Firat University

FACULTY OF ENGINEERING
ELECTRICAL-ELECTRONICS ENGINEERING

MMÜ327		Engineering Mechanic			
Semester	**Course Code**	**Course Name**	**L+P**	**Credit**	**ECTS**
5	MMÜ327	Engineering Mechanic	2	2	3

Language of Instruction:
Turkish
Course Level:
Faculty
Work Placement(s):
No
Department / Program:
ELECTRICAL-ELECTRONICS ENGINEERING
Course Type:
Seçmeli
Goals:
1.To provide the basic principles of statics and Dynamics 2.To provide an ability to apply the princeples of statics and Dynamics on engineering problems
Teaching Methods and Techniques:
princeples of statics, force vector, moment, equilibrium of particle and rijid body, equilibrium of forces in plane and space, support and support reactions, structures, frictions, center of gravity princeples of Dynamics, kinematics and kinetics of particles, definition of the problem in various coordinate systems, general motion, absolute and relative motion, work and energy, impuls and momentum, impact
Prerequisites:

Course Coordinator:

Instructors:
Associate Prof. Dr. Mete Onur KAMAN
Assistants:

Recommended Sources

Textbook	:	JL. Meriam and LG.Kraig, 1993, Engineering mechanics, Wiley,ISBN:978047173932.
Resources	:	R.C.Hibbeler. 2007, Engineering mechanics, Statics, Prentice Hall, ISBN:0023540206
Documents	:	
Assignments	:	
Exams	:	

Course Category

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

Course Content

Week	Topics	Study Materials	Materials
1	The principles of static		
2	free body diagrams, torque and force pair		
3	plane forces		
4	rigid body balance		
5	support and bond strengths		
6	guldinus teoremleri-center of gravity, pappus-Guldinus theorems		
7	friction		
8	dynamics of the basics, introduction to point body kinematics		
9	point body kinematics		
10	kinetic of point body		
11	work and energy		
12	impulse and momentum		
13	impulse and momentum and impact		

Course Learning Outcomes

No	Learning Outcomes
C01	Vector algebra, center of gravity, bond strength calculations, determining the structure of static equilibrium
C02	kinetics and kinematics problem solving, problem solving with work energy and impulse momentum

Program Learning Outcomes

No	Learning Outcome
P08	Ability to work effectively in disciplinary and multi-disciplinary teams.
P02	Ability to define, formulate and solve complex engineering problems; ability to select and apply appropriate modeling and analysis methods for this purpose.
P07	Professional and ethical responsibility
P06	Ability to communicate effectively in Turkish orally and in writing; knowledge of at least one foreign language.
P01	Sufficient knowledge in mathematics, science and electrical and electronic engineering; ability to apply theoretical and applied knowledge in these fields to engineering problems.
P05	Ability to design and conduct experiments, collect data, analyze and interpret results for the study of engineering problems.
P03	Ability to design a complex system, process, device or product to meet specific requirements under realistic constraints and conditions; for this purpose, the ability to apply modern design methods
P11	Information about the effects of engineering practices on health, environment and safety in universal and social dimensions and the problems of the age; awareness of the legal consequences of er
P09	Awareness of the necessity of lifelong learning; the ability to access information, follow developments in science and technology, and constantly renew oneself.
P10	Information on project management and business practices such as risk management and change management; awareness of entrepreneurship, innovation and sustainable development.
P04	Ability to develop, select and use modern techniques and tools necessary for engineering practice; Ability to use information technologies effectively.

Assessment		
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	0	0	0
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	0	0	0
Total Work Load			**42**
ECTS Credit of the Course			**1**

Course Contribution To Program
Contribution: 1: Very Slight 2:Slight 3:Moderate 4:Significant 5:Very Significant

Firat University

FACULTY OF ENGINEERING
ELECTRICAL-ELECTRONICS ENGINEERING

MEM323	Material Knowledge				
Semester	**Course Code**	**Course Name**	**L+P**	**Credit**	**ECTS**
5	MEM323	Material Knowledge	2	2	3

Language of Instruction:
Turkish
Course Level:
Faculty
Work Placement(s):
No
Department / Program:
ELECTRICAL-ELECTRONICS ENGINEERING
Course Type:
Seçmeli
Goals:
The purpose of this course, the materials required for the practice of engineering applications, understanding of the properties of these materials
Teaching Methods and Techniques:
Classification of materials, atomic structure and bonding, crystal structures, the deformation of materials, structure and phase diagrams of alloys, iron-carbon alloy system, heat treatment of metals, corrosion, material inspection.
Prerequisites:

Course Coordinator:

Instructors:
Asist Prof. Dr. Akın Odabaşı
Assistants:

Recommended Sources

Textbook	:	T. Savaşkan, "Malzeme Bilgisi ve Muayenesi", Genişletilmiş 6. Baskı, Trabzon, 2012.
Resources	:	W.D. Callister Jr., D.G. Rethwisch, "Materials Science and Engineering An Introduction", Wiley, 2009.
Documents	:	
Assignments	:	
Exams	:	

Course Category

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

Course Content

Week	Topics	Study Materials	Materials
1	Classification of materials, atomic structure, properties of atomic bonds		
2	Crystal structures		
3	Deformation of materials		
4	Structure of alloys		
5	Phase diagrams		
6	Iron-carbon alloy system		
7	Heat treatment of steel		
8	Alloy steels		
9	Midterm exam		
10	Corrosion of metals		
11	Material inspection		
12	The electrical properties of materials		
13	The electrical properties of materials		
14	Optical and magnetic properties of materials		

Course Learning Outcomes

No	Learning Outcomes
C01	To learn the classification of materials
C02	To learn the importance of atomic structure and bonding structure.
C03	To learn the crystal structures, the deformation of materials.
C04	To learn the phase diagrams, importance of the methods to gain strength
C05	To learn the heat treatment processes, corrosion and inspection of materials.
C06	Understands the importance of electrical and optical properties.

Program Learning Outcomes

No	Learning Outcome
P08	Ability to work effectively in disciplinary and multi-disciplinary teams.
P02	Ability to define, formulate and solve complex engineering problems; ability to select and apply appropriate modeling and analysis methods for this purpose.
P07	Professional and ethical responsibility
P06	Ability to communicate effectively in Turkish orally and in writing; knowledge of at least one foreign language.
P01	Sufficient knowledge in mathematics, science and electrical and electronic engineering; ability to apply theoretical and applied knowledge in these fields to engineering problems.
P05	Ability to design and conduct experiments, collect data, analyze and interpret results for the study of engineering problems.
P03	Ability to design a complex system, process, device or product to meet specific requirements under realistic constraints and conditions; for this purpose, the ability to apply modern design methods
P11	Information about the effects of engineering practices on health, environment and safety in universal and social dimensions and the problems of the age; awareness of the legal consequences of er
P09	Awareness of the necessity of lifelong learning; the ability to access information, follow developments in science and technology, and constantly renew oneself.
P10	Information on project management and business practices such as risk management and change management; awareness of entrepreneurship, innovation and sustainable development.
P04	Ability to develop, select and use modern techniques and tools necessary for engineering practice; Ability to use information technologies effectively.

Assessment		
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	1	14
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			**86**
ECTS Credit of the Course			**3**

Course Contribution To Program

Contribution: 1: Very Slight 2:Slight 3:Moderate 4:Significant 5:Very Significant

	P01	P02
All	4	4

Firat University

FACULTY OF ENGINEERING
ELECTRICAL-ELECTRONICS ENGINEERING

EEM343	Electronic Laboratory-1				
Semester	**Course Code**	**Course Name**	**L+P**	**Credit**	**ECTS**
5	EEM343	Electronic Laboratory-1	0	1	2

Language of Instruction:
Turkish
Course Level:
Faculty
Work Placement(s):
No
Department / Program:
ELECTRICAL-ELECTRONICS ENGINEERING
Course Type:
Zorunlu
Goals:
Students learns to obtain characteristics and the behavior of the main components used in electronics and their comparison with the theoretical results with the sample application circuits. To increase the ability to measure information and success as a group to overcome a problem. Develop the ability to use simulation programs related to electronic applications
Teaching Methods and Techniques:

Prerequisites:
(EEM242)
Course Coordinator:
Asist Prof. Dr. Sencer ÜNAL
Instructors:

Assistants:

Recommended Sources

Textbook	:	Related experiments sheets
Resources	:	Experiment 1: Obtaining the diode current voltage characteristic and Rectifier Circuits
Documents	:	Experiment 2: Examination of the Zener diode
Assignments	:	Experiment 3: Calculation of CMRR and instrumentation amplifier
Exams	:	Experiment 4: Comparator and schmitt trigger circuits Experiment 5: Op-amp applications : Derivative and integral circuits

Course Category

Mathmatics and Basic Sciences	:		**Education**	:	
Engineering	:	60	**Science**	:	
Engineering Design	:	40	**Health**	:	
Social Sciences	:		**Field**	:	

Course Content

Week	Topics	Study Materials	Materials
1	Establishment of experimental group and making related announcements		
2	Made courses related to laboratory rules and functioning		
3	Made courses related to content of experiments		
4	Made courses related to content of experiments		
5	Made courses related to content of experiments		
6	Week 1 : to be performed to the relevant group of experiment 1 - experiment 8		
7	Week 2: to be performed to the relevant group of experiment 1 - experiment 8		
8	Week 3 : to be performed to the relevant group of experiment 1 - experiment 8		
9	Week 4 : to be performed to the relevant group of experiment 1 - experiment 8		
10	Week 5 : to be performed to the relevant group of experiment 1 - experiment 8		
11	Week 6 : to be performed to the relevant group of experiment 1 - experiment 8		
12	Week 7 : to be performed to the relevant group of experiment 1 - experiment 8		
13	Experiment weeks for the students who have an excuse.		
14	Experiment weeks for the students who have an excuse.		

Course Learning Outcomes

No	Learning Outcomes
C01	The students will gain work ability in a group individual
C02	They will gain ability of designing experiment, experimenting, analyzing empirical results and interpretation of the experimental results.
C03	They will gain the ability to use tools, methods and Techniques required for engineering applications.

Program Learning Outcomes

No	Learning Outcome
P08	Ability to work effectively in disciplinary and multi-disciplinary teams.
P02	Ability to define, formulate and solve complex engineering problems; ability to select and apply appropriate modeling and analysis methods for this purpose.
P07	Professional and ethical responsibility
P06	Ability to communicate effectively in Turkish orally and in writing; knowledge of at least one foreign language.
P01	Sufficient knowledge in mathematics, science and electrical and electronic engineering; ability to apply theoretical and applied knowledge in these fields to engineering problems.
P05	Ability to design and conduct experiments, collect data, analyze and interpret results for the study of engineering problems.
P03	Ability to design a complex system, process, device or product to meet specific requirements under realistic constraints and conditions; for this purpose, the ability to apply modern design methods
P11	Information about the effects of engineering practices on health, environment and safety in universal and social dimensions and the problems of the age; awareness of the legal consequences of er
P09	Awareness of the necessity of lifelong learning; the ability to access information, follow developments in science and technology, and constantly renew oneself.
P10	Information on project management and business practices such as risk management and change management; awareness of entrepreneurship, innovation and sustainable development.
P04	Ability to develop, select and use modern techniques and tools necessary for engineering practice; Ability to use information technologies effectively.

Assessment		
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	2	2
Practice	0	0	0
Laboratory	14	1	14
Project	0	0	0
Final examination	1	2	2
Total Work Load			**60**
ECTS Credit of the Course			**2**

Course Contribution To Program

Contribution: 1: Very Slight 2:Slight 3:Moderate 4:Significant 5:Very Significant

	P04	P05	P06
C01			3
C02		5	
C03	3		

Firat University

FACULTY OF ENGINEERING
ELECTRICAL-ELECTRONICS ENGINEERING

EEM337	ELECTRICAL MACHINES				
Semester	**Course Code**	**Course Name**	**L+P**	**Credit**	**ECTS**
5	EEM337	ELECTRICAL MACHINES	3	3	5

Language of Instruction:
Turkish
Course Level:
Faculty
Work Placement(s):
No
Department / Program:
ELECTRICAL-ELECTRONICS ENGINEERING
Course Type:
Zorunlu
Goals:
To learn basic operating prenciples, characterics, starting methods and speed control methods of DC-AC electrical machines. To analyze a system is compused motor and load. To reach the level of information can solve basic problems of electrical machines.
Teaching Methods and Techniques:
Circuit model of DC generator, armature circuit model, field circuit model of dc motors, dc series model, torque and speed characteristics for a DC series motor, starting, DC shunt motor, torque and speed characteristic for a DC shunt motor and compunt motors, motor and load matching conventional speed control of DC motors. Reversal of direction of rotation of a DC motor. MMF waves and the rotating magnetic field, wquivalent circuit for a three-phase induction motor, starting methods for induction motors, conventional spped control of induction motors, single phase induction motors, cylindirical versus salient-pole construction, round-rotor machines, eguivalent circuit, principal steady-state characteristics. Power angle characteristic and the infinite-bus concept. Synchronous machine power angle characteristic for round and salient rotor type.
Prerequisites:
(EEM240)
Course Coordinator:

Instructors:
Associate Prof. Dr. Mehmet Özdemir
Assistants:

Recommended Sources

Textbook	:	Elektrik Makinalarının Esasları, Yrd.Doç.Dr. Ahmet ORHAN, Çağlayan Kitabevi, 2007. Theory and Problems of Electric Machines and Electromechanic
Resources	:	Elektrik Makinalarının Esasları, Yrd.Doç.Dr. Ahmet ORHAN, Çağlayan Kitabevi, 2007. Theory and Problems of Electric Machines and Electromechanic
Documents	:	
Assignments	:	
Exams	:	

Course Category

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

Course Content

Week	Topics	Study Materials	Materials
1	Introduction to electric machines. Contruction of DC machines.L		Lecture notes
2	DA makinalarında endüvi reaksiyonu ve komutasyon and the equivalent circuit of DC machines		Lecture notes
3	Characteristic Curves of Direct Current Motors		Lecture notes
4	Characteristic Curves of Direct Current Generators		Lecture Notes
5	Introduction to AC machines		Lecture Notes
6	To get rotating magnetic field		Lecture notes
7	Torque, power flow diagram and loses at the AC machines		Lecture Notes
8	Induction motors. Equivalent circuit, torque, power and torque-speed characteristic of induction motors		Lecture notes
9	Starting methods for induction motors		Lecture Notes
10	Speed control methods of induction motors		Lecture notes
11	Single phase induction motors		Lecture Notes
12	Introduction to synchronous machines		Lecture Notes
13	Equivalent Circuit and equations of synchronous generators		Lecture Notes
14	Paralel operating of synchronous generators		Lecture notes

Course Learning Outcomes

No	Learning Outcomes
C01	In this course the students will able to apply of mathematics, science and engineering knowledge to the problems and applications of electrical machines.
C02	The students will able to describe, model, formulate and solve the electrical machines problems.

Program Learning Outcomes

No	Learning Outcome
P08	Ability to work effectively in disciplinary and multi-disciplinary teams.
P02	Ability to define, formulate and solve complex engineering problems; ability to select and apply appropriate modeling and analysis methods for this purpose.
P07	Professional and ethical responsibility
P06	Ability to communicate effectively in Turkish orally and in writing; knowledge of at least one foreign language.
P01	Sufficient knowledge in mathematics, science and electrical and electronic engineering; ability to apply theoretical and applied knowledge in these fields to engineering problems.
P05	Ability to design and conduct experiments, collect data, analyze and interpret results for the study of engineering problems.
P03	Ability to design a complex system, process, device or product to meet specific requirements under realistic constraints and conditions; for this purpose, the ability to apply modern design methods
P11	Information about the effects of engineering practices on health, environment and safety in universal and social dimensions and the problems of the age; awareness of the legal consequences of er
P09	Awareness of the necessity of lifelong learning; the ability to access information, follow developments in science and technology, and constantly renew oneself.
P10	Information on project management and business practices such as risk management and change management; awareness of entrepreneurship, innovation and sustainable development.
P04	Ability to develop, select and use modern techniques and tools necessary for engineering practice; Ability to use information technologies effectively.

Assessment		
In-Term Studies	**Quantity**	**Percentage**
Mid-terms	1	%40
Quizzes	0	%0
Assignment	1	%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	6	84
Assignments	0	0	0
Presentation	1	6	6
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			**136**
ECTS Credit of the Course			**5**

Course Contribution To Program

Contribution: 1: Very Slight 2:Slight 3:Moderate 4:Significant 5:Very Significant

	P01	P02
All	4	5
C01	4	
C02		5

Firat University

FACULTY OF ENGINEERING
ELECTRICAL-ELECTRONICS ENGINEERING

EEM335	Logic Circuits				
Semester	**Course Code**	**Course Name**	**L+P**	**Credit**	**ECTS**
5	EEM335	Logic Circuits	3	3	5

Language of Instruction:
Turkish
Course Level:
Faculty
Work Placement(s):
No
Department / Program:
ELECTRICAL-ELECTRONICS ENGINEERING
Course Type:
Zorunlu
Goals:
This course aims to teach the boolean algebra used in digital system design. To teach the basic steps used in logic design problem to the students.
Teaching Methods and Techniques:
Combinational and synchronous sequential circuit synthesis, analysis and design
Prerequisites:

Course Coordinator:

Instructors:
Prof. Dr. Mustafa TÜRK
Assistants:

Recommended Sources

Textbook	:	
Resources	:	Fundamentals of Logic Design, H. CHARLES and Jr. ROTH, West Publishing Company, USA,. ,Digital Design, Morris MANO Prentice Hall, USA.,Intro
Documents	:	Mantık Devreleri Ders Notları
Assignments	:	
Exams	:	

Course Category

Mathmatics and Basic Sciences	:	20	**Education**	:	
Engineering	:	0	**Science**	:	
Engineering Design	:	80	**Health**	:	
Social Sciences	:		**Field**	:	

Course Content

Week	Topics	Study Materials	Materials
1	Introduction to digital systems		Lecture notes
2	number base and transformation, negative numbers, different aritmetic operations		Lecture notes
3	boolean algebra		Lecture notes
4	minimization of boolean functions. representation of boolean functions on karnaough diagrams.		Lecture notes
5	minimization of boolena functions with karnough diagrams and Quine Mc Cluskey method		Lecture notes
6	design of combinational logic circuits		Lecture notes
7	MSI and PLD elements (adders, decoders, encoders, multiplexer, ROM, PLA)		Lecture notes
8	Introduction to sequential logic circuits		Lecture notes
9	design and analysis of sequential logic circuits		Lecture notes
10	register, counters and memories		Lecture notes
11	ripple counters		Lecture notes
12	design examples		
13	TTL circuits, DTL circuits		Lecture notes
14	DCTL, DTL, TTL circuits, FET and MOSFET logic circiuts		Ders Notları ve Sayısal Tasarım (Morris M

Course Learning Outcomes

No	Learning Outcomes
C01	Students learn digital systems
C02	Students can analyze and design a digital system

Program Learning Outcomes

No	Learning Outcome
P08	Ability to work effectively in disciplinary and multi-disciplinary teams.
P02	Ability to define, formulate and solve complex engineering problems; ability to select and apply appropriate modeling and analysis methods for this purpose.
P07	Professional and ethical responsibility
P06	Ability to communicate effectively in Turkish orally and in writing; knowledge of at least one foreign language.
P01	Sufficient knowledge in mathematics, science and electrical and electronic engineering; ability to apply theoretical and applied knowledge in these fields to engineering problems.
P05	Ability to design and conduct experiments, collect data, analyze and interpret results for the study of engineering problems.
P03	Ability to design a complex system, process, device or product to meet specific requirements under realistic constraints and conditions; for this purpose, the ability to apply modern design methods
P11	Information about the effects of engineering practices on health, environment and safety in universal and social dimensions and the problems of the age; awareness of the legal consequences of er
P09	Awareness of the necessity of lifelong learning; the ability to access information, follow developments in science and technology, and constantly renew oneself.
P10	Information on project management and business practices such as risk management and change management; awareness of entrepreneurship, innovation and sustainable development.
P04	Ability to develop, select and use modern techniques and tools necessary for engineering practice; Ability to use information technologies effectively.

Assessment		
In-Term Studies	**Quantity**	**Percentage**
Mid-terms	1	%20
Quizzes	0	%0
Assignment	2	%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	14	3	42
Hours for off-the-c.r.stud	14	5	70
Assignments	2	6	12
Presentation	0	0	0
Mid-terms	1	2	2
Practice	0	0	0
Laboratory	0	0	0
Project	1	20	20
Final examination	1	2	2
Total Work Load			**148**
ECTS Credit of the Course			**5**

Course Contribution To Program

Contribution: 1: Very Slight 2:Slight 3:Moderate 4:Significant 5:Very Significant

	P01	P02
C01	4	
C02		4

Firat University

FACULTY OF ENGINEERING
ELECTRICAL-ELECTRONICS ENGINEERING

EEM333	Automatıc Control-1				
Semester	**Course Code**	**Course Name**	**L+P**	**Credit**	**ECTS**
5	EEM333	Automatıc Control-1	3	3	4

Language of Instruction:
Turkish
Course Level:
Faculty
Work Placement(s):
No
Department / Program:
ELECTRICAL-ELECTRONICS ENGINEERING
Course Type:
Zorunlu
Goals:
Ability to modelling of physical systems. Ability to learn transfer functions concept relationship between state equations and high-order differential equations, state equations and transfer functions. Time domain performance of control systems –the steady- state error. Time-domain performance of control systems, transient response at a second-order system , Routh–Hurwitz criterion, Root Locus techniques, Bode plots, relative stability, gain margin ,phase margin
Teaching Methods and Techniques:
Control systems and its units. Open and closed-loop control systems and their characteristics. Modelling of continuous time control systems .Principle analogy and its applications for modelling in different energy mod of systems.Open and closed loop systems and its properties.General control problems. Transfer funtions. Block and flow diagrams for control systems. State space analyasis. Stability analaysis of linear systems. Time response analysis of control systems. Root locus analaysis. Frequency response analysis of control systems. PID controllor desinged by Ziegler-Nichols
Prerequisites:

Course Coordinator:

Instructors:
Asist Prof. Barış KARAKAYAAssociate Prof. Dr. Vedat ÇELİK
Assistants:

Recommended Sources

Textbook	:	Automatic Control Lecture Notes- Prof. Dr. Mustafa POYRAZ
Resources	:	
Documents	:	Modern Control Engineering, K. OGATA, Englewood Cliffs, NJ: Prentice Hall, 2002. Modern Control Systems, C. D. DORF and R. H. BISHOP, Pearso
Assignments	:	
Exams	:	

Course Category

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

Course Content

Week	Topics	Study Materials	Materials
1	Control systems and its units. Open and closed-loop control systems and their characteristics.		
2	Modelling of continuous time control systems .		
3	Principle analogy and its applications for modelling in different energy mod of systems		
4	Open and closed loop systems and its properties		
5	Open and closed loop systems and its properties		
6	General control problems		
7	Transfer funtions		
8	Block and flow diagrams for control systems		
9	State space analyasis		
10	Stability analaysis of linear systems		
11	Time response analysis of control systems		
12	Root locus analaysis		
13	Frequency response analysis of control systems		
14	PID controllor desinged by Ziegler-Nichols		

Course Learning Outcomes

No	Learning Outcomes
C01	Sutudents learn the Modelling and analysing of control systems .
C02	Students learn the frequency domain analysis of control systems.

Program Learning Outcomes

No	Learning Outcome
P08	Ability to work effectively in disciplinary and multi-disciplinary teams.
P02	Ability to define, formulate and solve complex engineering problems; ability to select and apply appropriate modeling and analysis methods for this purpose.
P07	Professional and ethical responsibility
P06	Ability to communicate effectively in Turkish orally and in writing; knowledge of at least one foreign language.
P01	Sufficient knowledge in mathematics, science and electrical and electronic engineering; ability to apply theoretical and applied knowledge in these fields to engineering problems.
P05	Ability to design and conduct experiments, collect data, analyze and interpret results for the study of engineering problems.
P03	Ability to design a complex system, process, device or product to meet specific requirements under realistic constraints and conditions; for this purpose, the ability to apply modern design methods
P11	Information about the effects of engineering practices on health, environment and safety in universal and social dimensions and the problems of the age; awareness of the legal consequences of er
P09	Awareness of the necessity of lifelong learning; the ability to access information, follow developments in science and technology, and constantly renew oneself.
P10	Information on project management and business practices such as risk management and change management; awareness of entrepreneurship, innovation and sustainable development.
P04	Ability to develop, select and use modern techniques and tools necessary for engineering practice; Ability to use information technologies effectively.

Assessment		
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	12	3	36
Presentation	0	0	0
Mid-terms	0	0	0
Practice	6	2	12
Laboratory	0	0	0
Project	0	0	0
Final examination	1	2	2
Total Work Load			**120**
ECTS Credit of the Course			**4**

Course Contribution To Program

Contribution: 1: Very Slight 2:Slight 3:Moderate 4:Significant 5:Very Significant

	P01	P02	P03	P04
All	4	4	4	
C01	4	5	4	3
C02	4	4	4	

Firat University

FACULTY OF ENGINEERING
ELECTRICAL-ELECTRONICS ENGINEERING

EEM315	Analog Electronic-2				
Semester	**Course Code**	**Course Name**	**L+P**	**Credit**	**ECTS**
5	EEM315	Analog Electronic-2	3	3	5

Language of Instruction:
Turkish
Course Level:
Faculty
Work Placement(s):
No
Department / Program:
ELECTRICAL-ELECTRONICS ENGINEERING
Course Type:
Zorunlu
Goals:
The objective of this course is to provide information about basic electronic circuit design, application circuits and circuits building failures
Teaching Methods and Techniques:

Prerequisites:

Course Coordinator:

Instructors:
Asist Prof. Dr. Sencer ÜNALAsist Prof. Dr. Hasan GÜLER
Assistants:

Recommended Sources

Textbook	:	
Resources	:	MICROELECTRONICS: Digital and Analog Circuits and Systems, Jacob MILLMAN, McGraw-Hill. ,Electronic Devices and Circuit Theory, Prentice Hall,.
Documents	:	
Assignments	:	
Exams	:	

Course Category

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

Course Content

Week	Topics	Study Materials	Materials
1	Properties of OP-AMP and characteristics.		
2	OP-AMP Offset voltage and current and polarization current.		
3	Inverting and non-inverting amplifiers.		
4	Difference and enstrumentasyon amplifiers.		
5	Basic op-amp circuits.		
6	Ossilator and sinusoidal wave generators.		
7	Sensitive rectifiers,clippers and wave form generators.		
8	Comparators, logarithmic and anti-logarithmic amplifiers.		
9	Big signal amplifiers,A,B and C class working and efficients.		
10	Big signal amplifiers,A,B and C class working and efficients.		
11	Regulated power sources; shunt,series current limited and switched regulator circuits.		
12	UJT and applications.		
13	Elecronic circuit design method of tristor,Triak and diak companents		
14	Elecronic circuit design method of tristor,Triak and diak companents		

Course Learning Outcomes

No	Learning Outcomes
C01	Gains the ability to apply the knowledge about electronic circuits to engineering problems.
C02	Gain the ability to identify, model and solve electronic circuits

Program Learning Outcomes

No	Learning Outcome
P08	Ability to work effectively in disciplinary and multi-disciplinary teams.
P02	Ability to define, formulate and solve complex engineering problems; ability to select and apply appropriate modeling and analysis methods for this purpose.
P07	Professional and ethical responsibility
P06	Ability to communicate effectively in Turkish orally and in writing; knowledge of at least one foreign language.
P01	Sufficient knowledge in mathematics, science and electrical and electronic engineering; ability to apply theoretical and applied knowledge in these fields to engineering problems.
P05	Ability to design and conduct experiments, collect data, analyze and interpret results for the study of engineering problems.
P03	Ability to design a complex system, process, device or product to meet specific requirements under realistic constraints and conditions; for this purpose, the ability to apply modern design methods
P11	Information about the effects of engineering practices on health, environment and safety in universal and social dimensions and the problems of the age; awareness of the legal consequences of er
P09	Awareness of the necessity of lifelong learning; the ability to access information, follow developments in science and technology, and constantly renew oneself.
P10	Information on project management and business practices such as risk management and change management; awareness of entrepreneurship, innovation and sustainable development.
P04	Ability to develop, select and use modern techniques and tools necessary for engineering practice; Ability to use information technologies effectively.

Assessment		
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	3	42
Assignments	5	10	50
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			**138**
ECTS Credit of the Course			**5**

Course Contribution To Program

Contribution: 1: Very Slight 2:Slight 3:Moderate 4:Significant 5:Very Significant

	P01	P02
All	3	4
C01	3	
C02		4

Firat University

FACULTY OF ENGINEERING
ELECTRICAL-ELECTRONICS ENGINEERING

EEM313	Signals and Systems				
Semester	**Course Code**	**Course Name**	**L+P**	**Credit**	**ECTS**
5	EEM313	Signals and Systems	3	3	4

Language of Instruction:
Turkish
Course Level:
Faculty
Work Placement(s):
No
Department / Program:
ELECTRICAL-ELECTRONICS ENGINEERING
Course Type:
Zorunlu
Goals:
1. To teach general concepts in systems theory. 2. To teach the transformation techniques developed for the demonstration and analysis of continuous and discrete time systems and to emphasize their similarities and differences.
Teaching Methods and Techniques:
Classification of signals and systems, their features. Stability in continuous-time systems. Finding time response in systems defined by derivative equations, zero state and zero input response. Convolution integral in continuous time, its features, step and impulse response. Laplace transform and convergence region features. Inverse laplace transform, expansion to partial fractions. Definition of system function in continuous time systems, concept of pole and zero. Systems defined by difference equations and discretization. Time response analysis of discrete-time systems. Z-transform, region of convergence and its features. Inverse Z-transform, power series expansion, partial fractions expansion. Definition of system function in discrete time systems, concept of pole and zero, stability. Trigonometric and complex Fourier series representations. Phase and amplitude spectrum. Fourier transform features, Parseval's theorem. Frequency response of continuous and discrete time systems. Discrete Fourier transform and its features.
Prerequisites:

Course Coordinator:

Instructors:
Associate Prof. Dr. Turgay KAYA
Assistants:

Recommended Sources

Textbook	:	1-Signals and Systems 2nd Edition by Alan Oppenheim, Alan Willsky, with Hamid
Resources	:	2- Sinyaller ve Sistemler / Signals and Sistems - Schaum's
Documents	:	
Assignments	:	Schaum's Outline of Signals and Systems, Hwei Hsu, 3rd Edition
Exams	:	

Course Category

Mathmatics and Basic Sciences	:	40	**Education**	:	
Engineering	:	60	**Science**	:	
Engineering Design	:		**Health**	:	
Social Sciences	:		**Field**	:	

Course Content

Week	Topics	Study Materials	Materials
1	Properties and classifications of signal and systems		
2	Stability in continous systems		
3	The identified systems with differential equations,zero state and zero input responses.		
4	Convolution entagral in continuous-time, features, step and impulse response.		
5	Laplace dönüşümü ve yakınsama bölgesi özellikleri.		
6	Ters Laplace Dönüşümü, kısmi kesirlere açılım. Sürekli zamanlı sistemlerde sistem fonksiyonu tanımı, kutup ve sıfır kavramı		
7	Fark denklemleri ile tanımlanan sistemler ve ayrıklaştırma. Ayrık zamanlı sistemlerin zaman cevabı analizi.		
8	Z-dönüşümü, yakınsama bölgesi ve özellikleri.		
9	Ters Z-dönüşümü, güç serisi açılımı, kısmi kesirlere açılım.		
10	Ayrık zamanlı sistemlerde sistem fonksiyonu tanımı, kutup ve sıfır kavramı, kararlılık.		
11	Trigonometrik ve Kompleks Fourier Serisi gösterimleri. Faz ve genlik spektrumları.		
12	Fourier ve Ters Fourier Dönüşümü, özellikleri.		
13	Sürekli ve ayrık zamanlı sistemlerin frekans tepkisi		
14	Ayrık Fourier Dönüşümü ve özellikleri.		

Course Learning Outcomes

No	Learning Outcomes
C01	Sinyaller ve sistemlerin sınıflandırılmalarını ve temel kavramları öğrenmek
C02	Sürekli ve ayrık zamanlı sistemlerin gösterilmesi ve çözümlenmesi için geliştirilmiş olan dönüşüm tekniklerini öğrenmek

Program Learning Outcomes

No	Learning Outcome
P08	Ability to work effectively in disciplinary and multi-disciplinary teams.
P02	Ability to define, formulate and solve complex engineering problems; ability to select and apply appropriate modeling and analysis methods for this purpose.
P07	Professional and ethical responsibility
P06	Ability to communicate effectively in Turkish orally and in writing; knowledge of at least one foreign language.
P01	Sufficient knowledge in mathematics, science and electrical and electronic engineering; ability to apply theoretical and applied knowledge in these fields to engineering problems.
P05	Ability to design and conduct experiments, collect data, analyze and interpret results for the study of engineering problems.
P03	Ability to design a complex system, process, device or product to meet specific requirements under realistic constraints and conditions; for this purpose, the ability to apply modern design methods
P11	Information about the effects of engineering practices on health, environment and safety in universal and social dimensions and the problems of the age; awareness of the legal consequences of er
P09	Awareness of the necessity of lifelong learning; the ability to access information, follow developments in science and technology, and constantly renew oneself.
P10	Information on project management and business practices such as risk management and change management; awareness of entrepreneurship, innovation and sustainable development.
P04	Ability to develop, select and use modern techniques and tools necessary for engineering practice; Ability to use information technologies effectively.

Assessment		
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	12	3	36
Presentation	0	0	0
Mid-terms	1	2	2
Practice	6	2	12
Laboratory	0	0	0
Project	0	0	0
Final examination	1	2	2
Total Work Load			**122**
ECTS Credit of the Course			**4**

Course Contribution To Program

Contribution: 1: Very Slight 2:Slight 3:Moderate 4:Significant 5:Very Significant

	P01	P02
All	4	4
C01	4	4
C02	4	4

Firat University

FACULTY OF ENGINEERING
ELECTRICAL-ELECTRONICS ENGINEERING

EEM309		Profession Application-1			
Semester	**Course Code**	**Course Name**	**L+P**	**Credit**	**ECTS**
5	EEM309	Profession Application-1	2	1	2

Language of Instruction:
Turkish
Course Level:
Faculty
Work Placement(s):
No
Department / Program:
ELECTRICAL-ELECTRONICS ENGINEERING
Course Type:
Zorunlu
Goals:
Staj yoluyla mesleki açıdan bilgi, görgü ve becerilerini geliştirmek.
Teaching Methods and Techniques:

Prerequisites:

Course Coordinator:
Prof. Dr. Yakup DEMİR
Instructors:

Assistants:

Recommended Sources

Textbook	:	Öğrenci, Yaz Stajını yaptığı işyerindeki çalışma konularına göre kaynakları temin edecektir.
Resources	:	
Documents	:	
Assignments	:	
Exams	:	

Course Category

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

Course Content

Week	Topics	Study Materials	Materials
1	Mesleki Uygulama-1 dersi, "Müh.Fak. Pratik Çalışma (Staj) Yönergesi" ve "Bölüm İçi Öğrenci Stajları Yönergesi" nde belirler		
2	İlgili jürilerin; öğrencilerin, kendi stajlarına ilişkin olarak hazırladıkları sunu'ları dinleyerek ve sorular sorarak değerlendirmes		
3	İlgili jürilerin; öğrencilerin, kendi stajlarına ilişkin olarak hazırladıkları sunu'ları dinleyerek ve sorular sorarak değerlendirmes		
4	İlgili jürilerin; öğrencilerin, kendi stajlarına ilişkin olarak hazırladıkları sunu'ları dinleyerek ve sorular sorarak değerlendirmes		
5	İlgili jürilerin; öğrencilerin, kendi stajlarına ilişkin olarak hazırladıkları sunu'ları dinleyerek ve sorular sorarak değerlendirmes		
6	İlgili jürilerin; öğrencilerin, kendi stajlarına ilişkin olarak hazırladıkları sunu'ları dinleyerek ve sorular sorarak değerlendirmes		
7	İlgili jürilerin; öğrencilerin, kendi stajlarına ilişkin olarak hazırladıkları sunu'ları dinleyerek ve sorular sorarak değerlendirmes		
8	İlgili jürilerin; öğrencilerin, kendi stajlarına ilişkin olarak hazırladıkları sunu'ları dinleyerek ve sorular sorarak değerlendirmes		
9	İlgili jürilerin; öğrencilerin, kendi stajlarına ilişkin olarak hazırladıkları sunu'ları dinleyerek ve sorular sorarak değerlendirmes		
10	İlgili jürilerin; öğrencilerin, kendi stajlarına ilişkin olarak hazırladıkları sunu'ları dinleyerek ve sorular sorarak değerlendirmes		
11	İlgili jürilerin; öğrencilerin, kendi stajlarına ilişkin olarak hazırladıkları sunu'ları dinleyerek ve sorular sorarak değerlendirmes		
12	İlgili jürilerin; öğrencilerin, kendi stajlarına ilişkin olarak hazırladıkları sunu'ları dinleyerek ve sorular sorarak değerlendirmes		
13	İlgili jürilerin; öğrencilerin, kendi stajlarına ilişkin olarak hazırladıkları sunu'ları dinleyerek ve sorular sorarak değerlendirmes		
14	İlgili jürilerin; öğrencilerin, kendi stajlarına ilişkin olarak hazırladıkları sunu'ları dinleyerek ve sorular sorarak değerlendirmes		

Course Learning Outcomes

No	Learning Outcomes
C01	Yeniliklere ve gelişen teknolojiye uyum sağlayabilmek için, kendini sürekli yenileme ve araştırmacı yeteneğini geliştirme bilinci kazanacaklar
C02	Girişimcilik becerisi kazanacaklar

Program Learning Outcomes

No	Learning Outcome
P08	Ability to work effectively in disciplinary and multi-disciplinary teams.
P02	Ability to define, formulate and solve complex engineering problems; ability to select and apply appropriate modeling and analysis methods for this purpose.
P07	Professional and ethical responsibility
P06	Ability to communicate effectively in Turkish orally and in writing; knowledge of at least one foreign language.
P01	Sufficient knowledge in mathematics, science and electrical and electronic engineering; ability to apply theoretical and applied knowledge in these fields to engineering problems.
P05	Ability to design and conduct experiments, collect data, analyze and interpret results for the study of engineering problems.
P03	Ability to design a complex system, process, device or product to meet specific requirements under realistic constraints and conditions; for this purpose, the ability to apply modern design methods
P11	Information about the effects of engineering practices on health, environment and safety in universal and social dimensions and the problems of the age; awareness of the legal consequences of er
P09	Awareness of the necessity of lifelong learning; the ability to access information, follow developments in science and technology, and constantly renew oneself.
P10	Information on project management and business practices such as risk management and change management; awareness of entrepreneurship, innovation and sustainable development.
P04	Ability to develop, select and use modern techniques and tools necessary for engineering practice; Ability to use information technologies effectively.

Assessment		
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	0	0	0
Presentation	2	2	4
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			**62**
ECTS Credit of the Course			**2**

Course Contribution To Program
Contribution: 1: Very Slight 2:Slight 3:Moderate 4:Significant 5:Very Significant

Firat University

FACULTY OF ENGINEERING
ELECTRICAL-ELECTRONICS ENGINEERING

EEM305	Power Systems-1				
Semester	**Course Code**	**Course Name**	**L+P**	**Credit**	**ECTS**
5	EEM305	Power Systems-1	3	3	4

Language of Instruction:
Turkish
Course Level:
Faculty
Work Placement(s):
No
Department / Program:
ELECTRICAL-ELECTRONICS ENGINEERING
Course Type:
Zorunlu
Goals:
Realization of basic topics and principles of power systems.
Teaching Methods and Techniques:
Introduction to power systems. Generation, transmission and distribution voltages. General structure, units and properties of a generation institution. Power transmission line. Nominal ? and nominal T circuits. Calculations of resistance, inductance and capacitance on transmission lines Mechanical structure of transmission lines. Conductors and it's properties. Stranded and bunched conductors. LV, MV and HV cables. Insulators, it's structure, types and properties. Potential distributions on insulators. Mid term Selection criterias of pillars. Calculation and selection of pillar on LV distribution lines. Power switches; disconnector types and it's properties. Breaker types and it's properties and interrupt techniques. Bus bar and bus bar systems. Short circuit currents and it's properties. Calculation and selection of the breaker according to short circuit current. Dimensioning of bus bar and cables according to short circuit currents.
Prerequisites:

Course Coordinator:

Instructors:
Associate Prof. Dr. Mahmut Temel Özdemir
Assistants:

Recommended Sources

Textbook	:	Elektrik Enerjisi Dağıtımı, Nusret ALPERÖZ, 1987. Enerji İletimi, Prof. Dr. Hüseyin ÇAKIR, YTÜ Yayını, 1989. Enerji Hatları Mühendisliği, H. Hüsnü D
Resources	:	Elektrik Enerjisi Dağıtımı, Nusret ALPERÖZ, 1987. Enerji İletimi, Prof. Dr. Hüseyin ÇAKIR, YTÜ Yayını, 1989. Enerji Hatları Mühendisliği, H. Hüsnü D
Documents	:	
Assignments	:	
Exams	:	

Course Category

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

Course Content

Week	Topics	Study Materials	Materials
1	Introduction to power systems. Generation, transmission and distribution voltages.		
2	General structure, units and properties of a generation institution.		
3	Power transmission line. Nominal pi and nominal T circuits.		
4	Calculations of resistance, inductance and capacitance on transmission lines		
5	Mechanical structure of transmission lines. Conductors and it's properties. Stranded and bunched conductors.		
6	LV, MV and HV cables.		
7	Insulators, it's types, properties and selection criteries		
8	Potential distributions on insulators.		
9	Selection criterias of pillars. Calculation and selection of pillar on LV distribution lines.		
10	Power switches; disconnector types and it's properties. Breaker types and it's properties and interrupt techniques.		
11	Bus bar and bus bar systems.		
12	Short circuit currents and it's properties. Calculation and selection of the breaker according to short circuit current. Dimens		
13	Dimensioning of bus bar and cables according to short circuit currents.		
14	Grounding		

Course Learning Outcomes

No	Learning Outcomes
C01	Obtain information about construction and operation of equipments and apparatus used in electrical power systems.
C02	To calculate short cicuit currents in power systems
C04	Understanding of the relevant regulations

Program Learning Outcomes

No	Learning Outcome
P08	Ability to work effectively in disciplinary and multi-disciplinary teams.
P02	Ability to define, formulate and solve complex engineering problems; ability to select and apply appropriate modeling and analysis methods for this purpose.
P07	Professional and ethical responsibility
P06	Ability to communicate effectively in Turkish orally and in writing; knowledge of at least one foreign language.
P01	Sufficient knowledge in mathematics, science and electrical and electronic engineering; ability to apply theoretical and applied knowledge in these fields to engineering problems.
P05	Ability to design and conduct experiments, collect data, analyze and interpret results for the study of engineering problems.
P03	Ability to design a complex system, process, device or product to meet specific requirements under realistic constraints and conditions; for this purpose, the ability to apply modern design methods
P11	Information about the effects of engineering practices on health, environment and safety in universal and social dimensions and the problems of the age; awareness of the legal consequences of er
P09	Awareness of the necessity of lifelong learning; the ability to access information, follow developments in science and technology, and constantly renew oneself.
P10	Information on project management and business practices such as risk management and change management; awareness of entrepreneurship, innovation and sustainable development.
P04	Ability to develop, select and use modern techniques and tools necessary for engineering practice; Ability to use information technologies effectively.

Assessment		
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			**4**

Course Contribution To Program

Contribution: 1: Very Slight 2:Slight 3:Moderate 4:Significant 5:Very Significant

	P02	P04	P07
C01		4	
C02	4		
C04			3

Firat University

FACULTY OF ENGINEERING
ELECTRICAL-ELECTRONICS ENGINEERING

EEM303	Electrical Machines-1				
Semester	**Course Code**	**Course Name**	**L+P**	**Credit**	**ECTS**
5	EEM303	Electrical Machines-1	3	3	5

Language of Instruction:
Turkish
Course Level:
Faculty
Work Placement(s):
No
Department / Program:
ELECTRICAL-ELECTRONICS ENGINEERING
Course Type:
Zorunlu
Goals:
Ülkemizde devlet özel sektörün faaliyet gösterdiği alanlardan hızlı bir şekilde çekilmektedir. Dolayısıyla özellikle teknik dallarda mezun olacaklar devlet kuruluşlarından çok sanayide çalışacak formasyonlara sahip donanımlarla yetiştirilmek zorundadır. Ayrıca mezunlarımızı AB ülkelerinde çalışabilecek asgari teknik donanımlara sahip elemanlar olarak yetiştirme zarureti de günümüzde ortaya çıkmıştır. Yakın bir gelecekte mezunlarımız değişik AB ülkelerinin sanayi dallarında çalışacak birer teknik eleman olacaklardır. Bu nedenle tekstil, kimya, elektrikli ulaşım araçları, çimento ve diğer sanayi dallarında yaygın olarak kullanılan elektrik makinalarının çalışma ve kontrol yöntemlerinin anlaşılabilmesi için temel sayılabilecek, lineer doğru akım makinaları, dönen doğru akım makinaları ve permanent magnet doğru akım makinalarının yapısı, çalışması ve kontrol yöntemleri konusunda talebeleri mühendisçe düşünüp mühendisçe çözüm üretebilecek ön bilgi dağarcığına sahip hale getirmek bu dersin ana amacıdır.
Teaching Methods and Techniques:
Elektrik makinalarına giriş, DA makinalarının esasları, Lineer DA motorlarının sürekli ve geçici durum analizleri, Endüvi reaksiyonu, DA makinalarında endüvinin yapısı, DA makinalarının yapısı, Doğru akım makinalarında komütasyon, Moment ve indüklenen gerilim ifadeleri, DA makinelerinde güç akışı ve kayıplar, DA generatörleri, DA generatör ve motorlarının eşdeğer devreleri ve çeşitleri, DA motorlarının matematiksel modeli ve geçici durum analizleri, Doğru akım motorlarına yol verme, hız kontrolü, blok diagramı ve geçici durum analizi, Permanent Magnet (Fırçasız) DA makinaları, Fırçasız doğru akım motorlarının çalışma ilkesi ve kontrol yöntemleri.
Prerequisites:
(EEM240)
Course Coordinator:

Instructors:
Associate Prof. Dr. Ahmet ORHAN
Assistants:

Recommended Sources

Textbook	:	Elektrik Makinalarının Esasları; Prof. Dr. Erhan AKIN, Çağlayan Kitabevi, 2007. Theory and Problems of Electric Machines and Electromechanic, Syed
Resources	:	
Documents	:	
Assignments	:	
Exams	:	

Course Category

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

Course Content

Week	Topics	Study Materials	Materials
1	Elektrik makinalarına giriş		
2	DA makinalarının esasları		
3	Lineer DA motorlarının sürekli ve geçici durum analizleri		
4	Endüvi reaksiyonu, DA makinalarında endüvinin yapısı		
5	DA makinalarının yapısı		
6	DA makinalarında komütasyon		
7	Moment ve indüklenen gerilim ifadeleri		
8	DA makinelerinde güç akışı ve kayıplar		
9	Ara Sınav		
10	DA generatörleri, DA generatör ve motorlarının eşdeğer devreleri ve çeşitleri		
11	DA motorlarının matematiksel modeli ve geçici durum analizleri		
12	DA motorlarına yol verme, hız kontrolü, blok diyagramı ve geçici durum analizi		
13	Fırçasız DA makinaları		
14	Fırçasız DA motorlarının çalışma ilkesi ve kontrol yöntemleri		

Course Learning Outcomes

No	Learning Outcomes
C01	Karmaşık mühendislik problemlerini tanımlama, formüle etme ve çözme becerisi; bu amaçla uygun modelleme ve analiz yöntemlerini seçme ve uygulama becerisi.
C02	Karmaşık bir sistemi, süreci, cihazı veya ürünü gerçekçi kısıtlar ve koşullar altında, belirli gereksinimleri karşılayacak şekilde tasarlama becerisi; bu amaçla modern tasarım yöntemlerini uygulama bec

Program Learning Outcomes

No	Learning Outcome
P08	Ability to work effectively in disciplinary and multi-disciplinary teams.
P02	Ability to define, formulate and solve complex engineering problems; ability to select and apply appropriate modeling and analysis methods for this purpose.
P07	Professional and ethical responsibility
P06	Ability to communicate effectively in Turkish orally and in writing; knowledge of at least one foreign language.
P01	Sufficient knowledge in mathematics, science and electrical and electronic engineering; ability to apply theoretical and applied knowledge in these fields to engineering problems.
P05	Ability to design and conduct experiments, collect data, analyze and interpret results for the study of engineering problems.
P03	Ability to design a complex system, process, device or product to meet specific requirements under realistic constraints and conditions; for this purpose, the ability to apply modern design methods
P11	Information about the effects of engineering practices on health, environment and safety in universal and social dimensions and the problems of the age; awareness of the legal consequences of er
P09	Awareness of the necessity of lifelong learning; the ability to access information, follow developments in science and technology, and constantly renew oneself.
P10	Information on project management and business practices such as risk management and change management; awareness of entrepreneurship, innovation and sustainable development.
P04	Ability to develop, select and use modern techniques and tools necessary for engineering practice; Ability to use information technologies effectively.

Assessment

In-Term Studies	Quantity	Percentage
Mid-terms	1	%20
Quizzes	4	%40
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	0	%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	14	3	42
Presentation	0	0	0
Mid-terms	1	2	2
Practice	2	4	8
Laboratory	0	0	0
Project	1	1	1
Final examination	1	2	2
Total Work Load			**139**
ECTS Credit of the Course			**5**

Course Contribution To Program

Contribution: 1: Very Slight 2:Slight 3:Moderate 4:Significant 5:Very Significant

	P02	P03
All	4	4
C01	4	
C02		4

Firat University

FACULTY OF ENGINEERING
ELECTRICAL-ELECTRONICS ENGINEERING

ÇMÜ331	Hydrology				
Semester	**Course Code**	**Course Name**	**L+P**	**Credit**	**ECTS**
5	ÇMÜ331	Hydrology	2	2	3

Language of Instruction:
Turkish
Course Level:
Faculty
Work Placement(s):
No
Department / Program:
ELECTRICAL-ELECTRONICS ENGINEERING
Course Type:
Seçmeli
Goals:
The introduction for students about the hydrology science which gains significance increasingly. Establishing the foundation for the water resources course in the next term. Enabling the application on water resources subject employing mathematics, physics, and statistics sciences, design of hydraulic structures.
Teaching Methods and Techniques:
The definition of the hydrology, Rainfall, Evaporation, Infiltration, Groundwater flow. Flow records and analysis, River basins, Snow melting, Hydrograph and analysis, Unit hydrograph theory and its applications, Synthetic unit hydrograph, The routing of the hydrograph along the river, Probability theory and the employment of statistics in the hydrology
Prerequisites:

Course Coordinator:

Instructors:
Asist Prof. Dr. nİLÜFER nACAR kOÇER
Assistants:

Recommended Sources

Textbook	:	
Resources	:	
Documents	:	Prof. Nurünnisa USUL – Engineering hydrology,Prof. Mehmetçik BAYAZIT, Prof. İlhan AVCI, Prof. Zekai ŞEN, Hydrological applications
Assignments	:	
Exams	:	

Course Category

Mathmatics and Basic Sciences	:	10	**Education**	:	
Engineering	:	70	**Science**	:	
Engineering Design	:	20	**Health**	:	
Social Sciences	:		**Field**	:	

Course Content

Week	Topics	Study Materials	Materials
1	Definition of hydrology, place and significance of hydrology in civil engineering, hydrologic cycle, basic equations of hydrolc		
2	Generation of Precipitation , Measurement of Precipitation, Analysis of Precipitation Records		
3	Mechanism of Evaporation, Evaporation from Water Surface, Evaporation from Soil and Snow Surface, Transpiration and Ir		
4	Infiltration Capacity, Infiltration Velocity, Infiltration Indices		
5	Ground Water Zones, Unsaturated Zone, Saturated Zone, Feeding and Losses of Ground Water		
6	Ground Water Flow, Flow in the Unsaturated Zone, Abstraction of Ground Water by Wells, Measurement of Hydraulic Cond		
7	Level and Water Surface Slope Measurements, Cross-Section measurements, Discharge Measurements, Flow Rating Curve,		
8	MIDTERM EXAM		
9	River Basin Characteristics, Separation of Flow into Components, Flow induced by Snow Melting		
10	Elements of the Hydrograph, Separation of the Indirect Flow and the Base Flow, System Analysis of River Basins, Parametr		
11	Definition of the Unit Hydrograph, Unit Hydrograph as a Rainfall Runoff Model		
12	Synthetic Unit Hydrographs, Instantaneous Unit Hydrographs		
13	Hydrograph Routing along the Channel		
14	Probability, Frequency Distribution, Probability Distribution Functions, Flood Frequency Analysis		
15	MIDTERM EXAM EXCUSE		

Course Learning Outcomes

No	Learning Outcomes
C01	Learning the elements of the hydrological cycle and comprehending its significance in civil engineering
C02	Learning the significance of the groundwater in civil engineering
C03	The measurement of the hydrologic data and the ability to analyze the recorded data
C04	The learning of the flow which is an element of hydrological cycle directly affecting the civil engineering and the ability to employ the unit hydrograph theory which is frequently used in our country
C05	The ability to apply statistics which is an indispensable subject for the civil engineering program in water resources subject
C06	Design of hydraulic structures

Program Learning Outcomes

No	Learning Outcome
P08	Ability to work effectively in disciplinary and multi-disciplinary teams.
P02	Ability to define, formulate and solve complex engineering problems; ability to select and apply appropriate modeling and analysis methods for this purpose.
P07	Professional and ethical responsibility
P06	Ability to communicate effectively in Turkish orally and in writing; knowledge of at least one foreign language.
P01	Sufficient knowledge in mathematics, science and electrical and electronic engineering; ability to apply theoretical and applied knowledge in these fields to engineering problems.
P05	Ability to design and conduct experiments, collect data, analyze and interpret results for the study of engineering problems.
P03	Ability to design a complex system, process, device or product to meet specific requirements under realistic constraints and conditions; for this purpose, the ability to apply modern design methods
P11	Information about the effects of engineering practices on health, environment and safety in universal and social dimensions and the problems of the age; awareness of the legal consequences of er
P09	Awareness of the necessity of lifelong learning; the ability to access information, follow developments in science and technology, and constantly renew oneself.
P10	Information on project management and business practices such as risk management and change management; awareness of entrepreneurship, innovation and sustainable development.
P04	Ability to develop, select and use modern techniques and tools necessary for engineering practice; Ability to use information technologies effectively.

Assessment		
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	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			**60**
ECTS Credit of the Course			**2**

Course Contribution To Program

Contribution: 1: Very Slight 2:Slight 3:Moderate 4:Significant 5:Very Significant

	P08	P09	P11
All	4	4	4

Firat University

FACULTY OF ENGINEERING
ELECTRICAL-ELECTRONICS ENGINEERING

BMÜ341	Artificial Intelligence				
Semester	**Course Code**	**Course Name**	**L+P**	**Credit**	**ECTS**
5	BMÜ341	Artificial Intelligence	2	2	3

Language of Instruction:
Turkish
Course Level:
Faculty
Work Placement(s):
No
Department / Program:
ELECTRICAL-ELECTRONICS ENGINEERING
Course Type:
Seçmeli
Goals:
Gain the ability to problem solving with artificial intelligence algorithms.
Teaching Methods and Techniques:
Learning artificial intelligence method, applications, and languages. Determining a problem is fit to AI methods or not.
Prerequisites:

Course Coordinator:

Instructors:
Prof. Dr. Mehmet KAYA
Assistants:

Recommended Sources

Textbook	:	None
Resources	:	
Documents	:	
Assignments	:	
Exams	:	

Course Category

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

Course Content

Week	Topics	Study Materials	Materials
1	The history of AI		
2	Blind Search Algorithms		
3	Heuristic Search Algorithms		
4	Local Search Algorithms		
5	Genetic Algorithms		
6	Game Algorithms		
7	Reasoning Mechanisms		
8	Midterm Exam		
9	Prolog Programming Language		
10	Knowledge Representation		
11	Expert Systems		
12	Machine Learning Algorithms-1		
13	Machine Learning Algorithms-2		
14	Final Exam		

Course Learning Outcomes

No	Learning Outcomes
C01	Students will determine a problem is fit to AI methods or not.
C02	Students will choose appropriate AI methods for a given problem
C03	Students will implement of the AI methods for a given problem
C04	Students will know the searching algorithms, their advantages and disadvantages.
C05	Students will know the knowledge representation methods, their advantages and disadvantages.

Program Learning Outcomes

No	Learning Outcome
P08	Ability to work effectively in disciplinary and multi-disciplinary teams.
P02	Ability to define, formulate and solve complex engineering problems; ability to select and apply appropriate modeling and analysis methods for this purpose.
P07	Professional and ethical responsibility
P06	Ability to communicate effectively in Turkish orally and in writing; knowledge of at least one foreign language.
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P04	Ability to develop, select and use modern techniques and tools necessary for engineering practice; Ability to use information technologies effectively.

Assessment		
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	7	98
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	15	15
Total Work Load			**170**
ECTS Credit of the Course			**6**

Course Contribution To Program
Contribution: 1: Very Slight 2:Slight 3:Moderate 4:Significant 5:Very Significant