination	1	%40
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	14	3	42
Hours for off-the-c.r.stud	0	0	0
Assignments	10	2	20
Presentation	0	0	0
Mid-terms	1	8	8
Practice	0	0	0
Laboratory	0	0	0
Project	2	8	16
Final examination	1	16	16
Total Work Load			**102**
ECTS Credit of the Course			**3**

Contribution of Learning Outcomes to Programme Outcomes

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P10	P11	P12
C01	5	4	4	3	2	2	2	1	3	1		4
C02	5	4	4	3	2	2	2	1	3	1		4
C03	5	4	4	3	2	2	2	1	3	1		4
C04	5	4	4	3	2	2	2	1	3	1		4
C05	5	4	4	3	2	2	2	1	3	1		4

Karabük University

Faculty of Engineering
Automotive Engineering

AEE4005	Automotive Service Management				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
7	AEE4005	Automotive Service Management	3	3	5

Mode of Delivery:
Face to Face
Language of Instruction:
English (%100)
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Elective
Objectives of the Course:
Teaching service station operating techniques, commercial and juriprudence responsibilities, descriptions of customer relationships and legal rights of customers.
Teaching Methods and Techniques:
Introduction to managemet. Oral and written communication. Motivation and ergonomics. Customer Relationship Management (CRM). Body language. Business organization legislation. Employeer legilation. Consumer rights legislation.
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:
Associate Prof.Dr. Selami SAĞIROĞLU
Assistants:

Recommended or Required Reading

Resources

Service Management, Panel Printing, 2003,AUTOMOTIVE SERVICE MANAGEMENT Principles into Practice- Third Edition, Andrew A. Rezin, Ph.D. 330 Hudson, 330 Hudson
Turkish Commercial Code
Law of Obligations
Income Tax Law
Business rules
Collective Agreement
Strike and Lockout Law

Course Category

Mathmatics and Basic Sciences	:	10	**Education**	:	
Engineering	:	30	**Science**	:	
Engineering Design	:		**Health**	:	
Social Sciences	:	30	**Field**	:	30

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Introduction to managemet, basic concepts, types of services and service station		
2	Service station organization, oral and written communication, reporting, documentation		
3	Motivation on servise, work ergonomics		
4	Customer relationship, Customer Relationship Management (CRM). Body language		
5	Business organization legislation, concept, flotation and management		
6	Turkish Trade Law		
7	Mortgage Law		
8	Revenue Law		
9	Bankrupt Law, Trademark Law		
10	Employeer legilation, concepts		
11	Labour legislation, Turkish Labour Law, Collective Labour Agreement Law, Industrial Action and Lockout Law		
12	Social insurance legislation, Turkich Social Insurance Law, Turkish Social Insurance Law		
13	Consumer rights legislation, concept		
14	Consumer Rights Law		

Course Learning Outcomes

No	Learning Outcomes
C01	Students completed this course can establish operate service station organization.
C02	They can manage customer relationships.
C03	They can protect customer rights.
C04	They have a knowledge about all of the laws and legislations related to trading companies (Turkish trade law, mortgage law, revenue law, bankrupt law, trademark law, business organization legisl

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%20
Quizzes	0	%0
Assignment	1	%20
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	14	3	42
Hours for off-the-c.r.stud	0	0	0
Assignments	14	3	42
Presentation	0	0	0
Mid-terms	0	0	0
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	14	4	56
Total Work Load			**140**
ECTS Credit of the Course			**5**

Contribution of Learning Outcomes to Programme Outcomes

	P02	P06	P07	P08	P09
All	3	4	4	4	5
C01	3	4	4	4	5
C02	3	4	4	4	5
C03	3	4	4	4	5
C04	3	4	4	4	5

Karabük University

Faculty of Engineering
Automotive Engineering

OMT429	Computer Aided Engine Design				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
7	OMT429	Computer Aided Engine Design	3	2	3

Mode of Delivery:
Face to Face
Language of Instruction:
English (%100)
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Required
Objectives of the Course:
This course aims at optimizing the design and modeling of an engine suitable for the desired specifications, together with material selection.
Teaching Methods and Techniques:
Analyzing and graphically solving problems encountered in engine design, cylinder block, cylinder head, piston, connecting rod, crankshaft, flywheel, valve mechanism, etc. Drawing engine elements using Autodesk Inventor and Mechanical Desktop. Application drawings will be made for a specified engine and according to the required specifications. Based on its features; performance requirements, fuel, material and availability will be taken into account.
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:
Dr. Mustafa KARAGÖZ
Assistants:

Recommended or Required Reading

Resources	G.Ü. Teknik Eğitim Fakültesi Ders notları, Selim Çetinkaya, 1998, Ankara.

Course Category

Mathmatics and Basic Sciences	:	10	**Education**	:	0
Engineering	:	20	**Science**	:	0
Engineering Design	:	40	**Health**	:	0
Social Sciences	:	0	**Field**	:	30

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Reminding pre-learning, discussing concepts		
2	Analyzing the problems encountered in engine design		
3	Graphically solving problems encountered in engine design		
4	Compliance with the required specifications for a specified engine		
5	Scratching stationary parts such as cylinder blocks		
6	Scratching stationary parts such as cylinder heads		
7	Scratching moving parts such as pistons and connecting rods		
8	Scratching moving parts such as crankshaft and flywheel		
9	Scratching moving parts such as crankshaft and flywheel		
10	Scratching moving parts such as camshafts and valve mechanisms		
11	Chooses the materials according to the working conditions of the parts.		
12	Optimizes the system		
13	Report preparing		
14	Presentation of the report		

Course Learning Outcomes

No	Learning Outcomes
C01	A student who takes this course can make calculations of all the still and moving parts of an engine that is approximately suitable for the desired properties, and according to these calculations, he

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	0	%40
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	0	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	14	3	42
Hours for off-the-c.r.stud	0	0	0
Assignments	0	0	0
Presentation	0	0	0
Mid-terms	1	30	30
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	1	30	30
Total Work Load			**102**
ECTS Credit of the Course			**4**

Contribution of Learning Outcomes to Programme Outcomes

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P10	P11	P12
All	2	4	2	4	5	3	1	1	1	2	2	3

Karabük University

Faculty of Engineering
Automotive Engineering

AEE4010	Business and Industrial Machines				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
7	AEE4010	Business and Industrial Machines	3	3	5

Mode of Delivery:
Face to Face
Language of Instruction:
English (%100)
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Elective
Objectives of the Course:
The aim of this course is; 1. To introduce students to business and industrial machines. 2. Differences between construction machines and other vehicles. 3. To give information about the systems in construction machines.
Teaching Methods and Techniques:
Work and industrial machines. Work safety. Types of work machines. Motors used in construction machines. Powertrain. Hydraulic systems. Brake systems. Walking sets. Efficiency calculation in work machines. Emission on for off-road machines standards. Maintenance and repair of construction equipment.
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:
Prof.Dr. M. Bahattin Çelik
Assistants:

Recommended or Required Reading

Resources	Pallotta, J., Bolster, R., "The Construction Alphabet Book", Charlesbridge Publishing, Watertown, MA, 2005, Korea.

Course Category

Mathmatics and Basic Sciences	:	10	**Education**	:	
Engineering	:	30	**Science**	:	10
Engineering Design	:	10	**Health**	:	
Social Sciences	:		**Field**	:	40

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	General description of construction and industrial machines. Occupational safety in construction machines.		
2	Classification of construction and industrial machines.		
3	Engines for construction and industrial machines. Engine operation characteristics.		
4	Power transmission systems (torque converter, gearbox, planet gear systems).		
5	Power transmission systems (automatic transmission).		
6	Hydraulic system and their circuit elements.		
7	Brake systems.		
8	Control systems and indicators.		
9	Undercarriage systems (tyres, types of pallet, drive gear).		
10	Economical usage of construction machines.		
11	Efficency calculation in construction machines.		
12	Exhaust emissions standards for off-road construction machines.		
13	Selection criteria for work machines.		
14	Maintenance and repair of construction machines.		

Course Learning Outcomes

No	Learning Outcomes
C01	Student define the constuction machines.
C02	Classify the constuction machines.
C03	Select the constuction machine fit for work.
C04	Explain the undercarriage elements and control systems.
C05	Compute the efficency of construction machine.

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%40
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	14	3	42
Hours for off-the-c.r.stud	14	5	70
Assignments	0	0	0
Presentation	0	0	0
Mid-terms	1	2	2
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	1	2	2
Total Work Load			**116**
ECTS Credit of the Course			**5**

Contribution of Learning Outcomes to Programme Outcomes

	P01	P02	P03	P04	P05	P06	P07	P08	P11
C01	2	3		1		4	5	1	4
C02	3	1	2		2		1		
C03			3	5		1		3	2
C04	1	5	1		4		3		
C05				3		2		2	1

Karabük University

Faculty of Engineering
Automotive Engineering

MEE4019	Composite Materials and Manufacturing Methods				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
7	MEE4019	Composite Materials and Manufacturing Methods	3	3	5

Mode of Delivery:
Face to Face
Language of Instruction:
English (%100)
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Elective
Objectives of the Course:
Objectives of this course are: having the student's ability to understand the engineering materials and their properties and using these concepts in engineering application.
Teaching Methods and Techniques:
Introduction to Composites Composites Matrices and Properties (Polymers, Metal and Ceramics) Reinforced Materials ; Fibers (glass and carbon) and Whiskers and Particulates Manufacturing of Polymers/Metal Matrices Composites Interface between matrices and reinforcements.
Prerequisites and co-requisities:

Course Coordinator:
Dr. Özden İŞBİLİR
Name of Lecturers:
Dr. Gökhan SUR
Assistants:

Recommended or Required Reading

Resources Advanced Composites Manufacturing, Timothy G. Gutowski (Ed),Composite Manufacturing Technology, Bratukhin, A.G. and Bogolyubov V.S.,Composites Manufacturing: M
Composite Materials and Manufacturing Methods course notes

Course Category

Mathmatics and Basic Sciences	:	20	**Education**	:	
Engineering	:	40	**Science**	:	
Engineering Design	:	40	**Health**	:	
Social Sciences	:		**Field**	:	

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Definition and importance of composite		
2	Types of composites		
3	Metal amtrix composites		
4	Aluminium matrix compsoites		
5	Manufacturing of metal matrix composites		
6	Ceramic matrix composites		
7	Manufacturing of ceramic matrix composites		
8	plastic matrix materials and their composites		
9	Midterm examination		
10	Thermosets and thermoplastic composites		
11	Reinforcement materials, Fibres		
12	Manufacturing of polymer matrix composites		
13	Determination of design parameters and production method for production		
14	Composite materials technology		
15	Recent developments in composite materials		
16	Final examination		
17	Resit examiation		

Course Learning Outcomes

No	Learning Outcomes
C01	Define Composite Materials and classify Engineering Materials according to their structures
C02	Know the reinforcement materials and their properties and understand the role of reinforcement material
C03	Know the reinforcement materials and their properties and understand the role of reinforcement material
C04	Know the importance of the interface and learn the interface bonds
C05	Comprehend the composite production methods and their advantages and disadvantages
C06	Understand the importance of lightness, shaping (plastic) and strength for engineering materials and the development of these properties

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%40
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	14	3	42
Hours for off-the-c.r.stud	13	3	39
Assignments	0	0	0
Presentation	0	0	0
Mid-terms	1	15	15
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	1	25	25
Total Work Load			**121**
ECTS Credit of the Course			**5**

Contribution of Learning Outcomes to Programme Outcomes

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P10	P11	P12
All	4	2	4	3	2	2	3	2	2	2	2	2
C01	4	2	4	3	2	2	3	2	2	2	2	2
C02	4	2	4	3	2	2	3	2	2	2	2	2
C03	4	2	4	3	2	2	3	2	2	2	2	2
C04	4	2	4	3	2	2	3	2	2	2	2	2
C05	4	2	4	3	2	2	3	2	2	2	2	2
C06	4	2	4	3	2	2	3	2	2	2	2	2

Karabük University

Faculty of Engineering
Automotive Engineering

MEE4011	Computer Aided Manufacturing				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
7	MEE4011	Computer Aided Manufacturing	3	3	5

Mode of Delivery:
Face to Face
Language of Instruction:
English (%100)
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Elective
Objectives of the Course:
To identify the Computer Aided Manufacturing processes. To understand the manufacturing processes using in formation of product. To recognize the application and potential benefits of the automation and CAM concepts. To inform about the manufacturing processes supported from computer-based systems, tools and systems using in industry. To list the elements in Computer Aided Manufacturing medium. To explain the different automation techniques using in industry.
Teaching Methods and Techniques:
Computer-Aided Manufacturing (CAM) and components. Flexible manufacturing systems (ECS) and examples. The structure of the computer-controlled manufacturing systems. Design process steps in the CAD / CAM systems and the structure of the CAD system. Standard data base used in CAD/CAM systems and data exchange between systems in the Standard data base. CAD/CAM data transfer and data flow. Design techniques using in CAD/CAM systems, the transition phase from design to manufacturing. Computer Aided Process Planning (CAPP) in CAM, approaches using in process planning, data flow in CAPP. Group technology, the role of group technology in CAD/CAM integration, work-time distribution during part fabrication, group in the part production.
Prerequisites and co-requisities:

Course Coordinator:
Associate Prof.Dr. Selami Sağıroğlu
Name of Lecturers:

Assistants:

Recommended or Required Reading

Resources mastercam,solidcam
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Course Category

Mathmatics and Basic Sciences	: 25		**Education**	:	
Engineering	: 25		**Science**	: 25	
Engineering Design	: 25		**Health**	:	
Social Sciences	:		**Field**	:	

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	To learn the integrated ways of mechanical, electronic and information technology for manufacturing.		
2	To obtain information about the hierarchical and distributed computer control supported software and hardware.		
3	To obtain information about data collection, monitoring, processing and spreading.		
4	To obtain about sensors, tool control and station control. To learn the factory local area networks and their protocols.		
5	To learn the functioning of Computer Aided Design/Manufacturing (CAD/CAM) in manufacturing medium.		

Course Learning Outcomes

No	Learning Outcomes
C01	Computer-Aided Manufacturing (CAM) and Components
C02	Flexible Manufacturing Systems (ECS) and Examples. The Structure of The Computer-Controlled in Manufacturing Systems
C03	Design Process Steps in the CAD / CAM Systems and the Structure of The CAD System
C04	Standard Data Base Used in CAD/CAM Systems and Data Exchange between Systems in the Standard Data Base.
C05	Standard Data Base Used in CAD/CAM Systems and Data Exchange between Systems in the Standard Data Base.
C06	Definition of start point. Creating a stock. Setting the stock. Chosing a tool. Adding a new tool.
C07	Group technology, the role of group technology in CAD/CAM integration, work-time distribution during part fabrication, group in the part production.
C08	BSD code preparation methods, properties of CAD/CAM programs. DNC systems and structure. CAD/CAM integration.
C09	Product Design Techniques. 3 Dimensional Machinery, Product Modeling Techniques on the computer.
C10	Required operations for surface processing. BSD codes generate methods and BSD machine code sending.
C11	To plan the computer aided process with modeling of parts in CAD medium
C12	CAM Strategy Development
C13	CAM Strategy Development
C14	CAM Strategy Development

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%30
Quizzes	0	%0
Assignment	1	%10
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	2	14	28
Hours for off-the-c.r.stud	1	14	14
Assignments	10	4	40
Presentation	0	0	0
Mid-terms	15	1	15
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	18	3	54
Total Work Load			**151**
ECTS Credit of the Course			**5**

Contribution of Learning Outcomes to Programme Outcomes

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P10	P11	P12
All	5	5	5	4	4	3	3	2	2	3	3	4
C01	5	5	5	4	4	3	3	2	2	3	3	4
C02	5	5	5	4	4	3	3	2	2	3	3	4
C03	5	5	5	4	4	3	3	2	2	3	4	4
C04	5	5	5	4	4	3	3	2	2	3	3	4
C05	5	5	5	4	4	3	3	2	2	3	3	4
C06	5	5	5	4	4	3	3	2	2	3	3	4
C07	5	5	5	4	4	3	3	2	2	3	4	4
C08	5	5	5	4	4	3	3	2	2	3	3	4
C09	5	5	5	4	4	3	3	2	2	3	3	4
C10	5	5	5	4	4	3	3	2	2	3	3	4
C11	5	5	5	4	4	3	3	2	2	3	3	4
C12	5	5	5	4	4	3	3	2	2	3	3	4
C13	5	5	5	4	4	3	3	2	2	3	3	4
C14	5	5	5	4	4	3	3	2	2	3	3	4

Karabük University

Faculty of Engineering
Automotive Engineering

AEE4016	Computer Aided Vehicle Design				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
7	AEE4016	Computer Aided Vehicle Design	3	3	5

Mode of Delivery:
Face to Face
Language of Instruction:
English (%100)
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Elective
Objectives of the Course:
The aim of this course; 1. To introduce students to vehicle design parameters, 2. To gain the ability to design vehicles.
Teaching Methods and Techniques:
Vehicle design principles, computer-aided design and analysis techniques, vehicle dynamics and movement of resistance, the use of computers in the vehicle design stage, BDM in the modeling and analysis of vehicle components (Computer Aided Engineering) techniques, BDM vehicle design project work.
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:
Dr. Mustafa Karagöz
Assistants:

Recommended or Required Reading

Resources	Computer aided vehicle design lecture notes, Asst. Assoc. DR. Hilmi Kuşcu, Pamukkale University

Course Category

Mathmatics and Basic Sciences	:		**Education**	:	
Engineering	:	50	**Science**	:	
Engineering Design	:	50	**Health**	:	
Social Sciences	:		**Field**	:	

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	General design information to be reminded of.		
2	Software packages used in the industry.		
3	Layout design of the vehicle. Project 1 (Delivery date: Week 12)		
4	Design phase of transport.		
5	The problems encountered in the design of the vehicle.		
6	Problems and solutions encountered in the design of the vehicle.		
7	The division of the parts of the vehicle.		
8	The division of the parts of the vehicle.		
9	Identification of each section.		
10	The solid modeling program with appropriate drawings.		
11	Modelling the relevant section.		
12	Made of solid modeling.		
13	Each of the optimization.		
14	Harmonize with each other, each part.		

Course Learning Outcomes

No	Learning Outcomes
C01	Knows the desired properties are suitable vehicle design stages.
C02	You can use a 3D drawing program.
C03	Draw a portion or part of the vehicle as a solid model.
C04	Optimize part drawn through the package programs.
C05	Makes the animation and apply the relevant part.

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%20
Quizzes	0	%0
Assignment	1	%20
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	14	2	28
Hours for off-the-c.r.stud	12	3	36
Assignments	0	0	0
Presentation	0	0	0
Mid-terms	1	8	8
Practice	0	0	0
Laboratory	0	0	0
Project	1	40	40
Final examination	1	15	15
Total Work Load			**127**
ECTS Credit of the Course			**5**

Contribution of Learning Outcomes to Programme Outcomes

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P10	P11	P12
All	4	4	5	5	5	4	4	3	5	4	4	4

Karabük University

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Automotive Engineering

MEE4002	Electric and Hybrid Vehicles				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
7	MEE4002	Electric and Hybrid Vehicles	3	3	5

Mode of Delivery:
Face to Face
Language of Instruction:
English (%100)
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Elective
Objectives of the Course:
The main aim of this course is to provide students with knowledge about electric and hybrid vehicles and to learn the electrical and electronic systems used in these vehicles. Thus, students learn the modeling, analysis and control techniques of hybrid and electric vehicles.
Teaching Methods and Techniques:
Fundamentals of Electric Theory. Structure of Electric Vehicles. Types of Hybrid Vehicles. Structure of Hybrid Electric Vehicles. Battery technology. Regenerative Braking. Modeling, analysis and control of electric and hybrid vehicle systems.
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:
Prof.Dr. M. Bahattin ÇELİKAssociate ProfDr. Selami Sağıroğlu
Assistants:

Recommended or Required Reading

Resources Modern Electric Vehicle Technology, C.C. Chan, K.T. Chau. Oxford Science Publications, 2001

Course Category

Mathmatics and Basic Sciences	:		**Education**	:	
Engineering	:	50	**Science**	:	
Engineering Design	:	50	**Health**	:	
Social Sciences	:		**Field**	:	

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Introduction to the history and development of electric and hybrid vehicles		
2	Typical electric and hybrid vehicle structure		
3	Battery Charging		
4	Engine controllers		
5	Working principles of controllers		
6	Electric vehicles today		
7	Fuel cells		
8	Features of electric vehicles		
9	Torque-speed graph of a hybrid vehicle		
10	Battery and electric vehicle performance		
11	Series and Parallel Hybrid Vehicles, Complex Systems		
12	Electric Motor Types Used in Electric Hybrid Vehicles		
13	Batteries Used in Electric and Hybrid Vehicles		
14	Comparison of electric vehicles with internal combustion engine vehicles		

Course Learning Outcomes

No	Learning Outcomes
C01	Tipik bir elektirkli araç ve hibrit aracı teşhis eder
C02	Batarya şarj etme, kontrolörün çalışması ve kontrolör tiplerini açıklar
C03	Taşıt uygulamalarında elektrikli motor tipleri, hibrit aracın tork-hız grafiğini tanımlar
C04	Elektrikli motorlarla içten yanmalı motorların kıyaslamasını yapar
C05	Günümüzde kullanılan akü tiplerini tanımlar
C06	Günümüzde hibrit araçlarda kullanılan teknolojileri tanımlar
C07	Yakıt hücresi teknolojisini ve uygulamalarını açıklar

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%30
Quizzes	0	%0
Assignment	1	%10
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	14	3	42
Hours for off-the-c.r.stud	10	3	30
Assignments	3	5	15
Presentation	0	0	0
Mid-terms	1	14	14
Practice	0	0	0
Laboratory	0	0	0
Project	2	5	10
Final examination	1	11	11
Total Work Load			**122**
ECTS Credit of the Course			**5**

Contribution of Learning Outcomes to Programme Outcomes

	P01	P02	P03	P04	P05	P06
C01	4	5	5	4	4	5
C03			5			
C05				4		
C06						4
C07		5				

Karabük University

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OMT497	Industrial Practice II				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
7	OMT497	Industrial Practice II	0	0	5

Mode of Delivery:
Face to Face
Language of Instruction:
Turkish
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Required
Objectives of the Course:
To strengthen the theoretical knowledge of students and ensure their application, to create opportunities for them to decide on their career goals and to direct them to create a professional foundation.
Teaching Methods and Techniques:
* Continuing mechanical and / or automotive engineering applications. * Vocational Education * Practical Applications * Professional Ethics practices * Environmental Health Practices
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:
Dr. Samet Uslu
Assistants:

Recommended or Required Reading

Resources	Staj yapılan işletmede kullanılan kaynaklar.

Course Category

Mathmatics and Basic Sciences	:		**Education**	:	
Engineering	:	100	**Science**	:	
Engineering Design	:		**Health**	:	
Social Sciences	:		**Field**	:	

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Mesleki Deneyim ve Uygulamalar		
2	Mesleki Deneyim ve Uygulamalar		
3	Mesleki Deneyim ve Uygulamalar		
4	Mesleki Deneyim ve Uygulamalar		

Course Learning Outcomes

No	Learning Outcomes
C01	Makina ve Otomotiv Mühendisliği ile ilgili ulusal ve uluslararası gelişmeleri açıklar ve raporlar.
C02	İş yaşamı, hukuku, sorumlulukları ve şirket-çalışan ilişkilerini tanır.
C03	Mesleki deneyim kazanır.
C04	Mühendislikte ekonomi, pazarlama ve proje değerlendirme kurallarını kullanır.
C05	İş hayatında meslek ahlakı ve çevre sağlığı kurallarını uygular.
C06	Makina ve Otomotiv Mühendisliği Anlanlarında Modern Teknik ve Metotları kullanır.

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	0	%0
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	1	%100
Project	0	%0
Final examination	0	%0
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	0	0	0
Hours for off-the-c.r.stud	0	0	0
Assignments	0	0	0
Presentation	0	0	0
Mid-terms	0	0	0
Practice	6	20	120
Laboratory	0	0	0
Project	0	0	0
Final examination	0	0	0
Total Work Load			**120**
ECTS Credit of the Course			**5**

Contribution of Learning Outcomes to Programme Outcomes

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P10	P11	P12
All	5	5	5	5	5	5	5	5	5	5	5	5

Karabük University

Faculty of Engineering
Automotive Engineering

AEE4008	Factory Organization				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
7	AEE4008	Factory Organization	3	3	5

Mode of Delivery:
Face to Face
Language of Instruction:
English (%100)
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Elective
Objectives of the Course:
Factory management, manufacturing methods, working hours of the personnel and gaining the working routines during working hours
Teaching Methods and Techniques:
factory management, parameters taken into account for establishing a factory, determination of staff routines
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:
Dr. Cevat ÖZARPA
Assistants:

Recommended or Required Reading

Resources Clifford F. Gray. Project Management: The Managerial Process. 4. baskı. 2008

Course Category

Mathmatics and Basic Sciences	: 20		**Education**	:	
Engineering	: 40		**Science**	:	
Engineering Design	: 20		**Health**	:	
Social Sciences	:		**Field**	: 20	

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Examination of the phases of the factory organization		

Course Learning Outcomes

No	Learning Outcomes
C01	Acquisition of the process from the establishment of the factory to the sale of the products to be produced in the factory.

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%20
Quizzes	0	%0
Assignment	1	%20
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	14	2	28
Hours for off-the-c.r.stud	10	4	40
Assignments	1	32	32
Presentation	0	0	0
Mid-terms	1	9	9
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	1	14	14
Total Work Load			**123**
ECTS Credit of the Course			**5**

Contribution of Learning Outcomes to Programme Outcomes

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P10	P11	P12
All	5	5	5	5	5	5	5	5	5	5	5	5
C01	5	5	5	5	5	5	5	5	5	5	5	5

Karabük University

Faculty of Engineering
Automotive Engineering

AEE4012	Fuels and Combustion				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
7	AEE4012	Fuels and Combustion	3	3	5

Mode of Delivery:
Face to Face
Language of Instruction:
English (%100)
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Elective
Objectives of the Course:
The aim of this course is to introduce the fuels used in internal combustion engines, to teach combustion and thermo-chemistry.
Teaching Methods and Techniques:
Fuels, classification and properties, fuels used in internal combustion engines, combustion and combustion equations.
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:
Associate Prof.Dr. Mehmet ÇELİK
Assistants:

Recommended or Required Reading

Resources Internal Combustion Engines Nobel Publications
Fuels and Combustion Nobel Publications

Course Category

Mathmatics and Basic Sciences	: 10		**Education**	:	
Engineering	: 10		**Science**	: 10	
Engineering Design	: 10		**Health**	:	
Social Sciences	:		**Field**	: 60	

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Learning of fuels, their classification and properties.		Textbook
2	Learning of fuels, their classification and properties.		Textbook
3	Learning of fuels, their classification and properties.		Textbook
4	Learning of fuels, their classification and properties.		Textbook
5	To learn the fuels used in internal combustion engines.		Textbook
6	To learn the fuels used in internal combustion engines.		Textbook
7	To learn the fuels used in internal combustion engines.		Textbook
8	Mid-terms		
9	To learn the fuels used in internal combustion engines.		Textbook
10	To learn the fuels used in internal combustion engines.		Textbook
11	To learn burning and burning equations.		Textbook
12	To learn burning and burning equations.		Textbook
13	To learn burning and burning equations.		Textbook
14	To learn burning and burning equations.		Textbook
15	Final examination		

Recommended Optional Programme Components

AEE4001 Alternative Fuels

Course Learning Outcomes

No	Learning Outcomes
C01	Learning of fuels, their classification and properties.
C02	To learn the fuels used in internal combustion engines.
C03	To learn burning and burning equations.

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%40
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	1	15	15
Hours for off-the-c.r.stud	1	15	15
Assignments	0	0	0
Presentation	0	0	0
Mid-terms	1	40	40
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	1	60	60
Total Work Load			**130**
ECTS Credit of the Course			**5**

Contribution of Learning Outcomes to Programme Outcomes

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P10	P11	P12
C01	2				4			3		4		3
C02		2	3			4	4				3	
C03				3					2			

Karabük University

Faculty of Engineering
Automotive Engineering

MEE4008	Gas Dynamics				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
7	MEE4008	Gas Dynamics	3	3	5

Mode of Delivery:
Face to Face
Language of Instruction:
English (%100)
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Elective
Objectives of the Course:
Providing detailed theoretical and practical information about gas dynamics
Teaching Methods and Techniques:
One- dimensional compressible flows including basic concepts; isentropic flow; normal and oblique shock waves; flows with heat transfer (Rayleigh line), friction (Fanno line), simple waves, steady flows, steady flow and one-dimensional, unsteady flow
Prerequisites and co-requisities:

Course Coordinator:
Prof.Dr. Kamil ARSLAN
Name of Lecturers:

Assistants:

Recommended or Required Reading

Resources Aksel, M. H. and Eralp, O. C, Gas Dynamics, Prentice Hall, Inc., Englewood Cliffs, New Jersey, 1994., Robert D. Zucker, Oscar Biblarz, Fundamentals of Gas Dynamics, 3rd

Course Category

Mathmatics and Basic Sciences	:	30	**Education**	:	0
Engineering	:	50	**Science**	:	10
Engineering Design	:	10	**Health**	:	0
Social Sciences	:	0	**Field**	:	0

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Definitions and Fundamental Principles		
2	Definitions and Fundamental Principles		
3	Control Volume Analysis		
4	Control Volume Analysis		
5	Introduction to Compressible Flow		
6	Introduction to Compressible Flow		
7	Varying-Area Adiabatic Flow		
8	Varying-Area Adiabatic Flow		
9	Normal Shocks		
10	Normal Shocks		
11	Moving and Oblique Shocks		
12	Prandtl–Meyer Flow		
13	Fanno Flow		
14	Rayleigh Flow		

Course Learning Outcomes

No	Learning Outcomes
C01	Gains knowledge of control volume analysis.
C02	Gains knowledge of compressible flow.
C03	Gains knowledge of adiabatic flow.
C04	Gains knowledge of normal shock waves.
C06	Gains knowledge about Prandtl-Meyer, Fanno and Rayleigh flows.

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%40
Quizzes	0	%0
Assignment	3	%10
Attendance	0	%0
Practice	7	%5
Project	1	%5
Final examination	1	%40
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	14	3	42
Hours for off-the-c.r.stud	14	3	42
Assignments	3	2	6
Presentation	0	0	0
Mid-terms	1	5	5
Practice	7	2	14
Laboratory	0	0	0
Project	1	3	3
Final examination	1	5	5
Total Work Load			**117**
ECTS Credit of the Course			**4**

Contribution of Learning Outcomes to Programme Outcomes

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P10	P11	P12
All	4	5	3	1	2	1	5	1	4	3	1	4
C01	4	5	3	1	2	1	5	1	4	3	1	4
C02	4	5	3	1	2	1	5	1	4	3	1	4
C03	4	5	3	1	2	1	5	1	4	3	1	4
C04	4	5	3	1	2	1	5	1	4	3	1	4
C06	4	5	3	1	2	1	5	1	4	3	1	4

Karabük University

Faculty of Engineering
Automotive Engineering

AEE4003	Gas Turbines				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
7	AEE4003	Gas Turbines	3	3	5

Mode of Delivery:
Face to Face
Language of Instruction:
English (%100)
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Elective
Objectives of the Course:
To enable automotive engineering students to understand the historical development of gas turbines, operating principles, combustion and energy conversion in the engine, exhaust emissions, aviation practices and latest technological developments, and to strengthen their knowledge on these issues.
Teaching Methods and Techniques:
Historical development of gas turbines, classification. Classification of flow processes. Theoretical cycles; theoretical stirling cycle, theoretical Brayton cycle, regeneration, intercooler and heater gas turbines, closed system gas turbines. Real cycles. Stagnation values. Compressor and turbine efficiencies, pressure losses, regenerator efficiency, mechanical losses, air / fuel ratio and combustion efficiency. Performance, work and air rates. Aviation gas turbines, performance criteria, efficiency. Compressors, centrifugal compressors, axial compressors, speed diagrams of the compressor stage, stage characteristics. Combustion chambers, fuel supply, combustion chamber types. Combustion characteristics. Gas turbine fuels, emissions. Turbines, turbine stage, velocity diagrams, impulse and reaction, blade parameters. Recent developments, fuel economy, weight and dimensions, transmission requirement materials, comparison.
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:
Associate Prof.Dr. Mehmet ÇELİK
Assistants:

Recommended or Required Reading

Resources Internal Combustion Engines Nobel Publications
Lecturer Course Notes

Course Category

Mathmatics and Basic Sciences	:	10	**Education**	:	
Engineering	:	10	**Science**	:	10
Engineering Design	:	10	**Health**	:	
Social Sciences	:		**Field**	:	60

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Historical development of gas turbines, classification.		
2	Classification of flow processes.		
3	Theoretical cycles; theoretical stirling cycle, theoretical Brayton cycle, regeneration, intercooler and heater gas turbines, clc		
4	Theoretical cycles; theoretical stirling cycle, theoretical Brayton cycle, regeneration, intercooler and heater gas turbines, clc		
5	Real cycles. Stagnation values. Compressor and turbine efficiencies, pressure losses, regenerator efficiency, mechanical los		
6	Real cycles. Stagnation values. Compressor and turbine efficiencies, pressure losses, regenerator efficiency, mechanical los		
7	Performance, work and air rates. Aviation gas turbines, performance criteria, efficiency.		
8	Mid-term		
9	Compressors, centrifugal compressors, axial compressors, speed diagrams of the compressor stage, stage characteristics.		
10	Combustion chambers, fuel supply, combustion chamber types. Combustion characteristics.		
11	Gas turbine fuels, emissions.		
12	Turbines, turbine stage, velocity diagrams, impulse and reaction, blade parameters.		
13	Recent developments, fuel economy, weight and dimensions, transmission requirement materials, comparison.		
14	Recent developments, fuel economy, weight and dimensions, transmission requirement materials, comparison.		
15	Final Exam		

Recommended Optional Programme Components

AEE4003 Gas Turbines

Course Learning Outcomes

No	Learning Outcomes
C01	Learns the historical development and classification of gas turbines.
C02	Learns theoretical and real cycles.
C03	Learns compressors, centrifugal compressors, axial compressors, speed diagrams of the compressor stage, stage characteristics.
C04	Turbines, turbine stage, velocity diagrams, impulse and reaction, blade parameters.

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%40
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	1	10	10
Hours for off-the-c.r.stud	1	10	10
Assignments	0	0	0
Presentation	0	0	0
Mid-terms	1	40	40
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	1	60	60
Total Work Load			**120**
ECTS Credit of the Course			**5**

Contribution of Learning Outcomes to Programme Outcomes

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P10	P11	P12
C01	2			2			3		4			
C02		2						3		3		4
C03			4			3					3	
C04	4				2				3			3

Karabük University

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Automotive Engineering

AEE4004	German I				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
7	AEE4004	German I	3	3	5

Mode of Delivery:
Face to Face
Language of Instruction:
English (%100)
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Elective
Objectives of the Course:
To improve students' basic grammar, reading and listening skills at A1 level in the target language. Students will be able to understand short, simple texts containing the most used words; to be able to make short, simple descriptions of events; understand simple, clear, short dialogues; to make them use grammatical structures correctly.
Teaching Methods and Techniques:
Basic grammar of the German language, common words and A1 level reading and listening passages.
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:
Dr. Cevat ÖZARPA
Assistants:

Recommended or Required Reading

Resources	Dreyer, H. & Schmitt, R. (2016) Lehr-und Übungsbuch der deutschen Grammatik, İsmaning: Hueber Verlag.Hauschild, A. (2015) Praxis-Grammatik Deutsch als Fremdspra

Course Category

Mathmatics and Basic Sciences	:	**Education**	:
Engineering	:	**Science**	:
Engineering Design	:	**Health**	:
Social Sciences	:	**Field**	:

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Subject, Predicate and Complement		
2	Question and conjunction with binary structure		
3	How clauses and infinitives		
4	Properties of sentences made with the name of relevance		
5	For stating why, because, so alone, for this reason		
6	Indicating a condition, if there is, as long as		
7	Although stating the opposite reason, though, though, though, though, though, if it happens, however		
8	Stating the opposite reason is like / like, even if it is		
9	Stating the opposite reason and doing with question words		
10	Stating the purpose therefore and for this		
11	Continuing, so much so that ...		
12	Repetition of Lessons		
13	Repetition of Lessons		
14	Repetition of Lessons		

Course Learning Outcomes

No	Learning Outcomes
C01	Students will develop a positive attitude towards the target language.
C02	Students will increase their basic abilities to communicate in both academic and daily life.
C03	Students will be able to learn A1 level grammar and vocabulary in the target language and use what they have learned.
C04	Students will be able to understand A1 level texts and speech in the target language.
C05	Students will be able to express themselves verbally in the target language at A1 level.

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%40
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	14	2	28
Hours for off-the-c.r.stud	14	2	28
Assignments	1	48	48
Presentation	0	0	0
Mid-terms	1	9	9
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	1	14	14
Total Work Load			**127**
ECTS Credit of the Course			**5**

Contribution of Learning Outcomes to Programme Outcomes

	P01	P06	P07
All	3	2	5
C01	3	2	5
C02	3	2	5
C03	3	2	5
C04	3	2	5
C05	3	2	5

Karabük University

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AEE4015	German II				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
7	AEE4015	German II	3	3	5

Mode of Delivery:
Face to Face
Language of Instruction:
English (%100)
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Elective
Objectives of the Course:
To improve students' basic grammar, reading and listening skills at A1 level in the target language. Students will be able to understand short, simple texts containing the most used words; to be able to make short, simple descriptions of events; understand simple, clear, short dialogues; to make them use grammatical structures correctly.
Teaching Methods and Techniques:
Basic grammar of the German language, common words and A1 level reading and listening passages.
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:
Dr. Cevat ÖZARPA
Assistants:

Recommended or Required Reading

Resources	Dreyer, H. & Schmitt, R. (2016) Textbook and exercise book for German grammar, İsmaning: Hueber Verlag.Hauschild, A. (2015) Practice grammar German as a foreign

Course Category

Mathmatics and Basic Sciences	:	**Education**	:
Engineering	:	**Science**	:
Engineering Design	:	**Health**	:
Social Sciences	:	**Field**	:

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Adjectives, the use of the adjective, the adjective clause, the use of the adjective in the adverb task beside the verb, the u		
2	Adjectives and nouns		
3	Adjectives and nouns		
4	Comparison of adjectives		
5	Envelopes, place adverbs, adverbs of time		
6	Adverbs of state, adverbs of why		
7	Sentence, main and subordinate sentence		
8	Main and subordinate sentences		
9	Infinitive sentence, question sentences that do not start with the question word		
10	Order of items in German sentences		
11	The place of the subject and the verb in the sentence		
12	The place of adverbial markers in the sentence, the place of the object with a preposition		
13	Locations of objects and markers in the sentence		
14	Repetition of Lessons		

Course Learning Outcomes

No	Learning Outcomes
C01	Students will develop a positive attitude towards the target language.
C02	Students will increase their basic abilities to communicate in both academic and daily life.
C03	Students will be able to learn A2 level grammar and vocabulary in the target language and use what they have learned.
C04	Students will be able to understand A2 level texts and speech in the target language.
C05	Students will be able to express themselves verbally at A2 level in the target language.

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%40
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	14	2	28
Hours for off-the-c.r.stud	14	3	42
Assignments	1	32	32
Presentation	0	0	0
Mid-terms	1	9	9
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	1	14	14
Total Work Load			**125**
ECTS Credit of the Course			**5**

Contribution of Learning Outcomes to Programme Outcomes

	P01	P06	P07
All	3	2	5
C01	3	2	5
C02	3	2	5
C03	3	2	5
C04	3	2	5
C05	3	2	5

Karabük University

Faculty of Engineering
Automotive Engineering

MEE4009	Hydraulic Machinery				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
7	MEE4009	Hydraulic Machinery	3	3	5

Mode of Delivery:
Face to Face
Language of Instruction:
English (%100)
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Elective
Objectives of the Course:
To teach the hydraulic machine theory to the students, to comprehend the principles of turbine and pump design and to gain the ability to apply engineering.
Teaching Methods and Techniques:
Classification of hydraulic machines; Theory of turbomachinery; Euler's theorem; Speed diagram; Francis turbine; definition of head, specific speed, power and efficiency; Dimensional analysis and similarity; Mountain curves; Cavitation; Design of Francis, Kaplan, Pelton and Banki turbines; Centrifugal pumps; manometric head-flow, specific velocity, power, efficiency and cavitation definitions; Finding the operating point of pump systems; Centrifugal pump design; Axial pumps; Volumetric pumps.
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:
Prof.Dr. M. Bahattin Çelik
Assistants:

Recommended or Required Reading

Resources Karask, I. J., Krutzsch, W., C., Fraser, W., H., ve Messina, J., P. 1985. Pump Handbook, Mc-Graw Hill, New York.,Wright, T., Fluid Machinery Performance, Analysis and D
-

Course Category

Mathmatics and Basic Sciences	:	20	**Education**	:	
Engineering	:	30	**Science**	:	10
Engineering Design	:	10	**Health**	:	
Social Sciences	:		**Field**	:	30

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Introduction: Hydraulic Machines, Uses, Classification. Purpose of Hydraulic Machines: Turbine and Pump Examples. Berno		
2	Basic Concepts in Turbomachinery: Theory of Turbomachinery. Energy Transfer Between Liquid and Rotor. Euler's Theoren		
3	Hydraulic Turbines: Classification of Turbines. Operation of a Hydroelectric Power Plant. Francis Turbines. Emitters. Turbine		
4	Turbine Basic Equations: Defining Basic Terms for Turbines and Developing Related Equations; Head, Specific Speed, Turb		
5	Dimensional Analysis and Similarity Theory: Dimensional Analysis. Similarity Theory. Similarity Rules: Geometric, Kinematic		
6	Cavitation: Definition of Cavitation. Analysis of Parameters Affecting Cavitation. Development of Cavitation Criteria. Effects		
7	Franicis Turbines: Defining Design Parameters. Obtaining Design Steps. Calculation of Turbine Basic Dimensions.		
8	Model Testing Methodology. Creating Mountain Curves. Evaluation of Performance Parameters.		
9	Kaplan Turbines: Introducing Kaplan Turbines. Defining Design Parameters and Methodology. Formulation of Basic Dimens		
10	Pelton Turbines: Introducing the Pelton Turbines. Developing Formulas for Speed Diagram and Power Calculations. Definin		
11	Bench and Tubular Turbines: Introduction of Banki and Tubular Turbines, Their Applications in Small-Head Hydroelectric Pc		
12	Centrifugal Pumps: Working Principle of Centrifugal Pumps. Obtaining Basic Equations: Manometric Height-Flow Rate, Spec		
13	Analysis of Pump Systems: Finding the Operating Point of Different Pump Systems; Single, Parallel, Series Pumps, Pipe Cha		
14	Axial Pumps: Introduction and Usage Areas of Axial Pumps. Volumetric Pumps: Introduction and Usage Areas of Volumetric		

Course Learning Outcomes

No	Learning Outcomes
C01	Defines the basic principles of hydraulic machines.
C02	Makes the calculation and design of turbine and pump.
C03	Categorize pumps and turbines.
C04	Chooses the pump and turbine suitable for the job.
C05	Analyzes efficiency increasing methods in pumps and turbines.

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%40
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	14	3	42
Hours for off-the-c.r.stud	0	0	0
Assignments	0	0	0
Presentation	0	0	0
Mid-terms	1	3	3
Practice	0	0	0
Laboratory	14	5	70
Project	0	0	0
Final examination	1	3	3
Total Work Load			**118**
ECTS Credit of the Course			**5**

Contribution of Learning Outcomes to Programme Outcomes

	P01	P02	P03	P04	P05	P06	P07	P08	P12
C01	2		2	5	4	2	5	1	
C02		4					1		5
C03	3		3	2	3	2		3	2
C04		2				1		4	
C05			1	2	3		2		3

Program Learning Outcomes	
No	**Learning Outcome**
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria		
In-Term Studies	**Quantity**	**Percentage**
Mid-terms	0	%0
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	0	%0
Total		**%0**

ECTS Allocated Based on Student Workload			
Activities	**Quantity**	**Duration**	**Total Work Load**
Course Duration	0	0	0
Hours for off-the-c.r.stud	0	0	0
Assignments	0	0	0
Presentation	0	0	0
Mid-terms	0	0	0
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	0	0	0
Total Work Load			**0**
ECTS Credit of the Course			**0**

Contribution of Learning Outcomes to Programme Outcomes

Karabük University

Faculty of Engineering
Automotive Engineering

OMT490	Industrial Traning				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
7	OMT490	Industrial Traning	5	5	5

Mode of Delivery:
Face to Face
Language of Instruction:
Turkish
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Elective
Objectives of the Course:
It is for students to be trained as engineers who know how to apply and become effective and privileged in the market.
Teaching Methods and Techniques:
It is for students to be trained as engineers who know how to apply and become effective and privileged in the market.
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:
Associate Prof.Dr. Selami Sağıroğlu
Assistants:

Recommended or Required Reading

Resources Documents of the applied enterprise

Course Category

Mathmatics and Basic Sciences	:		**Education**	:	
Engineering	:	50	**Science**	:	
Engineering Design	:		**Health**	:	
Social Sciences	:		**Field**	:	50

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Workplace Training		
2	İş Yeri Eğitimi		
3	İş Yeri Eğitimi		
4	İş Yeri Eğitimi		
5	İş Yeri Eğitimi		
6	İş Yeri Eğitimi		
7	İş Yeri Eğitimi		
8	İş Yeri Eğitimi		
9	İş Yeri Eğitimi		
10	İş Yeri Eğitimi		
11	İş Yeri Eğitimi		
12	İş Yeri Eğitimi		
13	İş Yeri Eğitimi		
14	Workplace Training		

Course Learning Outcomes

No	Learning Outcomes
C01	Many important values such as business ethics, problem solving ability and experience that are not provided in formal education conditions will be gained to students.

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	0	%0
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%100
Project	0	%0
Final examination	0	%0
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	14	5	70
Hours for off-the-c.r.stud	5	4	20
Assignments	0	0	0
Presentation	0	0	0
Mid-terms	1	10	10
Practice	4	4	16
Laboratory	0	0	0
Project	0	0	0
Final examination	2	10	20
Total Work Load			**136**
ECTS Credit of the Course			**5**

Contribution of Learning Outcomes to Programme Outcomes

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P10	P11	P12
All	5	4	5	4	5	4	4	5	4	5	5	5

Karabük University

Faculty of Engineering
Automotive Engineering

OMT492	Workplace Practice				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
7	OMT492	Workplace Practice	15	7	20

Mode of Delivery:
Face to Face
Language of Instruction:
Turkish
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Elective
Objectives of the Course:
It is for students to be trained as engineers who know how to apply and become effective and privileged in the market.
Teaching Methods and Techniques:
It is for students to be trained as engineers who know how to apply and become effective and privileged in the market.
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:
Associate Prof.Dr. Selami Sağıroğlu
Assistants:

Recommended or Required Reading

Resources Documents of the applied enterprise

Course Category

Mathmatics and Basic Sciences	:		**Education**	:	
Engineering	:	50	**Science**	:	
Engineering Design	:		**Health**	:	
Social Sciences	:		**Field**	:	50

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Workplace Training		
2	İş Yeri Eğitimi		
3	İş Yeri Eğitimi		
4	İş Yeri Eğitimi		
5	İş Yeri Eğitimi		
6	İş Yeri Eğitimi		
7	İş Yeri Eğitimi		
8	İş Yeri Eğitimi		
9	İş Yeri Eğitimi		
10	İş Yeri Eğitimi		
11	İş Yeri Eğitimi		
12	İş Yeri Eğitimi		
13	İş Yeri Eğitimi		
14	Workplace Training		

Course Learning Outcomes

No	Learning Outcomes
C01	Many important values such as business ethics, problem solving ability and experience that are not provided in formal education conditions will be gained to students.

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	0	%0
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%100
Project	0	%0
Final examination	0	%0
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	14	5	70
Hours for off-the-c.r.stud	20	8	160
Assignments	0	0	0
Presentation	0	0	0
Mid-terms	1	10	10
Practice	10	5	50
Laboratory	0	0	0
Project	0	0	0
Final examination	2	10	20
Total Work Load			**310**
ECTS Credit of the Course			**12**

Contribution of Learning Outcomes to Programme Outcomes

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P10	P11	P12
All	5	4	5	4	5	4	4	5	4	5	5	5

Karabük University

Faculty of Engineering
Automotive Engineering

AEE4006	LPG and Natural Gas Applications in Vehicles				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
7	AEE4006	LPG and Natural Gas Applications in Vehicles	3	3	5

Mode of Delivery:
Face to Face
Language of Instruction:
English (%100)
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Elective
Objectives of the Course:
To teach the students the importance and benefits of using LPG and natural gas as alternative fuels in vehicles.
Teaching Methods and Techniques:
Alternative fuel use in vehicles. Properties of LPG fuel. Evaluation of LPG as an engine fuel. LPG conversion in vehicles. LPG Conversion system components. The effects of LPG on engine performance. Effects of LPG on emissions. Properties of natural gas fuel. Evaluation of natural gas as engine fuel. Conversion of natural gas in vehicles. Natural gas conversion system components. Effects of natural gas on performance. Effects of natural gas on emissions. The spread potential of alternative fuels.
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:
Prof.Dr. M. Bahattin Çelik
Assistants:

Recommended or Required Reading

Resources Pulkrabek, W.W., "Engineering undamentals of Internal Combustion Engines" , Dorling Kindersley (india) Pvt Ltd, 1990. ,Stone, R., Introduction to Internal Combustion E
-

Course Category

Mathmatics and Basic Sciences	:	10	**Education**	:	
Engineering	:	30	**Science**	:	10
Engineering Design	:	10	**Health**	:	
Social Sciences	:		**Field**	:	40

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Alternative fuel use in vehicles.		
2	Properties of LPG fuel.		
3	Evaluation of LPG as an engine fuel.		
4	LPG conversion in vehicles.		
5	LPG Conversion system components.		
6	The effects of LPG on engine performance.		
7	Effects of LPG on emissions.		
8	Properties of natural gas fuel.		
9	Evaluation of natural gas as engine fuel.		
10	Conversion of natural gas in vehicles.		
11	Natural gas conversion system components.		
12	Effects of natural gas on performance.		
13	Effects of natural gas on emissions.		
14	The spread potential of alternative fuels.		

Course Learning Outcomes

No	Learning Outcomes
C01	Students taking this course; understands the importance and necessity of alternative fuels.
C02	Knows the LPG system in vehicles.
C03	Evaluates the natural gas usage conditions in vehicles.
C04	Analyzes the usage results of LPG and natural gas.
C05	Interprets the effects of LPG and natural gas on engine performance and emissions.

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%40
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	14	3	42
Hours for off-the-c.r.stud	14	5	70
Assignments	0	0	0
Presentation	0	0	0
Mid-terms	1	2	2
Practice	2	5	10
Laboratory	0	0	0
Project	0	0	0
Final examination	1	2	2
Total Work Load			**126**
ECTS Credit of the Course			**5**

Contribution of Learning Outcomes to Programme Outcomes

	P01	P02	P03	P04	P05	P06	P07	P08	P11	P12
C01	1	3			3	1		2		
C02	2		2	1	1		3	3	5	3
C03		2	1	2		5	1			
C04	2				1			4		1
C05		3		3		2	4		2	1

Karabük University

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Automotive Engineering

AEE4020	Manufacturing Processes II				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
7	AEE4020	Manufacturing Processes II	3	3	5

Mode of Delivery:
Face to Face
Language of Instruction:
English (%100)
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Elective
Objectives of the Course:
To introduce the principles of basic manufacturing procedures, the equipment used and their application areas.
Teaching Methods and Techniques:
Classification of manufacturing methods; their comparison, advantages and limits. Design-manufacturing relationship; selection of manufacturing method, casting, welding, plastic forming, machining and powder metallurgy manufacturing methods, Manufacturing with plastic and composite materials, ceramic part production.
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:
Associate Prof.Dr. Mehmet ÇELİK
Assistants:

Recommended or Required Reading

Resources Production Methods and Manufacturing Technologies Seçkin Publications
Manufacturing, Engineering & Technology; 5th Edition; Serope Kalpakjian, Steven Schmid; Prentice Hall

Course Category

Mathmatics and Basic Sciences	:	10	**Education**	:	
Engineering	:	20	**Science**	:	10
Engineering Design	:	10	**Health**	:	
Social Sciences	:		**Field**	:	60

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Introductory Course		
2	Mechanical and manufacturing properties of materials		
3	Polymers and their manufacture		
4	Metal casting processes and equipment		
5	Metal casting processes and equipment		
6	Metal casting processes and equipment		
7	Forming processes and equipment		
8	Mid-term		
9	Forming processes and equipment		
10	Forming processes and equipment		
11	Machining methods and tools		
12	Machining methods and tools		
13	Welding Methods and equipment		
14	Welding Methods and equipment		
15	Final Exam		

Recommended Optional Programme Components

OMT212 Manufacturing Processes I

Course Learning Outcomes

No	Learning Outcomes
C01	Successful students will be able to understand the scientific principles of manufacturing processes.
C02	Successful students will be able to apply ethical standards and responsibilities towards engineering and society.
C03	Successful students will be able to develop creative solutions to the problems of breakdown processes.

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%40
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	1	10	10
Hours for off-the-c.r.stud	1	10	10
Assignments	0	0	0
Presentation	0	0	0
Mid-terms	1	45	45
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	1	55	55
Total Work Load			**120**
ECTS Credit of the Course			**5**

Contribution of Learning Outcomes to Programme Outcomes

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P10	P11	P12
C01	2				3			4		4		4
C02		3	2				4				3	
C03				3		4			3	3		3

Karabük University

Faculty of Engineering
Automotive Engineering

AEE4007	Marine Machinery				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
7	AEE4007	Marine Machinery	3	3	5

Mode of Delivery:
Face to Face
Language of Instruction:
English (%100)
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Elective
Objectives of the Course:
1. To introduce propulsion engine alternatives 2. To establish a sound understanding of diesel engines as a prime mover 3. To provide working knowledge on Diesel engine auxiliary systems and their functions 4. To introduce engine-propeller matching problem
Teaching Methods and Techniques:
Working principles of diesel engines, engine types, two and four stroke engines, engine construction, and thermodynamic analysis of engines, combustion in diesel engines, diesel engine emissions and abatement technologies, fuel-oil, cooling and lubrication systems, supercharging, clutching and gearing, engine and propeller matching. Laboratory experiments regarding diesel engine performance and emissions.
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:
Prof.Dr. M. Bahattin ÇELİK
Assistants:

Recommended or Required Reading

Resources	Introduction to Marine Engineering, 2nd Edition, D.A. Taylor, Butterworth & Heinemann, 1996

Course Category

Mathmatics and Basic Sciences	:		**Education**	:	
Engineering	:	100	**Science**	:	
Engineering Design	:		**Health**	:	
Social Sciences	:		**Field**	:	

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Introduction to Marine Engines (Steam, gas Turbine, Diesel)		
2	Marine Diesel Engines, four-stroke engines		
3	Marine Diesel Engines, two-stroke engines		
4	Diesel Engine Components		
5	Engine Performance Characteristics		
6	Fundamentals of Cycle Analysis		
7	Diesel Engine Cycle Analysis Applications		
8	Marine Fuels and Combustion		
9	Diesel Engine emissions and control technologies		
10	Gas exchange and supercharging		
11	Engine dynamics		
12	Shaft torsional vibration problems		
13	Diesel engine associated systems; fuel, lubrication and cooling circuits		
14	Engine selection and engine-propeller matching		

Course Learning Outcomes

No	Learning Outcomes
C01	Describe the alternatives for prime movers, explain their pros and cons
C02	Explain the working principles of 4-stroke and 2-stroke Diesel engines, identify the principal engine components and describe their functions
C03	Utilise engine design and operation parameters in efficiency calculations, employ cycle analysis in engine performance prediction
C04	Identify the physical and chemical specifications and standards of Marine Fuels, explain the Diesel engine exhaust emissions, conventions and emission abatement methods
C05	Carry out preliminary design calculations for superchargers, carry out engine dynamics calculations
C06	Identify Diesel engine auxiliary systems, Carry out engine-propeller mathcing procedure

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%30
Quizzes	0	%0
Assignment	1	%10
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	14	3	42
Hours for off-the-c.r.stud	12	3	36
Assignments	10	1	10
Presentation	0	0	0
Mid-terms	10	1	10
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	18	1	18
Total Work Load			**116**
ECTS Credit of the Course			**5**

Contribution of Learning Outcomes to Programme Outcomes

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P10	P11	P12
All	4	5	5	4	5	4	5	4	5	4	4	5

Karabük University

Faculty of Engineering
Automotive Engineering

MEE4041	Mechanical Vibrations				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
7	MEE4041	Mechanical Vibrations	3	3	5

Mode of Delivery:
Face to Face
Language of Instruction:
English (%100)
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Elective
Objectives of the Course:
Gaining the ability of obtaining the models of mechanical systems, analyzing and preventing mechanical vibration problems.
Teaching Methods and Techniques:
Mechanical vibrations and basic concepts, modeling of mechanical systems, single degree of freedom systems, two degree of freedom systems, multi degree of freedom systems, harmonic analysis, eigenvalue problem, energy method, Lagrange equations, reduction of gradual torsion systems and finding critical frequencies
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:
Dr. Engin YILDIRIM
Assistants:

Recommended or Required Reading

Resources	Singiresu S. Rao-Mechanical Vibrations (Prentice Hall 2010)

Course Category

Mathmatics and Basic Sciences	:	50	**Education**	:	
Engineering	:	50	**Science**	:	
Engineering Design	:		**Health**	:	
Social Sciences	:		**Field**	:	

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Mechanical vibrations and basic concepts		
2	Modeling of mechanical systems		
3	Single degree of freedom undamped free vibration systems		
4	Single degree of freedom damped free vibration systems		
5	Single degree of freedom damped forced vibration systems		
6	Single degree of freedom damped forced vibration systems		
7	System response under harmonic analysis and non-periodic forces		
8	MIDTERM EXAM		
9	Two degree of freedom systems		
10	Frequency response and mode shapes of two degree of freedom systems		
11	Energy method		
12	Lagrange Equations		
13	Lagrange Equations		
14	The reduction of gradual torsion systems and finding their critical frequencies		
15	The reduction of gradual torsion systems and finding their critical frequencies		

Course Learning Outcomes

No	Learning Outcomes
C01	Gaining the ability to model mechanical systems with various methods
C02	Ability to analyze single and multi degree of freedom system vibrations
C03	Ability of systems to obtain vibration response in time domain
C04	Gaining the ability to calculate the natural frequencies of systems
C05	Ability to work effectively in intra-disciplinary and multi-disciplinary teams; ability to work individually.

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%40
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	14	3	42
Hours for off-the-c.r.stud	13	5	65
Assignments	0	0	0
Presentation	0	0	0
Mid-terms	1	10	10
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	1	15	15
Total Work Load			**132**
ECTS Credit of the Course			**5**

Contribution of Learning Outcomes to Programme Outcomes

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P10	P11	P12
C02	5	5	4	3	3	3	1	3	3	4	2	2
C03	5	5	4	3	3	3	1	3	3	4	2	2
C04	5	5	4	3	3	3	1	3	3	4	2	2
C05	5	5	4	3	3	3	1	3	3	4	2	2

Karabük University

Faculty of Engineering
Automotive Engineering

AEE4002	Microcomputer System Design				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
7	AEE4002	Microcomputer System Design	3	3	5

Mode of Delivery:
Face to Face
Language of Instruction:
English (%100)
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Elective
Objectives of the Course:
The aim of this course is to enable students to gain knowledge about microcomputer architecture and programming.
Teaching Methods and Techniques:
Registers, arithmetic and logic unit (ALU) decoder unit, flags and stack. Reduced instruction set computer (RISC), complex instruction set computer (CISC), Haeward and Von Neuman architectures. Address, data and control lines, address and data multiplexing and memory map design, address and selective edge analysis, and system integration. Memory mapped G / C, dedicated G / C , and direct memory access (DMA). Mnemonics, opcode, process parameter (opermod), machine translation, addressing modes, instruction set, instruction groups, assembly language components, arithmetic and logic operations, using commands and subroutines. Assembly code introduction, code compilation, simulation, debugging and system analysis.
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:
Prof.Dr. M. Bahattin Çelik
Assistants:

Recommended or Required Reading

Resources Tom Denton, Automobile electrical and electoric systems, Hodder Headline Group,1995.,Adalı E., 1998 , "Mikroişlemciler Mikrobilgisayarlar", Birsen Yayınevi, Ankara.
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Course Category

Mathmatics and Basic Sciences	:	10	**Education**	:	
Engineering	:	40	**Science**	:	10
Engineering Design	:	30	**Health**	:	
Social Sciences	:		**Field**	:	10

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Registers, arithmetic and logic unit (ALU) decoder unit, flags and stack.		
2	Computer with reduced instruction set (RISC)		
3	Complex instruction set computer (CISC)		
4	Haeward and Von Neuman architectures.		
5	Address, data and control lines, address and data multiplexing, and memory map design.		
6	Address and selective edge resolution and system integration.		
7	Memory mapped G/C, dedicated G/C, and direct memory access (DMA).		
8	Mnemonics, opcode, process parameter (operand), machine cycle.		
9	Addressing modes, instruction set, command groups.		
10	Assembly language components.		
11	Arithmetic and logic operations.		
12	Using commands and subroutines.		
13	Assembly code introduction, code compilation, simulation.		
14	Debugging and system analysis.		

Course Learning Outcomes

No	Learning Outcomes
C01	Knows the definitions about microcomputers.
C02	Recognizes the elements that make up microcomputers.
C03	Can classify machine cycles.
C04	Learns assembly language components and code input.
C05	Make system analysis.

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%40
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	14	3	42
Hours for off-the-c.r.stud	14	5	70
Assignments	0	0	0
Presentation	0	0	0
Mid-terms	1	2	2
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	1	2	2
Total Work Load			**116**
ECTS Credit of the Course			**5**

Contribution of Learning Outcomes to Programme Outcomes

	P01	P02	P03	P04	P05	P06	P07	P08	P12
C01			3	3		3	1		
C02	3	2	2		1		4	2	3
C03	2	4		2	2	2		2	2
C04			3	1			2		1
C05	2	1			4	1		4	

Karabük University

Faculty of Engineering
Automotive Engineering

AEE4018	New Technologies on Vehicles				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
7	AEE4018	New Technologies on Vehicles	3	3	5

Mode of Delivery:
Face to Face
Language of Instruction:
English (%100)
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Elective
Objectives of the Course:
Understanding the why the need for safety and comfort systems in motor vehicles; recognition these systems; the creation of perspectives for the development of new designs
Teaching Methods and Techniques:
Vehicle design and various aspetsts, Interactions of factors affecting the vehicle design, Security systems for vehicles, Analysis of security systems for vehicles and new suggestions, Comfort systems for vehicles, Analysis of comfort systems for vehicles and new suggestions
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:
Dr. Mustafa KARAGÖZ
Assistants:

Recommended or Required Reading

Resources

1. Arslan, R.,Sürmen, S., Otomotiv Elektroniği, Aktüel Basım Yayın, 2004. 2. Jurgen,R,K., Automotive Electronics Handbook McGraww-Hill,İnc.,1999
1. Arslan, R.,Sürmen, S., Otomotiv Elektroniği, Aktüel Basım Yayın, 2004. 2. Jurgen,R,K., Automotive Electronics Handbook McGraww-Hill,İnc.,1999

Course Category

Mathmatics and Basic Sciences	:	20	**Education**	:	
Engineering	:	20	**Science**	:	
Engineering Design	:	30	**Health**	:	
Social Sciences	:		**Field**	:	30

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Introduction		
2	Developments in vehicles and hybrid vehicles		
3	The determinants of vehicle design and vehicle design		
4	Introduction to vehicle safety and comfort systems		
5	Active and passive safety		
6	Security systems used in motor vehicles		
7	Security Equipment and Facilities		
8	Security Systems Operating Mechanisms		
9	Midterm Exam		
10	Comfort systems used in motor vehicles		
11	Comfort Equipment and Facilities		
12	Comfort Systems Operating Mechanisms		
13	Vehicle Electronic Control Units and System Interventions		
14	General evaluation and new designs		

Course Learning Outcomes

No	Learning Outcomes
C01	Knows the developments in vehicles
C02	Knows and interprets the importance of vehicle design
C03	Knows the vehicle security systems and analyzes practices
C04	Knows the vehicle comfort systems and analyzes practices
C05	Knows the working mechanisms of security and comfort systems in vehicles

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%40
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	2	45	90
Hours for off-the-c.r.stud	0	0	0
Assignments	0	0	0
Presentation	0	0	0
Mid-terms	1	25	25
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	1	25	25
Total Work Load			**140**
ECTS Credit of the Course			**5**

Contribution of Learning Outcomes to Programme Outcomes

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P10	P11	P12
All	3	2	1	2	1	2	4	5	2	1	1	1

Karabük University

Faculty of Engineering
Automotive Engineering

OMT437	Automotive Engineering Laboratory				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
7	OMT437	Automotive Engineering Laboratory	4	3	4

Mode of Delivery:
Face to Face
Language of Instruction:
Turkish
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Required
Objectives of the Course:
The aims of the course are; 1. to introduce the engine and vehicle test devices. 2. to give the engine and vehicle test ability .
Teaching Methods and Techniques:
The occupational safety in automotive laboratories. Engine characteristics. Dynamometers. Engine tests. Engine performance parameters. Friction power. Measurement of engine vibration. Indicators. Measurement of cylinder pressure. Heat balance in engines. Work principles of vehicle test machines (chassis dy namometers). Vehicle tests. Measurement of vehicle brake forces. Determination of vehicle fuel economy . Prepare of technical report.
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:
Prof.Dr. M. Bahattin Çelik
Assistants:

Recommended or Required Reading

Resources Stone, R., Introduction to Internal Combustion Engines, Macmillan Press Ltd., Londan, UK. ,Plint, M., Martyr, A., "Engine Testing Theory and Practice", BH Publication, 20

Course Category

Mathmatics and Basic Sciences	:	10	**Education**	:	
Engineering	:	30	**Science**	:	
Engineering Design	:	20	**Health**	:	
Social Sciences	:		**Field**	:	40

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	The occupational safety in automotiv e laboratories. Engine characteristics.		
2	Dynamometers. Classification of dynamometers.		
3	Engine testing. Types of engine tests.		
4	Measurement of the air and f uel consumption.		
5	Engine performance parameters. Torque, power, specific fuel consumption.		
6	Friction power. Measurement of engine vibration.		
7	Indicators. Measurement of cylinder pressure.		
8	Heat balance in engines.		
9	Work principles of vehicle test machines (chassis dynamometers).		
10	Types of vehicle test machines.		
11	Vehicle performance tests.		
12	Measurement of vehicle brake forces.		
13	Measurement of vehicle fuel consumption and determination of fuel economy .		
14	Prepare of technical report.		

Course Learning Outcomes

No	Learning Outcomes
C01	Use the engine dy namometer.
C02	Use the chassis dynamometer.
C03	Determine the vehicle fuel economy .
C04	Perform the vehicle brake tests.
C05	Prepare the test result report.

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%40
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	14	4	56
Hours for off-the-c.r.stud	14	2	28
Assignments	0	0	0
Presentation	0	0	0
Mid-terms	1	2	2
Practice	0	0	0
Laboratory	3	3	9
Project	0	0	0
Final examination	1	2	2
Total Work Load			**97**
ECTS Credit of the Course			**4**

Contribution of Learning Outcomes to Programme Outcomes

	P01	P02	P03	P04	P05	P06	P07	P08	P12
C01		4	4	3	5	4	2	3	
C02	3		2	2	1	2		2	5
C03	2	2					5		
C04	1		1	3	2	3		1	3
C05		1			1		2		1

Karabük University

Faculty of Engineering
Automotive Engineering

MEE4015	Powder Metallurgy				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
7	MEE4015	Powder Metallurgy	3	3	5

Mode of Delivery:
Face to Face
Language of Instruction:
English (%100)
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Elective
Objectives of the Course:
To gain professional knowledge that will be able to use existing processes and technological developments in these processes in the production, shaping, determination of properties and evaluation of the products related to powder materials (Process-microstructure-property relationship), and develop suggestions for production optimization at process stages.
Teaching Methods and Techniques:
The place and importance of powder metallurgy in part production in the industry / Powder production methods / Important Properties of Metal Powders, Technological Properties of Powder and its Inspection / Process stages of Powder Metallurgy and Part Manufacturing method, Preparation of powder for pressing, Basic events during the densification and shaping of metal powders / Full Densification methods / Sintering methods and tools, solid and liquid phase sintering stages and mechanisms / Sintered Materials / Coating and similar finishing processes applied to Powder Metallurgical Parts / Recent developments in sintering furnaces / Common industrial application areas of powder metallurgy
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:
Dr. HARUN ÇUĞ
Assistants:

Recommended or Required Reading

Resources

Toz Metalurjisi ve Parçacıklı Malzeme İşlemleri. Randall M.German, 2007. Powder Metallurgy Science, Randall M.German, Metal Powder Industries Fede. 1994. Sintering T
Powder Metallurgy and Particulate Materials Process. Randall M. German, 2007.
Powder Metallurgy Science, Randall M.German, Metal Powder Industries Fede. 1994.
Sintering Theory and Practice, Randall m.German, A. Wiley-Interscience Public, 1996
Introduction to Physical Metallurgy, Sidney H. Avner, McGraw-Hill Book Company. 1974.
ASM Metals Handbook, Volume 7, Powder Metallurgy, 1993.
Powder Metallurgy lecture notes, Adem Bakkaloğlu, 2014

Course Category

Mathmatics and Basic Sciences	:	40	**Education**	:	
Engineering	:	40	**Science**	:	
Engineering Design	:	20	**Health**	:	
Social Sciences	:		**Field**	:	

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	İnrtodustion the powder metallurgy	none	
2	Powder characterization		
3	Powder production		
4	Microstructure control in powders		
5	Powder processes before shaping and densification		
6	Powder forming		
7	Compacting powders		
8	Sintering		
9	Different applications related to powder metallurgy		
10	Full density operations		
11	Finishing operations,		

Course Learning Outcomes

No	Learning Outcomes
C01	Can comprehend powder metallurgy production techniques used in recent years.
C02	Can characterize the powders produced.
C03	Can understand powder forming principles.
C04	Can comprehend sintering.
C05	Can comprehend the last processes applied to produced parts.

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%40
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	14	3	42
Hours for off-the-c.r.stud	14	4	56
Assignments	0	0	0
Presentation	0	0	0
Mid-terms	3	3	9
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	3	3	9
Total Work Load			**116**
ECTS Credit of the Course			**4**

Contribution of Learning Outcomes to Programme Outcomes

	P01	P02	P03
C01	5	5	2
C02	5	5	2
C03	5	5	2
C04	5	5	2
C05	5	5	2

Karabük University

Faculty of Engineering
Automotive Engineering

MEE4037	Principles of Energy Conversion				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
7	MEE4037	Principles of Energy Conversion	3	3	5

Mode of Delivery:
Face to Face
Language of Instruction:
English (%100)
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Elective
Objectives of the Course:
1- Compare competing energy conversion technologies on an economic and efficiency basis; 2- Assess the validity of energy conversion claims made in popular media; 3- Be familiar with thermodynamic processes and power cycles; 4- Be familiar with the basic principles of themal, mechanical, chemical, nuclear, and solar energy conversion; 5- Be familiar with the basic principles of energy storage; 6- Serve those around you who are trying to make energy-conscious decisions.
Teaching Methods and Techniques:
Introduction to Energy, Heat Engines & Thermodynamics Thermal-to-Mechanical Energy Conversion (Rankine Cycle) Chemical-to-Thermal Energy Conversion (Fuels & Combustion) Thermal-to-Mechanical Energy Conversion (Brayton Cycle) Nuclear-to-Thermal Energy Conversion (Fission) Electromagnetic-to-Thermal Energy Conversion(Solar) Electromagnetic-to-Electrical Energy Conversion (Solar) Chemical-to-Electrical Energy Conversion (Fuel Cells) Energy Storage
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:

Assistants:
Dr. Abdulrazzak AKROOT

Recommended or Required Reading

Resources Principles of energy conversion McGraw-Hill series in mechanical engineering,Principles of energy conversion, second edition Culp, A.W. Jr. (Missouri Univ., Rolla, MO (Uni

Course Category

Mathmatics and Basic Sciences	:	40	**Education**	:	
Engineering	:	60	**Science**	:	
Engineering Design	:		**Health**	:	
Social Sciences	:		**Field**	:	

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Introduction to Energy		
2	Energy Perspectives		
3	Energy Economics		
4	Fluid Power and Heat Engines		
5	Thermodynamic Processes and Properties		
6	Rankine Cycle		
7	Brayton Cycle		
8	Chemical Energy (Fuels and Combustion)		
9	Nuclear Energy (Nuclear Decay Reactions)		
10	Nuclear Fission Reactions and Nuclear Reactor Designs		
11	Solar Energy (Insolation & Collectors)		
12	Solar Energy (Storage)		
13	Solar Energy - Photovoltaics		
14	Fuel Cells		

Course Learning Outcomes

No	Learning Outcomes
C01	Know the principles of the modern energy conversion systems
C02	Recognize the energy conversion concepts in complex engineering systems
C03	Do assessments of fundamental properties/quantities of a power plant and/or some of their components
C04	Recognize and identify technical, economical and environmental problems appearing in modern energy conversion systems and their components

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%40
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	14	2	28
Hours for off-the-c.r.stud	6	1	6
Assignments	1	6	6
Presentation	0	0	0
Mid-terms	1	5	5
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	1	7	7
Total Work Load			**52**
ECTS Credit of the Course			**2**

Contribution of Learning Outcomes to Programme Outcomes

	P01
C01	5
C02	5
C03	5
C04	5

Karabük University

Faculty of Engineering
Automotive Engineering

MEE4022	Quality Control in Manufacturing				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
7	MEE4022	Quality Control in Manufacturing	3	3	5

Mode of Delivery:
Face to Face
Language of Instruction:
English (%100)
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Elective
Objectives of the Course:
The aim of this course is to improve students' knowledge of quality control and to develop quality awareness.
Teaching Methods and Techniques:
Basic concepts of quality and quality control. Quality control in the professional field. Basic standardization concepts. Standardization of the profession. Total quality Management. Statistical quality control method. Quality assurance system, ISO 9000 standards Quality performance tests in professional goods. The concept of reliability.
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:
Dr. Cevat ÖZARPA
Assistants:

Recommended or Required Reading

Resources	Şimşek, M., Quality management, Alfa Publications, 1998, İstanbul.

Course Category

Mathmatics and Basic Sciences	:	**Education**	:
Engineering	:	**Science**	:
Engineering Design	:	**Health**	:
Social Sciences	:	**Field**	:

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Kalite ve kalite kontrol ile ilgili temel kavramlar.		
2	Mesleki alanda kalite kontrolü.		
3	Mesleki alanda kalite kontrolü.		
4	Temel standardizasyon kavramları. Meslek alanının standardizasyonu.		
5	Temel standardizasyon kavramları. Meslek alanının standardizasyonu.		
6	Temel standardizasyon kavramları. Meslek alanının standardizasyonu.		
7	Toplam Kalite Yönetimi.		
8	Toplam Kalite Yönetimi.		
9	İstatistiksel kalite kontrol yöntemi.		
10	İstatistiksel kalite kontrol yöntemi.		
11	Kalite güvenilirlik sistemi, ISO 9000 standartları.		
12	Kalite güvenilirlik sistemi, ISO 9000 standartları.		
13	Mesleki ürünlerde kalite performans testleri.		
14	Güvenilirlik kavramı.		

Course Learning Outcomes

No	Learning Outcomes
C01	Kalite kavramı, kalite yönetimi, kalite bileşenleri konularının boyutlarını değerlendirebilecektir.
C02	Kalite sistemi konusunu, kalite yapısı – kalite sorunları boyutlarında analiz edebilecektir.
C03	Kalite kontrol kavram ve yöntemlerini analiz edebilecektir.

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%40
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	14	2	28
Hours for off-the-c.r.stud	14	3	42
Assignments	1	34	34
Presentation	0	0	0
Mid-terms	1	9	9
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	1	14	14
Total Work Load			**127**
ECTS Credit of the Course			**5**

Contribution of Learning Outcomes to Programme Outcomes

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P10	P11	P12
All	5	5	3	4	4	2	1	3	3	4	4	5
C01	4	4	2	3	5	2	1	3	2	4	4	5
C02	4	5	3	4	3	3	1	2	3	4	3	5
C03	5	5	2	4	4	2	2	2	3	5	4	4

Karabük University

Faculty of Engineering
Automotive Engineering

OMT431	Vehicle Body Design				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
7	OMT431	Vehicle Body Design	3	2	3

Mode of Delivery:
Face to Face
Language of Instruction:
English (%100)
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Required
Objectives of the Course:
Purpose of this course is to give detail knowledge the student about the vehicle design. Dimensioning of them and optimization using 3D package programme.
Teaching Methods and Techniques:
Problems that come accross during vehicle design. Designing seperated parts of the vehicle. Identification of each part and drawing proper package programme. 3D solid modelling will be drawn with choosen and asked required specifications. These specifications are considered aerodynamically and aesthetically suitable for common vehicle.
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:
Dr. Mustafa KARAGÖZ
Assistants:

Recommended or Required Reading

Resources SolidWorks 2008, Bayrak S. ve Turgut M., Seçkin Yayıncılık, 2008.

Course Category

Mathmatics and Basic Sciences	:	0	**Education**	:	0
Engineering	:	20	**Science**	:	0
Engineering Design	:	60	**Health**	:	0
Social Sciences	:	0	**Field**	:	20

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Updating general background information		
2	Package programmes that used in Automotive Industry		
3	Vehicle design phases		
4	Vehicle design phases		
5	Problems that come accross during vehicle design.		
6	Problems that come accross during vehicle design.		
7	Designing seperated parts of the vehicle.		
8	Designing seperated parts of the vehicle.		
9	Identification of each part.		
10	Identification of each part and drawing proper package programme.		
11	Drawing each part of the vehicle with given envelope.		
12	Drawing each part of the vehicle with given envelope.		
13	Drawing each part of the vehicle with given envelope.		
14	Drawing each part of the vehicle with given envelope.		

Course Learning Outcomes

No	Learning Outcomes
C01	Students attended this lecture may use 3D design programmes to optimize the vehicle parts that have been dimensioned with required necessary specifications.

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	0	%40
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	0	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	14	1,50	21
Hours for off-the-c.r.stud	0	0	0
Assignments	0	0	0
Presentation	0	0	0
Mid-terms	1	30	30
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	1	30	30
Total Work Load			**81**
ECTS Credit of the Course			**3**

Contribution of Learning Outcomes to Programme Outcomes

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P10	P11	P12
All	1	1	2	4	4	2	1	1	4	3	1	3

Program Learning Outcomes	
No	**Learning Outcome**
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria		
In-Term Studies	**Quantity**	**Percentage**
Mid-terms	0	%0
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	0	%0
Total		**%0**

ECTS Allocated Based on Student Workload			
Activities	**Quantity**	**Duration**	**Total Work Load**
Course Duration	0	0	0
Hours for off-the-c.r.stud	0	0	0
Assignments	0	0	0
Presentation	0	0	0
Mid-terms	0	0	0
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	0	0	0
Total Work Load			**0**
ECTS Credit of the Course			**0**

Contribution of Learning Outcomes to Programme Outcomes

Karabük University

Faculty of Engineering
Automotive Engineering

AEE4019	Thermal Systems Design				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
7	AEE4019	Thermal Systems Design	3	3	5

Mode of Delivery:
Face to Face
Language of Instruction:
English (%100)
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Elective
Objectives of the Course:
The goals of this course are to understand engineering design process, to learn characteristics of thermal system components and their effects on overall system performance, and to design and build a thermal system as a team.
Teaching Methods and Techniques:
Applications of principles of thermodynamics, fluid mechanics and heat transfer to design of components and thermal systems. Study of component characteristics and their effect on overall system performance.
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:
Dr. Erhan KAYABAŞI
Assistants:

Recommended or Required Reading

Resources	Fundamentals of Heat and Mass Transfer (7th Edition) by Theodore L. Bergman, Adrienne S. Lavine, Frank P. Incropera, David P. DeWitt. Wiley. ISBN-10: 0470501979 or

Course Category

Mathmatics and Basic Sciences	:		**Education**	:	
Engineering	:	50	**Science**	:	
Engineering Design	:	50	**Health**	:	
Social Sciences	:		**Field**	:	

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Design process		
2	Patents		
3	Pressure drop in pipe systems + Design meeting as a team		
4	Pressure drop in pipe systems + Design meeting as a team		

Course Learning Outcomes

No	Learning Outcomes
C01	To understand engineering design process
C02	To learn characteristics of thermal system components and their effects on overall system performance
C03	To design and build a simple thermal system as a team

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%30
Quizzes	0	%0
Assignment	1	%10
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	14	3	42
Hours for off-the-c.r.stud	14	1	14
Assignments	5	6	30
Presentation	0	0	0
Mid-terms	1	10	10
Practice	0	0	0
Laboratory	0	0	0
Project	2	5	10
Final examination	1	10	10
Total Work Load			**116**
ECTS Credit of the Course			**5**

Contribution of Learning Outcomes to Programme Outcomes

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P10	P11	P12
All	5	5	5	5	5	4	5	5	5	4	5	4

Karabük University

Faculty of Engineering
Automotive Engineering

AEE4017	Traffic Management				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
7	AEE4017	Traffic Management	3	3	5

Mode of Delivery:
Face to Face
Language of Instruction:
English (%100)
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Elective
Objectives of the Course:
To explain the interaction between vehicle, traffic and road and to raise the awareness of the student on this issue, To provide information about the laws and regulations related to vehicles, traffic and transportation in our country.
Teaching Methods and Techniques:
Interaction between vehicle, traffic and road. connections between vehicles, traffic and transportation in our country.
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:
Dr. Cevat ÖZARPA
Assistants:

Recommended or Required Reading

Resources	Principles of Highway Engineering and Traffic Analysis (Fred L. MANNERING, Walter P. KILARESKI)

Course Category

Mathmatics and Basic Sciences	:	**Education**	:
Engineering	:	**Science**	:
Engineering Design	:	**Health**	:
Social Sciences	:	**Field**	:

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Trafik Yönetimine Giriş		

Course Learning Outcomes

No	Learning Outcomes
C01	To know the laws and regulations related to vehicle, traffic and transportation, and the situations that drivers and passengers must obey in traffic.

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%40
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	14	2	28
Hours for off-the-c.r.stud	10	3	30
Assignments	1	44	44
Presentation	0	0	0
Mid-terms	1	9	9
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	1	14	14
Total Work Load			**125**
ECTS Credit of the Course			**5**

Contribution of Learning Outcomes to Programme Outcomes

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P10	P11	P12
All	1	1	2	3	3	3	1	2	4	3	4	2
C01	1	1	2	3	3	3	1	2	4	3	4	2

Karabük University

Faculty of Engineering
Automotive Engineering

MEE4055	Transport Techniques				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
7	MEE4055	Transport Techniques	3	3	5

Mode of Delivery:
Face to Face
Language of Instruction:
English (%100)
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Elective
Objectives of the Course:
Main purpose of the course students, giving knowledge abaut lifting and moving machinery-related topics in basic engineering design projects.
Teaching Methods and Techniques:
Lifting and handling machinery elements; load related components, drive components, motors and gearboxes between loads. Pulleys and pulley systems, drums. Stop and load holding brakes, lock gears. wheels and rails. Feeders and belt, chain, vibratory, endless screw conveyors. Pneumatic conveying systems. Design projects.
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:
Dr. Recep Demirsöz
Assistants:

Recommended or Required Reading

Resources	Transport Tekniği, Kaldırma ve Taşıma Makinaları,İstanbul 1999, Prof.Dr. Hamit ÖZTEPE

Course Category

Mathmatics and Basic Sciences	:	30	**Education**	:	
Engineering	:	70	**Science**	:	
Engineering Design	:		**Health**	:	
Social Sciences	:		**Field**	:	

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Material handling systems and classification.		
2	Wire ropes and chains.		
3	Wire rope and chain pulleys and pulleys sets.		
4	Hooks, hooks beds and sleepers.		
5	Wire rope and chain drums.		
6	The accounts of hoisting system (Design Project).		
7	Brakes and brake rleasers.		
8	Brakes and brake torque account.		
9	Locks, wheels and rails.		
10	Kilitler, tekerlekler ve raylar.		
11	Locks, wheels and rails.		
12	The design of belt conveyors.		
13	The design of belt conveyors.		
14	The design of belt conveyors.		

Course Learning Outcomes

No	Learning Outcomes
C01	General Knowledge about Transport Machines.
C02	Designing capability for transporting and lifting machines.
C03	Learning Transport Systems Projects.
C04	Ability to calculate Transport Systems unknowns and analysing.
C05	Learning maintanence and repair of transport systems.

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%24
Quizzes	0	%0
Assignment	1	%16
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	14	3	42
Hours for off-the-c.r.stud	12	4	48
Assignments	1	20	20
Presentation	0	0	0
Mid-terms	1	16	16
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	1	16	16
Total Work Load			**142**
ECTS Credit of the Course			**5**

Contribution of Learning Outcomes to Programme Outcomes

	P01	P02	P06	P09	P10
C01	3	4	3	2	4
C02	3	4	3	2	4
C03	3	4	3	2	4
C04	3	4	3	2	4
C05	3	4	3	2	4

Program Learning Outcomes	
No	**Learning Outcome**
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria		
In-Term Studies	**Quantity**	**Percentage**
Mid-terms	0	%0
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	0	%0
Total		**%0**

ECTS Allocated Based on Student Workload			
Activities	**Quantity**	**Duration**	**Total Work Load**
Course Duration	0	0	0
Hours for off-the-c.r.stud	0	0	0
Assignments	0	0	0
Presentation	0	0	0
Mid-terms	0	0	0
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	0	0	0
Total Work Load			**0**
ECTS Credit of the Course			**0**

Contribution of Learning Outcomes to Programme Outcomes

Karabük University

Faculty of Engineering
Automotive Engineering

AEE4011	Vehicle Emission and Control				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
7	AEE4011	Vehicle Emission and Control	3	3	5

Mode of Delivery:
Face to Face
Language of Instruction:
English (%100)
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Elective
Objectives of the Course:
The aim of this course is to teach the pollutants from internal combustion engines and their control techniques.
Teaching Methods and Techniques:
Pollutants from internal combustion engines. Emission control systems. Clean energy fuels, emission factors, control of pollutants from internal combustion engines. Recycling and alternative solutions.
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:
Associate Prof.Dr. Mehmet ÇELİK
Assistants:

Recommended or Required Reading

Resources
Environment and Gas Emissions
Vehicle Emissions and Control Nobel Publications
Ders Notları

Ara Sınav ve Genel Sınav

Course Category

Mathmatics and Basic Sciences	:	10	**Education**	:	
Engineering	:	10	**Science**	:	10
Engineering Design	:	10	**Health**	:	
Social Sciences	:		**Field**	:	60

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Learning of fuels, their classification and properties.		Textbook
2	Learning of fuels, their classification and properties.		Textbook
3	Learning of fuels, their classification and properties.		Textbook
4	Learning of fuels, their classification and properties.		Textbook
5	To learn the fuels used in internal combustion engines.		Text book
6	To learn the fuels used in internal combustion engines.		Textbook
7	To learn the fuels used in internal combustion engines.		Textbook
8	Mid-terms		
9	To learn the fuels used in internal combustion engines.		Textbook
10	To learn burning and burning equations.		Textbook
11	To learn burning and burning equations.		Textbook
12	To learn burning and burning equations.		Textbook
13	To learn burning and burning equations.		Textbook
14	To learn burning and burning equations.		Textbook
15	Final examination		

Recommended Optional Programme Components

OMT304 Internal Combustion Engines

Course Learning Outcomes

No	Learning Outcomes
C01	Pollutants from internal combustion engines.
C02	Emission control systems.
C03	Clean energy fuels, emission factors, control of pollutants from internal combustion engines.
C04	Recycling and alternative solutions.

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%40
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	1	10	10
Hours for off-the-c.r.stud	1	10	10
Assignments	0	0	0
Presentation	0	0	0
Mid-terms	1	45	45
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	1	65	65
Total Work Load			**130**
ECTS Credit of the Course			**5**

Contribution of Learning Outcomes to Programme Outcomes

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P10	P11	P12
C01	3		2	3		2		3			2	2
C02		3					3		3	4		
C03	2				3						4	2
C04		3	3			2		2	2			

Karabük University

Faculty of Engineering
Automotive Engineering

AEE4009	Vehicle Ergonomics				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
7	AEE4009	Vehicle Ergonomics	3	3	5

Mode of Delivery:
Face to Face
Language of Instruction:
English (%100)
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Elective
Objectives of the Course:
To introduce students to ergonomics rules. To provide information about vehicle ergonomics and comfort.
Teaching Methods and Techniques:
Introduction to vehicle ergonomics. Basic concepts. Anthropometry and arrival distances. Human comfort in the design of the vehicle. Physical factors; noise, vibration, light, colors, air conditioning and visual clarity. Cabin design. Human-equipment interface. Seat, pedals, steering wheel, mirrors, gear lever, control panel, screen. Passenger-vehicle interface. Service systems and accessories.
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:
Associate Prof.Dr. Mehmet ÇELİK
Assistants:

Recommended or Required Reading

Resources
Ergonomics Necmettin Ertan
Ergonomics for Engineers Dora Publications

Course Category

Mathmatics and Basic Sciences	:	10	**Education**	:	
Engineering	:	10	**Science**	:	10
Engineering Design	:	10	**Health**	:	
Social Sciences	:		**Field**	:	60

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Introduction to vehicle ergonomics.		
2	Introduction to vehicle ergonomics.		
3	Basic concepts.		
4	Basic concepts.		
5	Human comfort in the design of the vehicle.		
6	Physical factors; noise, vibration, light, colors, air conditioning and visual clarity.		
7	Physical factors; noise, vibration, light, colors, air conditioning and visual clarity.		
8	mid-term		
9	Cabin design.		
10	Human-equipment interface.		
11	Seat, pedals, steering wheel, mirrors, gear lever, control panel, screen.Passenger-vehicle interface.		
12	Passenger-vehicle interface.		
13	Passenger-vehicle interface.		
14	Service systems and accessories.		
15	Final exem		

Recommended Optional Programme Components

OMT204 Vehicle Technologies

Course Learning Outcomes

No	Learning Outcomes
C01	Learns vehicle ergonomics.
C02	Learns the importance of the design of the vehicle in human comfort.
C03	Learns the definitions of noise, vibration, light, colors, air conditioning and visual clarity.
C04	Learns the passenger-vehicle interface.

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%40
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	1	10	10
Hours for off-the-c.r.stud	1	10	10
Assignments	0	0	0
Presentation	0	0	0
Mid-terms	1	45	45
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	1	55	55
Total Work Load			**120**
ECTS Credit of the Course			**5**

Contribution of Learning Outcomes to Programme Outcomes

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P10	P11	P12
C01	2						3				2	
C02		2		3					3			
C03			2			2		2				
C04					3					3		3

Karabük University

Faculty of Engineering
Automotive Engineering

AEE4013	Vehicle Safety Systems				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
7	AEE4013	Vehicle Safety Systems	3	3	5

Mode of Delivery:
Face to Face
Language of Instruction:
English (%100)
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Elective
Objectives of the Course:
Understanding the why the need for safety and comfort systems in motor vehicles; recognition these systems; the creation of perspectives for the development of new designs
Teaching Methods and Techniques:
Vehicle design and various aspetsts, Interactions of factors affecting the vehicle design, Security systems for vehicles, Analysis of security systems for vehicles and new suggestions, Comfort systems for vehicles, Analysis of comfort systems for vehicles and new suggestions
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:
Dr. Mustafa KARAGÖZ
Assistants:

Recommended or Required Reading

Resources
1. Arslan, R.,Sürmen, S., Otomotiv Elektroniği, Aktüel Basım Yayın, 2004. 2. Jurgen,R,K., Automotive Electronics Handbook McGraww-Hill,İnc.,1999
1. Arslan, R.,Sürmen, S., Otomotiv Elektroniği, Aktüel Basım Yayın, 2004. 2. Jurgen,R,K., Automotive Electronics Handbook McGraww-Hill,İnc.,1999

Course Category

Mathmatics and Basic Sciences	:	20	**Education**	:	
Engineering	:	20	**Science**	:	
Engineering Design	:	30	**Health**	:	
Social Sciences	:		**Field**	:	30

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Introduction		
2	Developments in vehicles and hybrid vehicles		
3	The determinants of vehicle design and vehicle design		
4	Introduction to vehicle safety and comfort systems		
5	Active and passive safety		
6	Security systems used in motor vehicles		
7	Security Equipment and Facilities		
8	Security Systems Operating Mechanisms		
9	Midterm Exam		
10	Comfort systems used in motor vehicles		
11	Comfort Equipment and Facilities		
12	Comfort Systems Operating Mechanisms		
13	Vehicle Electronic Control Units and System Interventions		
14	General evaluation and new designs		

Course Learning Outcomes

No	Learning Outcomes
C01	Knows the developments in vehicles
C02	Knows and interprets the importance of vehicle design
C03	Knows the vehicle security systems and analyzes practices
C04	Knows the vehicle comfort systems and analyzes practices
C05	Knows the working mechanisms of security and comfort systems in vehicles

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%40
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	2	45	90
Hours for off-the-c.r.stud	0	0	0
Assignments	0	0	0
Presentation	0	0	0
Mid-terms	1	25	25
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	1	25	25
Total Work Load			**140**
ECTS Credit of the Course			**5**

Contribution of Learning Outcomes to Programme Outcomes

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P10	P11	P12
All	3	2	1	2	1	2	4	5	2	1	1	1

Karabük University

Faculty of Engineering
Automotive Engineering

AEE4014	Vehicles Manufacturing Systems				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
7	AEE4014	Vehicles Manufacturing Systems	3	3	5

Mode of Delivery:
Face to Face
Language of Instruction:
English (%100)
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Elective
Objectives of the Course:
Mass production in the automotive industry, developing the ability to analyze different production systems.
Teaching Methods and Techniques:
Overview of vehicle production systems. Mass production in automotive industry, principles of value added chain, analysis of different systems (such as Toyoto, Mersedes). Vehicle body design. Pressing, Painting, Coating. Cab, chassis and engine assembly. Components production systems; electrical and electronic systems, powertrain. Competence in central production, production with internal resources, production with external resources, Logistics, Optimization of production systems.
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:
Associate Prof.Dr. Mehmet ÇELİK
Assistants:

Recommended or Required Reading

Resources Industrial Design Ideal Publishing
Vehicle Mechanics Nobel Yayıncılık

Course Category

Mathmatics and Basic Sciences	:	10	**Education**	:	
Engineering	:	10	**Science**	:	10
Engineering Design	:	10	**Health**	:	
Social Sciences	:		**Field**	:	60

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Vehicle production systems overview.		
2	Vehicle production systems overview.		
3	Vehicle body production.		
4	Vehicle body production.		
5	Paint shop and coating.		
6	Paint shop and coating.		
7	Paint shop and coating.		
8	Mid-term		
9	Assembly: cab, chassis and engine.		
10	Assembly: cab, chassis and engine.		
11	Assembly: cab, chassis and engine.		
12	Electric and electronic systems, transmission organs.		
13	Electric and electronic systems, transmission organs.		
14	Electric and electronic systems, transmission organs.		
15	Final Exam		

Recommended Optional Programme Components

OMT431 Vehicle Body Design

Course Learning Outcomes

No	Learning Outcomes
C01	Vehicle production systems overview.
C02	Vehicle body production.
C03	Paint shop and coating.
C04	Assembly: cab, chassis and engine.
C05	Electric and electronic systems, transmission organs.

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%40
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	1	10	10
Hours for off-the-c.r.stud	1	10	10
Assignments	0	0	0
Presentation	0	0	0
Mid-terms	1	50	50
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	1	60	60
Total Work Load			**130**
ECTS Credit of the Course			**5**

Contribution of Learning Outcomes to Programme Outcomes

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P10	P11	P12
C01	2		3									
C02				2		2	3			2		2
C03		2						3	2		3	
C04	3						2					
C05					3						2	

Program Learning Outcomes	
No	**Learning Outcome**
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria		
In-Term Studies	**Quantity**	**Percentage**
Mid-terms	0	%0
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	0	%0
Total		**%0**

ECTS Allocated Based on Student Workload			
Activities	**Quantity**	**Duration**	**Total Work Load**
Course Duration	0	0	0
Hours for off-the-c.r.stud	0	0	0
Assignments	0	0	0
Presentation	0	0	0
Mid-terms	0	0	0
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	0	0	0
Total Work Load			**0**
ECTS Credit of the Course			**0**

Contribution of Learning Outcomes to Programme Outcomes

Karabük University

Faculty of Engineering
Automotive Engineering

OTM432	Graduation Project				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
8	OTM432	Graduation Project	2	1	5

Mode of Delivery:
Face to Face
Language of Instruction:
English (%100)
Level of Course Unit:
Bachelor's Degree
Work Placement(s):
No
Department / Program:
Automotive Engineering
Type of Course Unit:
Required
Objectives of the Course:
To give students the ability to produce projects and make presentations
Teaching Methods and Techniques:
Theoretical information on research, literature research and evaluation, mathematical modeling, computer simulations, experiments, report or article writing, presentations
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:
Prof.Dr. M. Bahattin ÇELİK
Assistants:

Recommended or Required Reading

Resources Internet

Course Category

Mathmatics and Basic Sciences	:		**Education**	:	
Engineering	:	50	**Science**	:	
Engineering Design	:	50	**Health**	:	
Social Sciences	:		**Field**	:	

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Theoretical information on research		
2	Theoretical information on research		
3	Literatür araştırması		
4	Literatür değerlendirilmesi raporu yazımı		
5	Literatür değerlendirilmesi raporu yazımı		
6	Literatür değerlendirilmesi raporu yazımı		
7	Matematiksel modelleme: problem formülasyonu		
8	Matematiksel modelleme: problem formülasyonu		
9	Bilgisayar simülasyonları/deneyler		
10	Bilgisayar simülasyonları/deneyler		
11	Bilgisayar simülasyonları/deneyler		
12	Araştırma sonuçlarının son halinin sunulması		
13	Araştırma sonuçlarının iyileştirilmesi		
14	Araştırma sonuçlarının iyileştirilmesi		

Course Learning Outcomes

No	Learning Outcomes
C01	At the end of this course, the student learns to do a successful literature review -Learns to apply advanced methods in problem solving -Does computer simulation and / or experiment
C02	danışmanı ile yaptığı araştırmada iletişim becerilerini geliştirir -zaman yönetimi becerilerini geliştirir -araştırma hakkında rapor ve/veya makale yazmayı öğrenir -izleyici karşısında araştırma sonuçlarır

Program Learning Outcomes

No	Learning Outcome
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Mid-terms	1	%50
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%50
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Course Duration	0	0	0
Hours for off-the-c.r.stud	5	5	25
Assignments	0	0	0
Presentation	2	5	10
Mid-terms	0	0	0
Practice	2	10	20
Laboratory	0	0	0
Project	4	20	80
Final examination	0	0	0
Total Work Load			**135**
ECTS Credit of the Course			**5**

Contribution of Learning Outcomes to Programme Outcomes

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P10	P11	P12
All	4	5	4	5	4	5	4	5	5	5	5	4

Program Learning Outcomes	
No	**Learning Outcome**
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria		
In-Term Studies	**Quantity**	**Percentage**
Mid-terms	0	%0
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	0	%0
Total		**%0**

ECTS Allocated Based on Student Workload			
Activities	**Quantity**	**Duration**	**Total Work Load**
Course Duration	0	0	0
Hours for off-the-c.r.stud	0	0	0
Assignments	0	0	0
Presentation	0	0	0
Mid-terms	0	0	0
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	0	0	0
Total Work Load			**0**
ECTS Credit of the Course			**0**

Contribution of Learning Outcomes to Programme Outcomes

Program Learning Outcomes	
No	**Learning Outcome**
P09	Recognize the importance of professional and ethical responsibility.
P08	Recognize the need for lifelong learning and follow up developments in automotive field.
P07	Communicate effectively in oral and written forms with a good command of at least one foreign language, preferably English.
P12	Collect and classify the data in the applications of automotive engineering.
P11	Assess the impact of automotive engineering solutions in a global, economic, environmental, and societal context.
P10	Appreciate the need for knowledge of contemporary issues.
P03	Design an automotive based system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufact
P02	Identify and solve complex automotive engineering problems.
P01	Apply theoretical and practical knowledge of mathematics, science and engineering to automotive engineering.
P06	Work effectively in multidisciplinary teams to accomplish a common goal.
P05	Design and conduct experiments individually or in groups, as well as analyze and interpret data for automotive engineering problems.
P04	Use the techniques, skills, and modern engineering tools necessary for automotive engineering practice.

Assessment Methods and Criteria		
In-Term Studies	**Quantity**	**Percentage**
Mid-terms	0	%0
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	0	%0
Total		**%0**

ECTS Allocated Based on Student Workload			
Activities	**Quantity**	**Duration**	**Total Work Load**
Course Duration	0	0	0
Hours for off-the-c.r.stud	0	0	0
Assignments	0	0	0
Presentation	0	0	0
Mid-terms	0	0	0
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	0	0	0
Total Work Load			**0**
ECTS Credit of the Course			**0**

Contribution of Learning Outcomes to Programme Outcomes

Program Learning Outcomes	
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Assessment Methods and Criteria		
In-Term Studies	**Quantity**	**Percentage**
Mid-terms	0	%0
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	0	%0
Total		**%0**

ECTS Allocated Based on Student Workload			
Activities	**Quantity**	**Duration**	**Total Work Load**
Course Duration	0	0	0
Hours for off-the-c.r.stud	0	0	0
Assignments	0	0	0
Presentation	0	0	0
Mid-terms	0	0	0
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	0	0	0
Total Work Load			**0**
ECTS Credit of the Course			**0**

Contribution of Learning Outcomes to Programme Outcomes