Firat University

FACULTY OF ENGINEERING
ELECTRICAL-ELECTRONICS ENGINEERING

EEM485	Electrical Machines Lab.-2				
Semester	**Course Code**	**Course Name**	**L+P**	**Credit**	**ECTS**
7	EEM485	Electrical Machines Lab.-2	0	1	2

Language of Instruction:
Turkish
Course Level:
Faculty
Work Placement(s):
No
Department / Program:
ELECTRICAL-ELECTRONICS ENGINEERING
Course Type:
Zorunlu
Goals:
EEM-304 Elektrik Makinaları-II dersinde anlatılan konuların deneysel olarak pekiştirilmesidir.
Teaching Methods and Techniques:
İlk iki hafta gruplar belirlenecektir. Daha sonra öğrencilere ait oldukları gruplar, deney günleri ve laboratuvar kuralları hakkında bilgi verilecektir. Her hafta 8 grup 8 ayrı deney yapacaktır. Bu deneyler gruplar tarafından her hafta dönüşümlü olarak yapılacaktır. Deneylerin başlangıcında deney sorumluları kısa birsözlü veya yazılı sınav yapacaktır. Daha sonra deney sorumlusu gözetiminde öğrenciler deneyini yapacaktır. Sene sonu sınavı yazılı ve laboratuvarda uygulamalı olarak gerçekleştirilecektir. Öğrencilerin hangi deneyi yapacakları kura ile belirlenecektir. Laboratuvarda yapılan deneyler: 1. Üç Fazlı Asenkrom Motor Ve Generatörün İncelenmesi 2. Elektrikle Tahriklerin Kumandası 3. Tek Fazlı Asenkron Motorların İncelenmesi 4. Senkron Motor Ve Generatörün İnclenmesi 5. Adım Motorlarının İncelenmesi 6. Şebeke İle Paralel Çalışan Senkron Generatör 7. İnverterlerle Beslenen Üç Fazlı Asenkron Motorun Pc İle Açık Çevrim Hız Kontrolu 8. Asenkron Motorlara Yol Verme Ve Hız Ayarı Yöntemleri
Prerequisites:
(EEM240 or EEM304)
Course Coordinator:
Associate Prof. Dr. Ahmet ORHAN
Instructors:

Assistants:
Research Assist. İrem GÖRGÖZResearch Assist. Abdülcelil KÜLEKÇİOĞLUResearch Assist.Dr. Bircan ÇALIŞIRResearch Assist. Melike ESENResearch Assist. Rumeysa KÜLEKÇİOĞLUResearch Assist. Erman ÖZPOLATResearch Assist. Merve YILDIRIM

Recommended Sources

Textbook	:	Elektrik Makineleri-II Laboratuvarı Föyleri
Resources	:	
Documents	:	
Assignments	:	
Exams	:	

Course Category

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

Course Content

Week	Topics	Study Materials	Materials
1	Deney Gruplarının Belirlenmesi		
2	Laboratuvar hakkında öğrencilere genel bilgi verilmesi		
3	Deney anlatımı		Lab. Föyleri
4	Ilgili deneylerin Elektrik Makineleri Laboratuvarında yapılması		Lab. Föyleri
5	Ilgili deneylerin Elektrik Makineleri Laboratuvarında yapılması		Lab. Föyleri
6	Ilgili deneylerin Elektrik Makineleri Laboratuvarında yapılması		Lab. Föyleri
7	Ilgili deneylerin Elektrik Makineleri Laboratuvarında yapılması		Lab. Föyleri
8	Ilgili deneylerin Elektrik Makineleri Laboratuvarında yapılması		Lab. Föyleri
9	Ilgili deneylerin Elektrik Makineleri Laboratuvarında yapılması		Lab. Föyleri
10	Ilgili deneylerin Elektrik Makineleri Laboratuvarında yapılması		Lab. Föyleri
11	Ilgili deneylerin Elektrik Makineleri Laboratuvarında yapılması		Lab. Föyleri
12	Telafi deneyleri		Lab. Föyleri
13	Gruplar tarafından hazırlanan deney raporlarının değerlendirilmesi		Deney raporları
14	Gruplar tarafından hazırlanan deney raporlarının değerlendirilmesi		Deney raporları

Course Learning Outcomes

No	Learning Outcomes
C01	Öğrenciler temel elektrik makinaları sistemlerine hakim olacaktır
C02	Öğrenciler grup çalışmasını öğrenecektir.
C03	Öğrenciler deney tasarlama, test etme, sonuçları analiz etme ve deneysel sonuçları yorumlama yeteneği kazanacaktır.
C04	Öğrenciler rapor yazmayı öğrenecektir.

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	%0
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%40
Project	0	%0
Final examination	0	%60
Total		**% 100**

ECTS Allocated Based on Student Workload			
Activities	**Quantity**	**Duration**	**Total Work Load**
Course Duration	8	2	16
Hours for off-the-c.r.stud	0	0	0
Assignments	8	2	16
Presentation	0	0	0
Mid-terms	0	0	0
Practice	0	0	0
Laboratory	8	2	16
Project	0	0	0
Final examination	1	1	1
Total Work Load			**49**
ECTS Credit of the Course			**2**

Course Contribution To Program

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

	P03	P05	P06	P08
C01	4			
C02				4
C03		5		
C04			3	

Firat University

FACULTY OF ENGINEERING
ELECTRICAL-ELECTRONICS ENGINEERING

EEM483	SATELLITE COMMUNICATIONS				
Semester	**Course Code**	**Course Name**	**L+P**	**Credit**	**ECTS**
7	EEM483	SATELLITE COMMUNICATIONS	2	2	3

Language of Instruction:
Turkish
Course Level:
Faculty
Work Placement(s):
No
Department / Program:
ELECTRICAL-ELECTRONICS ENGINEERING
Course Type:
Seçmeli
Goals:
Satellites, satellite systems, satellite types, services used in the satellite communication system will be studied in detail.
Teaching Methods and Techniques:
Introduction to satellite communications. Kepler's laws of universal gravitation. Satellite orbits and features. Frequencies used in satellite communications.
Prerequisites:

Course Coordinator:

Instructors:
Asist Prof. Dr. Turgay KAYA
Assistants:

Recommended Sources

Textbook	:	Satellite and Cellular Mobile Communication Systems, Prof. Dr. Ergun BAYRAKÇI, Birsen Publishing House, 2002. Mobile Satellite Communications,
Resources	:	
Documents	:	
Assignments	:	
Exams	:	

Course Category

Mathmatics and Basic Sciences	:	10	**Education**	:	
Engineering	:	50	**Science**	:	
Engineering Design	:	40	**Health**	:	
Social Sciences	:		**Field**	:	

Course Content

Week	Topics	Study Materials	Materials
1	Introduction to satellite communications.		
2	Kepler's laws of universal gravitation.		
3	Satellite orbits and features.		
4	Frequencies used in satellite communications.		
5	Placing the structure and the orbits of satellites.		
6	Determining the type of satellite orbit.		
7	The longest period of time and the importance of communication with the satellite. Calculating the duration of the satellite'		
8	The rate and period of the satellite in orbit.		
9	Antennas and accounts used in satellite communications.		
10	Antenna beam angle, the analysis of income and size.		
11	Used in calculating the azimuth and elevation angle antenna installations.		
12	The concept of satellite antenna polarization.		
13	LNB (low noise block), Diseqc (digital satellite equipment controller) systems.		
14	Cable types used in satellite systems. Studies and Turksat made on satellite systems in Turkey.		

Course Learning Outcomes

No	Learning Outcomes
C01	Learn the basics of satellite communications.
C02	The devices used in satellite communication systems know the working principles.

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	2	4	8
Presentation	0	0	0
Mid-terms	1	5	5
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	1	10	10
Total Work Load			**93**
ECTS Credit of the Course			**3**

Course Contribution To Program

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

	P02	P03
All	4	5
C01	4	
C02		5

Firat University

FACULTY OF ENGINEERING
ELECTRICAL-ELECTRONICS ENGINEERING

EEM481	Optoelectronic				
Semester	**Course Code**	**Course Name**	**L+P**	**Credit**	**ECTS**
7	EEM481	Optoelectronic	3	3	7

Language of Instruction:
Turkish
Course Level:
Faculty
Work Placement(s):
No
Department / Program:
ELECTRICAL-ELECTRONICS ENGINEERING
Course Type:
Seçmeli
Goals:
Learning of opto electronic circuits and systems
Teaching Methods and Techniques:
Radiation theory, construction of light wave and particle. Electromagnetic theory of ligth,spreading of beam, spherical waves. Gauss beams, Fourier optic,atom,molecule and optic spectrum of solids. Polarization,Anisotrophy, even diffraction,Pockel,Faraday and Kerr effects. Modulation of optik radiation and detection: noise,interference, diffraction, visualization Sound and light interference,Lasers,optic wave guides,fibers Rezonators and applications,fiberotics and applications Companents making radiation, Opto-electronic companents, light emitting diodes (LED). Laser and Maser beam theory, laser types and industrial application of lasers Detectors,Photodiodes,PIN Photodiodes, avalanche Photodiodes. Photo transistors,light sensors, solar cell and application field of optoelectronic companents. Opto-electronic circuits, working principle Infrared illumination and night vision systems Infrared communication systems.
Prerequisites:

Course Coordinator:

Instructors:
Asist Prof. Dr. Yavuz Erol
Assistants:

Recommended Sources

Textbook	:	Optoelektronik Devreler ve Sistemler, Eldar MUSAYEV, Birsen Yayınevi, İstanbul, 1999. Fundamentals of Photonics, SALEH and TEICH, Wiley, 1991.
Resources	:	Optoelectronics, WILSON and HAWKES, 3ed. Prentice Hall, 1998
Documents	:	
Assignments	:	
Exams	:	

Course Category

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

Course Content

Week	Topics	Study Materials	Materials
1	Radiation theory, construction of light wave and particle.		
2	Electromagnetic theory of ligth,spreading of beam, spherical waves.		
3	Gauss beams,Fourier optic,atom,molecule and optic spectrum of solids.		
4	Polarization,Anisotrophy,even diffraction,Pockel,Faraday and Kerr effects.		
5	Modulation of optik radiation and detection: noise,interference, diffraction, visualization		
6	Sound and light interference,Lasers,optic wave guides, fibers		
7	Rezonators and applications,fiberotics and applications		
8	Components making radiation, Opto-electronic components, light emitting diodes (LED).		
9	Laser and Maser beam theory, laser types and industrial application of lasers		
10	Detectors,Photodiodes,PIN Photodiodes, avalanche Photodiodes.		
11	Photo transistors,light sensors, solar cell and application field of optoelectronic components.		
12	Opto-electronic circuits, working principle		
13	Infrared illumination and night vision systems		
14	Infrared communication systems.		

Course Learning Outcomes

No	Learning Outcomes
C01	Analysis of optoelectronic systems
C02	Design of optoelectronic 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	3	42
Assignments	3	6	18
Presentation	0	0	0
Mid-terms	1	2	2
Practice	14	1	14
Laboratory	14	3	42
Project	2	20	40
Final examination	1	2	2
Total Work Load			**202**
ECTS Credit of the Course			**7**

Course Contribution To Program

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

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

Firat University

FACULTY OF ENGINEERING
ELECTRICAL-ELECTRONICS ENGINEERING

EEM479	Antennas and Propagation				
Semester	**Course Code**	**Course Name**	**L+P**	**Credit**	**ECTS**
7	EEM479	Antennas and Propagation	2	2	3

Language of Instruction:
Turkish
Course Level:
Faculty
Work Placement(s):
No
Department / Program:
ELECTRICAL-ELECTRONICS ENGINEERING
Course Type:
Seçmeli
Goals:
Antenna parameters in order to a basis for the Electrical and Electronic Engineering, learn the selection and calculation.
Teaching Methods and Techniques:
Maxwell's equations, wave equations, smith chart.
Prerequisites:

Course Coordinator:

Instructors:
Associate Prof. Dr. Duygu KAYA
Assistants:

Recommended Sources

Textbook	:	Foundation for Microwave Engineering, Robert E. COLLIN, McGraw-Hill, 1992. Introduction to Antennas and Propagation, James R. WAIT, Peter PE
Resources	:	
Documents	:	
Assignments	:	
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	Maxwell's equations.		
2	Derivation of wave equation.		
3	Basic antenna theory, the calculation of the near and far field of the magnetic dipole. Hertz dipole.		
4	Antenna radiation, beam width, directivity, gain, efficiency, radiation resistance parameters and calculating.		
5	Calculation of the antenna and the power density of the field intensity.		
6	Friss transmission equation and the free space path loss.		
7	Thevenin and Norton equivalent circuits of the antenna.		
8	Thevenin and Norton equivalent circuits of the antenna.		
9	Input impedance and impedance matching in antenna.		
10	Dipole, folded dipole, half wavelength, full wavelength antenna.		
11	Yagi-Uda, the patch, the calculation of the parameters of the loop and helical antennas		
12	Using of the Smith chart.		
13	Using of the Smith chart.		
14	Examples of Smith Smith chart.		

Course Learning Outcomes

No	Learning Outcomes
C01	Communication engineering definition of the problem, modeling, formulate and solve engineering problems.
C02	To design to provide the desired 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	2	28
Hours for off-the-c.r.stud	0	0	0
Assignments	14	2	28
Presentation	5	2	10
Mid-terms	1	2	2
Practice	7	3	21
Laboratory	0	0	0
Project	0	0	0
Final examination	1	2	2
Total Work Load			**91**
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	P03
C01	4	4	4
C02	4	4	4

Firat University

FACULTY OF ENGINEERING
ELECTRICAL-ELECTRONICS ENGINEERING

EEM477	Microcontrollers and their Applications				
Semester	**Course Code**	**Course Name**	**L+P**	**Credit**	**ECTS**
7	EEM477	Microcontrollers and their Applications	4	3	7

Language of Instruction:
Turkish
Course Level:
Faculty
Work Placement(s):
No
Department / Program:
ELECTRICAL-ELECTRONICS ENGINEERING
Course Type:
Seçmeli
Goals:
Construction work of microcontrollers, programming, and offers to gain the ability to make its own projects.
Teaching Methods and Techniques:
Microcontroller based system's hardware and software
Prerequisites:

Course Coordinator:

Instructors:
Asist Prof. Dr. Yavuz EROL
Assistants:

Recommended Sources

Textbook	:	Lecture notes
Resources	:	Designing Embedded Systems with PIC Microcontrollers: Principles and Applications, Tim Wilmshurst, Elsevier, 2007.
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	Microcontroller families, the most commonly used to introduce the PIC16F877 microcontroller.		Ders Notları
2	Software development environment MPLAB.		Ders Notları
3	Programming environment, test and programming PIC card, laboratory facilities.		
4	Byte stream of commands, the commands are done on the application, data processing and control commands.		
5	Flash, RAM, addressing modes, changing bank concept.		
6	Ports, special purpose recorders, interrupt concept.		
7	The concept of environmental interface, peripheral interrupts.		
8	Timers, counters		
9	Capture, compare, PWM module.		
10	Serial communication		
11	Analog-digital converter module, EEPROM, LCD.		
12	Applications; DC motor, stepper motor, servo motor, serial communications, RF communications		
13	Project presentations.		
14	Project presentations.		

Course Learning Outcomes

No	Learning Outcomes
C01	PIC16F877 microcontroller, which is widely used to be able to use all the functions and understand the structure
C02	Be able to program in assembly language commands using the PIC. The topics included in the course and try to perform the simulator card. Laboratory facilities to carry out a project using his own

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	8	112
Assignments	4	4	16
Presentation	1	2	2
Mid-terms	1	2	2
Practice	14	2	28
Laboratory	0	0	0
Project	1	20	20
Final examination	1	2	2
Total Work Load			**210**
ECTS Credit of the Course			**7**

Course Contribution To Program

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

	P01	P02	P03	P06	P07	P09	P10	P11
C01	3	4	3					
C02				3	4	3	3	2

Firat University

FACULTY OF ENGINEERING
ELECTRICAL-ELECTRONICS ENGINEERING

EEM475	Industrial Electronics				
Semester	**Course Code**	**Course Name**	**L+P**	**Credit**	**ECTS**
7	EEM475	Industrial Electronics	2	2	3

Language of Instruction:
Turkish
Course Level:
Faculty
Work Placement(s):
No
Department / Program:
ELECTRICAL-ELECTRONICS ENGINEERING
Course Type:
Seçmeli
Goals:
To learn industrial electronics in applied manner with perspective of electrical-electronics engineering. To introduce the design philosophy for processes control based on analog and digital electronics and electrical machines.
Teaching Methods and Techniques:
the circuit with Linear and nonlinear op-amp, voltage regulators and sensors
Prerequisites:

Course Coordinator:

Instructors:
Associate Prof. Dr. Hasan GÜLER
Assistants:

Recommended Sources

Textbook	:	Hakan Kuntman lecturer notes, Fikret Ata lecturer notes
Resources	:	Mohan, T.M. Undeland, W.P. Robbins, Power Electronics, John Wiley and Sons. Inc., New York, 1995,H.Kuntman, Endüstriyel Elektronik (3. Basım)
Documents	:	
Assignments	:	
Exams	:	

Course Category

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

Course Content

Week	Topics	Study Materials	Materials
1	Introduction toIndustrial Electronics		
2	Application of linear opamp		
3	Application of linear opamp		
4	Application of nonlinear opamp		
5	Application of nonlinear opamp		
6	AC-DC converter		
7	Schmitt triger circuit		
8	Semi conductor power switches		
9	Circuits with transistor		
10	Circuits with transistor		
11	Circuits with FET		
12	Circuits with MOSFET		
13	Sensors		
14	Circuits with 555		

Course Learning Outcomes

No	Learning Outcomes
C01	design of opamp amplifier
C02	Design of industrial circuit

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	3	42
Assignments	6	3	18
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			**92**
ECTS Credit of the Course			**3**

Course Contribution To Program

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

	P01	P03
C01	3	4
C02	3	4

Firat University

FACULTY OF ENGINEERING
ELECTRICAL-ELECTRONICS ENGINEERING

EEM473	ELECTRONIC COMMUNICATIONS.				
Semester	**Course Code**	**Course Name**	**L+P**	**Credit**	**ECTS**
7	EEM473	ELECTRONIC COMMUNICATIONS.	2	2	3

Language of Instruction:
Turkish
Course Level:
Faculty
Work Placement(s):
No
Department / Program:
ELECTRICAL-ELECTRONICS ENGINEERING
Course Type:
Seçmeli
Goals:
Learning of electronic devices and operating principles used in the basic communication system.
Teaching Methods and Techniques:
Power amplifiers, amplitude modulated basic, basic, fundamental frequency modulation, phase locked loop (PLL)
Prerequisites:

Course Coordinator:
Asist Prof. Dr. Ayhan AKBAL
Instructors:
Asist Prof. Dr. Yavuz EROL
Assistants:

Recommended Sources

Textbook	:	David M. Pozar: Microwave and RF Design of Wireless Systems, John Wiley & Sons, 2001 J. Smith, Modern Communication Circuits, McGraw Hill C
Resources	:	
Documents	:	
Assignments	:	
Exams	:	

Course Category

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

Course Content

Week	Topics	Study Materials	Materials
1	Communication systems		
2	Resonant circuits		
3	Impedance adaptive circuits		
4	Power amplifiers		
5	Class C power amplifiers.		
6	High frequency response of the amplifier		
7	Tuned amplifiers		
8	Tuned amplifiers		
9	Wideband amplifiers		
10	Basic amplitude modulation receivers		
11	Fundamental frequency modulation receiver circuits		
12	Phase locked loop (PLL)		
13	Examining the linear PLL		
14	PLL applications.		

Course Learning Outcomes

No	Learning Outcomes
C01	Learning the basic circuit structure
C02	Examining the structure of the basic amplitude and frequency modulation receiver circuit

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	10	4	40
Assignments	6	3	18
Presentation	0	0	0
Mid-terms	1	2	2
Practice	1	3	3
Laboratory	0	0	0
Project	1	4	4
Final examination	1	2	2
Total Work Load			**97**
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	P04
C01	4	4	4
C02	4	4	4

Firat University

FACULTY OF ENGINEERING
ELECTRICAL-ELECTRONICS ENGINEERING

EEM471	Process Control				
Semester	**Course Code**	**Course Name**	**L+P**	**Credit**	**ECTS**
7	EEM471	Process Control	2	2	3

Language of Instruction:
Turkish
Course Level:
Faculty
Work Placement(s):
No
Department / Program:
ELECTRICAL-ELECTRONICS ENGINEERING
Course Type:
Seçmeli
Goals:
Algılayıcılar,dönüştürücüler,sürücüleri öğretmek. Otomatik kumanda devreleri ve PLC yi öğretmek.
Teaching Methods and Techniques:
Introduction to Process Control and Concepts. Industrial Processes and Models. Control Types. Basic Control Effects and Industrial Control and Organs. Sensors. Transducers. Drivers. Automatic Control Circuits. PLC (Programmable Logic Circuits)
Prerequisites:

Course Coordinator:

Instructors:
Prof. Dr. Mustafa POYRAZ
Assistants:

Recommended Sources

Textbook	:	Automated Process Control Systems, R.P Hunter, 1978, Printre Hall. Sensors and Transducers, M.T Usher,1983, Mac.Millman. Elektrik ve Elektroni
Resources	:	
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	Introduction to Process Control and Concepts		
2	Introduction to Process Control and Concepts		
3	Industrial Processes and Models		
4	Control Types		
5	Basic Control Effects and Industrial Control and organs.		
6	Basic Control Effects and Industrial Control and organs.		
7	Sensors		
8	Transducers		
9	Drivers		
10	Automatic control circuits		
11	Computer Aided Process Circuits		
12	PLC (Programmable Logic Circuits)		
13	PLC (Programmable Logic Circuits)		
14	PLC (Programmable Logic Circuits)		

Course Learning Outcomes

No	Learning Outcomes
C01	Süreç denetleme kavramını öğrenmek
C02	Algılayıcı ve Dönüştürücüleri tanımak
C03	PLC Programlamanın temellerinin öğrenilmesi

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	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			**95**
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	P03
All	4	3	2
C01	2	3	3
C02	3	3	4
C03	3	2	4

Firat University

FACULTY OF ENGINEERING
ELECTRICAL-ELECTRONICS ENGINEERING

EEM469	Control Lab				
Semester	**Course Code**	**Course Name**	**L+P**	**Credit**	**ECTS**
7	EEM469	Control Lab	0	1	2

Language of Instruction:
Turkish
Course Level:
Faculty
Work Placement(s):
No
Department / Program:
ELECTRICAL-ELECTRONICS ENGINEERING
Course Type:
Seçmeli
Goals:
The realization of practices related to the basic concepts and the control of continuous-time systems.
Teaching Methods and Techniques:
Basic Mathematical Operators and its Characteristics Used in Continuous and Discrete Time Control Systems. Temperature and Light System Controled by the Time optimal controllers (On / Off). The Investigation Characteristics of analog PID controllers and its Application in the Position Control System. Application of analog PID Controller in Speed Control Systems and its Characteristic. Feedback Test Set and Its Applications. Open and Closed Loop Control Systems and Stability. MATLAB Applications for Analysis of Control Systems.
Prerequisites:

Course Coordinator:

Instructors:
Asist Prof. Barış KARAKAYA
Assistants:
Research Assist. Sertaç YAMAN Research Assist. Ezgi TAŞKINResearch Assist. Muhammet Sefa ÇETİNResearch Assist. Fatma MURATResearch Assist. Erman ÖZPOLAT

Recommended Sources

Textbook	:	Handouts
Resources	:	
Documents	:	K. OGATA, Englewood Cliffs, NJ: Prentice Hall, 2002. Modern Control Sytems, C. D. DORF and R. H. BISHOP, Pearson Educational International, N
Assignments	:	
Exams	:	

Course Category

Mathmatics and Basic Sciences	:	10	**Education**	:	
Engineering	:	40	**Science**	:	
Engineering Design	:	50	**Health**	:	
Social Sciences	:		**Field**	:	

Course Content

Week	Topics	Study Materials	Materials
1	Basic Mathematical Operators and its Characteristics Used in Continuous and Discrete Time Control Systems.		
2	Temperature and Light System Controled by the Time optimal controllers (On / Off)		
3	The Investigation Characteristics of analog PID controllers and its Application in the Position Control System		
4	Application of analog PID Controller in Speed Control Systems and its Characteristic		
5	Feedback Test Set and Its Applications		
6	Open and Closed Loop Control Systems and Stability		
7	MATLAB Applications for Analysis of Control Systems		

Course Learning Outcomes

No	Learning Outcomes
C01	Students will learn the basic mathematical operators and mathematical modeling
C02	Students will observe the characteristics of the basic converter
C03	Students will perform the control process with PID controllers
C04	Students will can use the on -off controller
C05	Students will observe the concept of stability

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	%0
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	7	%40
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	0	0	0
Presentation	0	0	0
Mid-terms	0	0	0
Practice	0	0	0
Laboratory	7	2	14
Project	0	0	0
Final examination	1	2	2
Total Work Load			**44**
ECTS Credit of the Course			**1**

Course Contribution To Program

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

	P01	P04	P05
C01	4	3	3
C02	4	3	4
C03	4	3	4
C04	4	3	4
C05	4	3	4

Firat University

FACULTY OF ENGINEERING
ELECTRICAL-ELECTRONICS ENGINEERING

EEM467	Logic Circuits Lab.				
Semester	**Course Code**	**Course Name**	**L+P**	**Credit**	**ECTS**
7	EEM467	Logic Circuits Lab.	0	1	2

Language of Instruction:
Turkish
Course Level:
Faculty
Work Placement(s):
No
Department / Program:
ELECTRICAL-ELECTRONICS ENGINEERING
Course Type:
Seçmeli
Goals:
To design in Integrated circuit-level.
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 Lab. 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	Fundemental gate circuits		
2	Combinational logic applications		
3	Adders and substractors		
4	MSI Components: Decoder and multiplexer		
5	Counterrs		
6	Synchronous sequential logic applications-1		
7	Synchronous sequential logic applications-2		
8	FPGA: VHDL and Xilinx ISE editor		

Course Learning Outcomes

No	Learning Outcomes
C03	Mühendislik uygulamaları için gerekli olan modern teknik ve araçları geliştirme, seçme ve kullanma becerisi; bilişim teknolojilerini etkin bir şekilde kullanma becerisi.
C08	Disiplin içi ve çok disiplinli takımlarda etkin biçimde çalışabilme becerisi.

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	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	1	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

	P03	P08
C03	4	4
C08	4	4

Firat University

FACULTY OF ENGINEERING
ELECTRICAL-ELECTRONICS ENGINEERING

EEM465	Digital Signal Processing				
Semester	**Course Code**	**Course Name**	**L+P**	**Credit**	**ECTS**
7	EEM465	Digital Signal Processing	3	3	7

Language of Instruction:
Turkish
Course Level:
Faculty
Work Placement(s):
No
Department / Program:
ELECTRICAL-ELECTRONICS ENGINEERING
Course Type:
Seçmeli
Goals:
To grasp the concept of the digital filter and learn how to design a digital filter.Inverese Z-Transform.
Teaching Methods and Techniques:
Discrete Time signals and systems. Analog Digital and Digital Analog Transform and their stages. The solutions of Linear Difference Equations with constant coefficients. Z Transform, defininition and region of convergence. Properties of Z-Transform. The solution of linear difference equations with constant coefficients via Z-Transform. Stability of discrete time systems. Frequency domain analysis of discrete time signals and systems . Definition and properties of Discrete Time Fourier Transform(DTFT). Definition and properties of Fast Fourier Transform(FFT). Simple Digital Filters. Digital filter design techniques. Infinite Impulse Response (IIR) Filter Design.Fiinite Impulse Response (FIR) Filter Design
Prerequisites:

Course Coordinator:

Instructors:
Associate Prof. Dr. Turgay KAYA
Assistants:

Recommended Sources

Textbook	:	: Ertürk, S., Sayısal İşaret İşleme, Birsen Yayınevi, İstanbul, 2002. Mitra, S.K., Digital Signal Processing, A Computer-Based Approach, McGraw-Hill,
Resources	:	
Documents	:	
Assignments	:	
Exams	:	

Course Category

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

Course Content

Week	Topics	Study Materials	Materials
1	Discrete Time signals and systems		
2	Analog Digital and Digital Analog Transform and their stages.		
3	The solutions of Linear Difference Equations with constant coefficients		
4	Z Transform, defininition and region of convergence		
5	Properties of Z-Transform		
6	Inverse Z-Transform		
7	The solution of linear difference equations with constant coefficients via Z-Transform		
8	Frequency domain analysis of discrete time signals and systems		
9	Definition and properties of Discrete Time Fourier Transform(DTFT)		
10	Definition and properties of Fast Fourier Transform(FFT)		
11	Simple Digital Filters		
12	Digital filter design techniques		
13	Infinite Impulse Response (IIR) Filter Design		
14	Finite Impulse Response(FIR) Filter Design		

Course Learning Outcomes

No	Learning Outcomes
C01	Sayısal İşaret İşlemenin temel kavramlarını öğrenmek
C02	Sayısal filtre tasarımı gerçekleştirmek

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	6	84
Assignments	5	3	15
Presentation	0	0	0
Mid-terms	1	20	20
Practice	2	6	12
Laboratory	0	0	0
Project	0	0	0
Final examination	1	25	25
Total Work Load			**198**
ECTS Credit of the Course			**7**

Course Contribution To Program

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

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

Firat University

FACULTY OF ENGINEERING
ELECTRICAL-ELECTRONICS ENGINEERING

EEM463	INUSTRIAL AUTOMATION				
Semester	**Course Code**	**Course Name**	**L+P**	**Credit**	**ECTS**
7	EEM463	INUSTRIAL AUTOMATION	4	3	7

Language of Instruction:
Turkish
Course Level:
Faculty
Work Placement(s):
No
Department / Program:
ELECTRICAL-ELECTRONICS ENGINEERING
Course Type:
Seçmeli
Goals:
Endüstriyel otomasyon sistemlerinin temelleri hakkında öğrenciye genel bir fikir verilmesi
Teaching Methods and Techniques:
Endüstriyel otomasyon sistemlerinin temel elemanları, işaretler ve endüstriyel standartlar, Güvenlik. Otomasyonda pinomatik ve hidrolik ekipmanlar. PLC mimarisi, PLC programlama teknikleri, giriş/çıkış komutları, zamanlama ve sayma işlemleri ile programlama, karşılaştırma işlemleri, yapısal programlama, kesme işlemleri, yüksek hızlı sayıcılar ve çıkışlar, seri haberleşme işlemleri, SCADA sistemleri.
Prerequisites:

Course Coordinator:

Instructors:
Asist Prof. Dr. Fikret ATA
Assistants:

Recommended Sources

Textbook	:	Ders Notları
Resources	:	Dersin akışı içerisinde gerektiğinde belirtilecektir.
Documents	:	
Assignments	:	
Exams	:	

Course Category

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

Course Content

Week	Topics	Study Materials	Materials
1	Endüstriyel otomasyon ile ilgili kavramların tanımı		ders notları
2	Endüstriyel otomasyonda kullanılan sensörler ve ölçme sistemleri		Ders Notları
3	Kontrol sistemleri, bilgisayar ve programlanabilen lojik kontrolörler (PLC)		Ders Notları
4	Donanım özellikleri; Bellek sahaları.		Ders Notları
5	Yazma ve programa girilme.		Ders Notları
6	Komut seti ve uygulamaları.		Ders Notları
7	Program icra zamanlaması.		Ders Notları
8	Program denetleme ve icrası.		Ders Notları
9	Analog giriş birimi ve kullanımı.		Ders Notları
10	Analog çıkış birimi ve kullanımı		Ders Notları
11	Programlanabilir terminal birimi ve PLC ile entegre kullanımı		Ders Notları
12	Büyük kapasiteli PLC sistemleri, Uzaktan denetimli PLC Sistemleri.		Ders Notları
13	PLC sayısal kontrol uygulamaları.		Ders Notları
14	PLC Analog denetim uygulamaları		Ders Notları

Course Learning Outcomes

No	Learning Outcomes
C01	Matematik, fen ve mühendislik bilgilerini uygulama becerisi
C02	Mühendislik problemlerini tanımlama, formüle etme ve çözme becerisi

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	5	70
Assignments	14	5	70
Presentation	0	0	0
Mid-terms	1	2	2
Practice	14	2	28
Laboratory	0	0	0
Project	0	0	0
Final examination	1	2	2
Total Work Load			**200**
ECTS Credit of the Course			**7**

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

EEM461	Illumination Technique and Domestic Installation Project				
Semester	**Course Code**	**Course Name**	**L+P**	**Credit**	**ECTS**
7	EEM461	Illumination Technique and Domestic Installation Project	4	3	7

Language of Instruction:
Turkish
Course Level:
Faculty
Work Placement(s):
No
Department / Program:
ELECTRICAL-ELECTRONICS ENGINEERING
Course Type:
Seçmeli
Goals:
- Teaching illumination technique principles in order to ensure a sufficiently good and economical solution for illumination problems, - In accordance with these principles giving information about how to draw an electric domestic installation project. - For each student, drawing of electrical installation project of a building and doing the whole of project calculations.
Teaching Methods and Techniques:
Illumination techniques. Light sources. Calculation of illumination. Drawing of electrical interior wiring for a building. Single line schemas and table imposition list.
Prerequisites:

Course Coordinator:

Instructors:
Associate Prof. Dr. Muhsin Tunay GENÇOĞLU
Assistants:

Recommended Sources

Textbook	:	Handouts of Illumination and Indoor Installation Assoc. Prof.Dr. Muhsin Tunay Gençoğlu and power point presentations.
Resources	:	Aydınlatma Tekniği, Prof. Dr. Muzaffer ÖZKAYA, Uludağ Üniv. Yayınları, 1981. ,Elektrik Şebeke ve Tesisleri, Mahmut NACAR, 2003. ,Elektrik İç Tesi
Documents	:	
Assignments	:	
Exams	:	

Course Category

Mathmatics and Basic Sciences	:	15	**Education**	:	
Engineering	:	50	**Science**	:	
Engineering Design	:	35	**Health**	:	
Social Sciences	:		**Field**	:	

Course Content

Week	Topics	Study Materials	Materials
1	introduction to illumination technique and domestic installation project.		
2	Purpose and subject of illuminating.		
3	Illumination types and illumination armatures.		
4	Photometric sizes (light flux, light quantity, intensity of light. Luminous level, photographical excitation, photometric radian		
5	Photometric laws (law of cosine, law of inverse proportion with square of distances, law of Lambert, law of space angle pro		
6	Solving of sample problems concerned with photometric laws. Component of illumination, event of light and sight, producti		
7	Light sources (incandescent lamps, arc lamps, discharge lamps), calculation of illumination.		
8	Materials of electrical interior wiring. Electrical incidents and receivable precautions for them.		
9	Classification of electrical interior wiring, achieve of electrical interior wiring at construction period of a building. Installatior		
10	Important items of Electrical Interior Wiring Regulations.		
11	Drawing of electrical interior wiring of normal, ground and underground floor for a sample building.		
12	Control of project: drawing of open and single line schemas.		
13	Control of project: drawing of high current column schema. Prepare of table imposition list.		
14	Control of project: drawing of high current column schema. Prepare of table imposition list.		

Course Learning Outcomes

No	Learning Outcomes
C01	To design electrical system projects which are various environment of use.
C02	To learn drawing principles of a lighting and domestic installation projects.
C03	The students will be able to identify project drawing

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	0	%0
Attendance	0	%0
Practice	0	%0
Project	1	%30
Final examination	1	%50
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	20	10	200
Assignments	0	0	0
Presentation	0	0	0
Mid-terms	1	0	0
Practice	0	0	0
Laboratory	0	0	0
Project	1	60	60
Final examination	1	3	3
Total Work Load			**319**
ECTS Credit of the Course			**11**

Course Contribution To Program

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

	P01	P05	P07
C01		4	5
C02	4	5	4
C03	5	5	5

Firat University

FACULTY OF ENGINEERING
ELECTRICAL-ELECTRONICS ENGINEERING

EEM459	COMMUNICATION SYSTEMS				
Semester	**Course Code**	**Course Name**	**L+P**	**Credit**	**ECTS**
7	EEM459	COMMUNICATION SYSTEMS	2	2	3

Language of Instruction:
Turkish
Course Level:
Faculty
Work Placement(s):
No
Department / Program:
ELECTRICAL-ELECTRONICS ENGINEERING
Course Type:
Seçmeli
Goals:
In order to form the basis of Electrical and Electronics Engineering learn analog and digital communications systems,to learn the types of analog and digital modulation schemes.
Teaching Methods and Techniques:
Modulation and demodulation circuits and multiplexing techniques.
Prerequisites:

Course Coordinator:

Instructors:
Asist Prof. Dr. Ayhan AKBAL
Assistants:

Recommended Sources

Textbook	:	
Resources	:	Basic Communication Theory, J. E. PEARSON, Prentice Hall, 1993. Principles of Communication Systems, H. TAUB and D. L. SCHILLING, McGraw-H
Documents	:	
Assignments	:	
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	Introduction to communication systems.		
2	Communication systems and the remarkable cases for communication system design.		
3	Filters and obtaining theirs transfer functions		
4	Signals and modulation		
5	Types of base band signals		
6	The necessity of modulation and the classification of modulation types. The advantages obtained with modulation.		
7	Theory of Amplitude Modulation (AM), types and obtaining of mathematical equalities.		
8	Amplitude modulation modulators and demodulators		
9	Theory of Frequency Modulation (AM), types obtaining of mathematical equalities, advantages and disadvantages		
10	Phase modulation theory and general analysis		
11	Analog to digital conversion		
12	Heat effects		
13	Digital Modulations		
14	Digital Modulations		

Course Learning Outcomes

No	Learning Outcomes
C01	Learn the communication system
C02	Design and analyze a 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	%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	4	56
Assignments	0	0	0
Presentation	0	0	0
Mid-terms	1	1	1
Practice	0	0	0
Laboratory	0	0	0
Project	1	3	3
Final examination	1	2	2
Total Work Load			**90**
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	P03	P04	P05
C01	4				3
C02		3	4	4	

Firat University

FACULTY OF ENGINEERING
ELECTRICAL-ELECTRONICS ENGINEERING

EEM457	Dynamics of Electrical Machines				
Semester	**Course Code**	**Course Name**	**L+P**	**Credit**	**ECTS**
7	EEM457	Dynamics of Electrical Machines	2	2	3

Language of Instruction:
Turkish
Course Level:
Faculty
Work Placement(s):
No
Department / Program:
ELECTRICAL-ELECTRONICS ENGINEERING
Course Type:
Seçmeli
Goals:
The aim of this module is to provide knowledge to students about the dynamic behavior of direct current, asynchronous and synchronous machines in detail.
Teaching Methods and Techniques:
Computerized analysis of dynamic behaviors of direct current, asynchronous and synchronous machines
Prerequisites:

Course Coordinator:

Instructors:
Asist Prof. Dr. Abuzer ÇALIŞKAN
Assistants:

Recommended Sources

Textbook	:	Electrical Machines and Drives, J. HINDMARSH, Pergamon Press, 1985. Power Semiconductor Controlled Drives, G. K. DUBEY, Prentice Hall, 1989.
Resources	:	
Documents	:	
Assignments	:	
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	Investigation of the dynamic behavior of direct current machines.		
2	Investigation of the dynamic behavior of direct current machines.		
3	Computerized analysis of the dynamic behavior of direct current machines		
4	Computerized analysis of the dynamic behavior of Direct Current Machines		
5	Reference frame transformations		
6	Reference frame transformations		
7	Investigation of the dynamic behavior of asynchronous machines		
8	Investigation of the dynamic behavior of asynchronous machines		
9	Mid term		
10	Computerized analysis of the dynamic behavior of asynchronous machines		
11	Computerized analysis of the dynamic behavior of asynchronous machines		
12	Investigation of the dynamic behavior of synchronous machines		
13	Investigation of the dynamic behavior of synchronous machines		
14	Computerized analysis of the dynamic behavior of synchronous machines		

Course Learning Outcomes

No	Learning Outcomes
C01	Matematik, fen bilimleri ve elektrik-elektronik mühendisliği konularında yeterli bilgi birikimi; bu alanlardaki kuramsal ve uygulamalı bilgileri mühendislik problemlerine uygulama bece
C04	Mühendislik uygulamaları için gerekli olan modern teknik ve araçları geliştirme, seçme ve kullanma becerisi; bilişim teknolojilerini etkin bir şekilde kullanma becerisi.

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	8	3	24
Assignments	4	4	16
Presentation	0	0	0
Mid-terms	1	2	2
Practice	0	0	0
Laboratory	0	0	0
Project	4	4	16
Final examination	1	2	2
Total Work Load			**102**
ECTS Credit of the Course			**3**

Course Contribution To Program

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

	P01	P04
All	4	4
C01	4	4
C04	4	4

Firat University

FACULTY OF ENGINEERING
ELECTRICAL-ELECTRONICS ENGINEERING

EEM455	POWER SYSTEM PROTECTION				
Semester	**Course Code**	**Course Name**	**L+P**	**Credit**	**ECTS**
7	EEM455	POWER SYSTEM PROTECTION	2	2	3

Language of Instruction:
Turkish
Course Level:
Faculty
Work Placement(s):
No
Department / Program:
ELECTRICAL-ELECTRONICS ENGINEERING
Course Type:
Seçmeli
Goals:
Learning the basic principles of protection in power systems.
Teaching Methods and Techniques:
Protection with fuse in LV and HV systems. Relays. Over current, over voltage, impedance and differential protections.
Prerequisites:

Course Coordinator:

Instructors:
Prof. Dr. Muhsin Tunay GENÇOĞLU
Assistants:

Recommended Sources

Textbook	:	Power System Protection, Volume 1-2-3, Paul M. ANDERSON, The Institution of Electrical Engineering, London, 1988. Elektrik Enerjisi Dağıtımı, Nus
Resources	:	Power System Protection-Volume 1-2-3, Paul M. ANDERSON.,The Institution of Electrical Engineering, London, 1988., Orta Gerilim Elektrik Tesisle
Documents	:	
Assignments	:	
Exams	:	

Course Category

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

Course Content

Week	Topics	Study Materials	Materials
1	Basis principle of protection.		
2	Basis principle of protection.		
3	Protection with fuse in LV and HV systems.		
4	Relays and it's features.		
5	Relays and it's features.		
6	Over voltage relay, impedance relay and protection with differential relay		
7	Protections of generator and line.		
8	Protections of transformer.		
9	Protections of motor.		
10	Relay coordination.		
11	Protection mechanism against to over voltage.		
12	Surge arrester, it's structure, operating features and selection.		
13	Protection lines.		
14	Skip distances.		

Course Learning Outcomes

No	Learning Outcomes
C01	Knowing methods and techniques of protection on the Power Systems.
C02	Relay coordination and distance protection
C03	Selecting suitable protecting method and device by specifying the principles of the protection

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	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			**88**
ECTS Credit of the Course			**3**

Course Contribution To Program

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

	P02	P03	P04
C01	5		
C02		4	
C03			3

Firat University

FACULTY OF ENGINEERING
ELECTRICAL-ELECTRONICS ENGINEERING

EEM453	Industrial Measurement				
Semester	**Course Code**	**Course Name**	**L+P**	**Credit**	**ECTS**
7	EEM453	Industrial Measurement	2	2	3

Language of Instruction:
Turkish
Course Level:
Faculty
Work Placement(s):
No
Department / Program:
ELECTRICAL-ELECTRONICS ENGINEERING
Course Type:
Zorunlu
Goals:
The students will gain design ability for desired measurement systems. They will be able to effective use the methods and modern tools required for engineering applications such as designing a measurement system for measuring electrical, mechanical, physical, thermal and chemical magnitudes.
Teaching Methods and Techniques:
Transducers, Potentiometers. Linear Variable Differential Transformer (LVDT). Pressure transducers, Temperature sensors. Thermocouples. Thermistors and resistive temperature sensors. Optical position measurement, strain sensors. Acceleration sensors, humidity sensors. Fluid velocity measurement: Electromagnetic method, electro acoustic method. Fluid velocity measurement with electromagnetic method, Measurement using fluidmeter with narrow part. Speed measurement with thermistors. Three-phase active and reactive power measurements by using two wattmeters.
Prerequisites:

Course Coordinator:

Instructors:
Associate Prof. Dr. Hasan Güler
Assistants:

Recommended Sources

Textbook	:	Power points of the lecture prepared by Sedat Sünter. Handouts.
Resources	:	1- Timothy J. Maloney, Modern Industrial Electronics, Prentice Hall, Bıçaklar Bookstore, Ankara, 1996,2- C.T. Baldwin, Fundamentals of Electrical M
Documents	:	
Assignments	:	
Exams	:	

Course Category

Mathmatics and Basic Sciences	:	10	**Education**	:	
Engineering	:	40	**Science**	:	
Engineering Design	:	50	**Health**	:	
Social Sciences	:		**Field**	:	

Course Content

Week	Topics	Study Materials	Materials
1	Transducers, Potentiometers.		Handouts
2	Linear Variable Differential Transformer (LVDT).		Handouts
3	Pressure transducers: Bourdon tubes.		Handouts
4	Pressure transducers: Belows		Handouts
5	Temperature sensors: Thermocouples.		Handouts
6	Thermistors and resistive temperature sensors.		Handouts
7	Thermistors and resistive temperature sensors.		Handouts
8	Optical position measurement, strain sensors.		Handouts
9	Acceleration sensors, humidity sensors.		Handouts
10	Acceleration sensors, humidity sensors.		Handouts
11	Fluid velocity measurement with electromagnetic method, Measurement using fluidmeter with narrow part.		Handouts
12	Speed measurement with thermistors. Photocells, photovoltaic devices and their applications		Handouts
13	Fluid measurement by using electro acoustic method		Handouts
14	Three-phase active and reactive power measurements by using two wattmeters		Handouts

Course Learning Outcomes

No	Learning Outcomes
C01	The students will gain design ability for desired measurement systems.
C02	They will be able to effective use the methods and modern tools required for engineering applications such as designing a measurement system for measuring electrical, mechanical, physical, therm

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	%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	14	2	28
Assignments	1	12	12
Presentation	1	4	4
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			**76**
ECTS Credit of the Course			**3**

Course Contribution To Program

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

	P01	P03
C01	4	4
C02	4	4

Firat University

FACULTY OF ENGINEERING
ELECTRICAL-ELECTRONICS ENGINEERING

EEM435	POWER ELECTRONICS SYSTEMS				
Semester	**Course Code**	**Course Name**	**L+P**	**Credit**	**ECTS**
7	EEM435	POWER ELECTRONICS SYSTEMS	2	2	3

Language of Instruction:
Turkish
Course Level:
Faculty
Work Placement(s):
No
Department / Program:
ELECTRICAL-ELECTRONICS ENGINEERING
Course Type:
Seçmeli
Goals:
The students are prerequested to take power electronics course for this course. The module is actually a continuance of power electronics module and it is aimed to analyse and design the power electronic systems by implementing the ideas and concepts gained in the module of power electronics. Application fields of these system are also tought.
Teaching Methods and Techniques:
Analysis, waveforms and harmonic spectrum of three phase six step inverter for R load. Analysis of three phase six step inverter feeding Y/? connected R-L load. Switch Mode Power Supplies (SMPS) Design and Analysis of Flyback Converter. Non-Isolated Flyback Converter Non-Isolated Flyback Converter. Analysis of forward converter. Isolated Flyback Converter. Boost converter. Analysis of boost converter. Control of SMPS. Resonant converter. Uninterruptible Power Supplies
Prerequisites:

Course Coordinator:

Instructors:
Asist Prof. Abuzer ÇALIŞKAN
Assistants:

Recommended Sources

Textbook	:	The course will be given on blackboard. Lecture notes will be provided.
Resources	:	N. MOHAN, T. M. UNDELAND and W. P. ROBBINS, Power Electronics, Çeviri: Nejat TUNCAY, Metin GÖKAŞAN, Seta BOĞOSYAN, Literatür Yayınları,
Documents	:	
Assignments	:	
Exams	:	

Course Category

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

Course Content

Week	Topics	Study Materials	Materials
1	Analysis, waveforms and harmonic spectrum of three phase six step inverter for R load.		Handouts
2	Analysis of three phase six step inverter feeding Y/? connected R-L load.		Handouts
3	Switch Mode Power Supplies (SMPS)		Handouts
4	Design and Analysis of Flyback Converter		Handouts
5	Isolated Flyback Converter		Handouts
6	Analysis of forward converter		Handouts
7	Isolated Forward Converter		Handouts
8	Boost konverter		Handouts
9	Analysis of isolated boost converter		Handouts
10	Control of SMPS'		Handouts
11	Resonant converters		Handouts
12	Resonant converters		Handouts
13	Uninterruptible Power Supplies		Handouts
14	Uninterruptible Power Supplies		Handouts

Course Learning Outcomes

No	Learning Outcomes
C01	They will gain application ability of mathematics, science and engineering knowledge which have been learnt in the other courses such as power electronic, engineering mathematic, etc.
C02	The students will be able to describe, model, formulate and solve engineering 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	%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	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	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	1	2	2
Total Work Load			**88**
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	P03
C01	4		
C02	4	4	4

Firat University

FACULTY OF ENGINEERING
ELECTRICAL-ELECTRONICS ENGINEERING

EEM429	VISION SYSTEMS				
Semester	**Course Code**	**Course Name**	**L+P**	**Credit**	**ECTS**
7	EEM429	VISION SYSTEMS	2	2	3

Language of Instruction:
Turkish
Course Level:
Faculty
Work Placement(s):
No
Department / Program:
ELECTRICAL-ELECTRONICS ENGINEERING
Course Type:
Seçmeli
Goals:
Providing basic information about the place of television in general communication theory, its history and development, the structure of the receivers and transmitters used, its basic principles, digital image and sound transmission methods, image processing methods and cameras. Gaining the ability to comment on the situation that television and video systems will reach in the future.
Teaching Methods and Techniques:
Mathematics, science and engineering ability to apply knowledge of. The techniques required for engineering applications, methods and modern tools recognition skills
Prerequisites:

Course Coordinator:

Instructors:

Assistants:

Recommended Sources

Textbook	:	Television Techniques, Adnan ATAMAN, Avni MORGÜL, Boğaziçi University Press, 2002. Communication Theory, Haluk DEEP, Murat AŞKAR, METU.
Resources	:	
Documents	:	
Assignments	:	
Exams	:	

Course Category

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

Course Content

Week	Topics	Study Materials	Materials
1	TV systems overview		
2	Converting the image into an electrical signal		
3	Color television systems		
4	PAL, SECAM and NTSC systems		
5	Image elements, liquid crystal display (LCD)		
6	Plasma, OLED elements.		
7	Television cameras		
8	Midterm exam		
9	Charge-coupled (CCD) and CMOS image elements		
10	Digital image processing techniques		
11	Image compression techniques, CCITT, JPEG and MPEG standards		
12	Digital audio transmission. Digital television broadcasting		
13	Analog and digital television receivers		
14	hree-dimensional television broadcasting		

Course Learning Outcomes

No	Learning Outcomes
C01	Learns communication and display systems
C02	Design and analyze a 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	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	3	6	18
Hours for off-the-c.r.stud	0	0	0
Assignments	2	6	12
Presentation	0	0	0
Mid-terms	6	5	30
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	6	5	30
Total Work Load			**90**
ECTS Credit of the Course			**3**

Course Contribution To Program

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

	P03	P04
C01		4
C02	4	

Firat University

FACULTY OF ENGINEERING
ELECTRICAL-ELECTRONICS ENGINEERING

EEM409	Electrical Machines Lab.				
Semester	**Course Code**	**Course Name**	**L+P**	**Credit**	**ECTS**
7	EEM409	Electrical Machines Lab.	0	1	2

Language of Instruction:
Turkish
Course Level:
Faculty
Work Placement(s):
No
Department / Program:
ELECTRICAL-ELECTRONICS ENGINEERING
Course Type:
Zorunlu
Goals:
EEM-337 Elektrik Makinaları ve EEM-348 Elektrik Tesisleri derslerinde anlatılan konuların deneysel olarak pekiştirilmesine yardımcı olmaktır.
Teaching Methods and Techniques:

Prerequisites:
(EEM337 or EEM348)
Course Coordinator:
Associate Prof. Dr. Mehmet ÖZDEMİR
Instructors:

Assistants:
Research Assist. Musab COŞKUNResearch Assist. Bircan KAMIŞLIOĞLUResearch Assist. Abdulcelil KÜLEKÇİOĞLUResearch Assist. Melike ESENResearch Assist. İrem GörgözResearch Assist. Merve YıldırımResearch Assist. Esra İNCEResearch Assist. Kıvanç DoğanResearch Assist. Ezgi TAŞKIN

Recommended Sources

Textbook	:	Electrical Machines Lab. Experiment Sheets
Resources	:	
Documents	:	
Assignments	:	
Exams	:	

Course Category

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

Course Content

Week	Topics	Study Materials	Materials
1	Deney Gruplarının Belirlenmesi		
2	Laboratuvar hakkında genel bilgi verilmesi		Lab. Föyleri
3	İlgili deneylerin elektrik makinaları laboratuvarında yapılışı		Lab. Föyleri
4	İlgili deneylerin elektrik makinaları laboratuvarında yapılışı		Lab. Föyleri
5	İlgili deneylerin elektrik makinaları laboratuvarında yapılışı		Lab. Föyleri
6	İlgili deneylerin elektrik makinaları laboratuvarında yapılışı		Lab. Föyleri
7	İlgili deneylerin elektrik makinaları laboratuvarında yapılışı		Lab. Föyleri
8	İlgili deneylerin elektrik makinaları laboratuvarında yapılışı		Lab. Föyleri
9	İlgili deneylerin elektrik makinaları laboratuvarında yapılışı		Lab. Föyleri
10	İlgili deneylerin elektrik makinaları laboratuvarında yapılışı		Lab. Föyleri
11	İlgili deneylerin elektrik makinaları laboratuvarında yapılışı		Lab. Föyleri
12	İlgili deneylerin elektrik makinaları laboratuvarında yapılışı		Lab. Föyleri
13	Telafi Deneyleri		Lab. Föyleri
14	Gruplar tarafından hazırlanan deney raporlarının değerlendirilmesi		Deney Raporları

Course Learning Outcomes

No	Learning Outcomes
C01	Öğrenciler temel elektrik makinaları uygulamalarına hakim olacaktır.
C02	Öğrenciler grup ve takım çalışmasını öğrenecektir.
C03	Öğrenciler deney tasarlama, test etme, sonuçları anaiz etme ve deneysel sonuçları yorumlama yeteneği kazanacaktır.
C04	Öğrenci rapor yazmayı öğrenecektir.

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	%0
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	9	%40
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

	P03	P05	P06	P08
All	4	5	3	4
C01	4			
C02				4
C03		5		
C04			3	

Firat University

FACULTY OF ENGINEERING
ELECTRICAL-ELECTRONICS ENGINEERING

EEM405		Profession Application-2			
Semester	**Course Code**	**Course Name**	**L+P**	**Credit**	**ECTS**
7	EEM405	Profession Application-2	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	Ilgili jürilerin; öğrencilerin, kendi stajlarına ilişkin olarak hazırladıkları sunu'ları dinleyerek ve sorular sorarak değerlendirmes		
3	Ilgili jürilerin; öğrencilerin, kendi stajlarına ilişkin olarak hazırladıkları sunu'ları dinleyerek ve sorular sorarak değerlendirmes		
4	Ilgili jürilerin; öğrencilerin, kendi stajlarına ilişkin olarak hazırladıkları sunu'ları dinleyerek ve sorular sorarak değerlendirmes		
5	Ilgili jürilerin; öğrencilerin, kendi stajlarına ilişkin olarak hazırladıkları sunu'ları dinleyerek ve sorular sorarak değerlendirmes		
6	Ilgili jürilerin; öğrencilerin, kendi stajlarına ilişkin olarak hazırladıkları sunu'ları dinleyerek ve sorular sorarak değerlendirmes		
7	Ilgili jürilerin; öğrencilerin, kendi stajlarına ilişkin olarak hazırladıkları sunu'ları dinleyerek ve sorular sorarak değerlendirmes		
8	Ilgili jürilerin; öğrencilerin, kendi stajlarına ilişkin olarak hazırladıkları sunu'ları dinleyerek ve sorular sorarak değerlendirmes		
9	Ilgili jürilerin; öğrencilerin, kendi stajlarına ilişkin olarak hazırladıkları sunu'ları dinleyerek ve sorular sorarak değerlendirmes		
10	Ilgili jürilerin; öğrencilerin, kendi stajlarına ilişkin olarak hazırladıkları sunu'ları dinleyerek ve sorular sorarak değerlendirmes		
11	Ilgili jürilerin; öğrencilerin, kendi stajlarına ilişkin olarak hazırladıkları sunu'ları dinleyerek ve sorular sorarak değerlendirmes		
12	Ilgili jürilerin; öğrencilerin, kendi stajlarına ilişkin olarak hazırladıkları sunu'ları dinleyerek ve sorular sorarak değerlendirmes		
13	Ilgili jürilerin; öğrencilerin, kendi stajlarına ilişkin olarak hazırladıkları sunu'ları dinleyerek ve sorular sorarak değerlendirmes		
14	Ilgili 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

EEM401	Design in EEE				
Semester	**Course Code**	**Course Name**	**L+P**	**Credit**	**ECTS**
7	EEM401	Design in EEE	2	2	8

Language of Instruction:
Turkish
Course Level:
Faculty
Work Placement(s):
No
Department / Program:
ELECTRICAL-ELECTRONICS ENGINEERING
Course Type:
Zorunlu
Goals:
Gaining ability to work in a team. Applying the duty share in a team. Applying the engineering knowledge to a design project. Designing a prototype. Gaining ability to write a report and give an oral presentation.
Teaching Methods and Techniques:
First week, the students determine their design team and chose their team leader. Information about the design project is given to the students. Constraints of the design are also given. The following two weeks lectures about the engineering design and design stages are given. Importance of the team work is emphasized and concurrent engineering and other design parameters are mentioned. Then, the groups start designing their projects. They present a midterm report. At the end of the term, each group prepares both final report and a power point presentation. They demonstate their design projects and give an oral presentation to a viva and students.
Prerequisites:

Course Coordinator:
Asist Prof. Yavuz EROL
Instructors:

Assistants:

Recommended Sources

Textbook	:	Power point presentation of Prof.Dr. Sedat SÜNTER
Resources	:	Elektrik ve Bilgisayar Mühendisliği'ne Giriş, C. B. FLEDDERMANN, M. D. BRADSHAW, Çeviren: Erhan AKIN, Nobel Dağıtım, Ankara, 2003
Documents	:	
Assignments	:	
Exams	:	

Course Category

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

Course Content

Week	Topics	Study Materials	Materials
1	Forming the groups and choosing the group leaders. Duty sharing of the team members. Giving information about the sub	An announcement to the students for es	Power point presentations.
2	Engineering design stages. A simple application of engineering design stage.		Power point presentation.
3	Engineering design, team work, concurrency engineering, other design parameters.		Power point presentations.
4	Team work on the design project.		
5	Team work on the design project.		
6	Team work on the design project.		
7	Team work on the design project.		
8	Team work on the design projects.		
9	Team work on the design project.		
10	Presentation of the midterm reports of the design projects and evaluation of the reports.		
11	Team work on the design project.		
12	Team work on the design project.		
13	Team work on the design project.		
14	Presentations of the design projects and the final reports.		

Course Learning Outcomes

No	Learning Outcomes
C01	Ability to apply mathematic, science and engineering knowledge.
C02	Ability to describe, model formulaze and solve the engineering problems.
C03	Ability to work indivually and/or in a group.
C04	Ability to communicate effectively and ability to apply the technics and methods required for engineering applications. Ability to use modern equipments.

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	1	%54
Final examination	1	%6
Total		**% 100**

ECTS Allocated Based on Student Workload			
Activities	**Quantity**	**Duration**	**Total Work Load**
Course Duration	2	2	4
Hours for off-the-c.r.stud	14	2	28
Assignments	0	0	0
Presentation	1	10	10
Mid-terms	0	0	0
Practice	0	0	0
Laboratory	0	0	0
Project	1	184	184
Final examination	1	1	1
Total Work Load			**227**
ECTS Credit of the Course			**8**

Course Contribution To Program

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

	P01	P02	P03	P04	P06	P08
All	4	4	3	5	4	5
C01	4					
C02		4				
C03						5
C04			3	5	4	