

FACULTY OF ENGINEERING
ENERGY DEPARTMENT
Energy Engineering BS

Date	2020-2021	Credits	2
Course Title	Energy Laboratory	Course Number	ENER411
Pre-requisite (s)	None	Co-requisite (s)	none
Hours	4	Out of Class Work Hours	30 (5 ECTS)

Place and Time of Class Meeting

Friday 13-15, C100

Name and Contact Information of Instructor

Name **Ömer Cihan Kıvanç**

E-mail & office phone cihan.kivanc@okan.edu.tr 90 216 6771630 Ext : 2459

Book required

(The institution recognizes the use of the textbook in the classroom as part of the educational methodology and strategy applied in diverse materials. The textbook is part of the curriculum and is used to reach the student in an effective manner in the classroom. Every student is expected to acquire and use the textbook.)

This is a very multidisciplinary laboratory course. There is no single text book

Classroom expectations for students

Attendance Policy

Students are expected to attend all scheduled Institutional (classes) experiments for the courses that they are registered for and to achieve the goals set forth by each class instructor. Attendance is taken daily. Enrolled students are permitted no more than **30%** absences in one semester.

Student Tardiness Policy

A student is considered tardy/late if he/she comes to class 15 minutes late.

Course Description (must correspond exactly to Catalog description)

This course starts with introduction in which definition of energy efficiency is done. The

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Learning Objectives

At the end of this course :

- Will be Able to Identify; the Major Energy Conversion Techniques.
- Will be Able to Conduct Experiments on Various Energy Conversion Techniques.
- Will be Able to Conduct Experiments on Solar Cell Energy Conversion Techniques.
- Will be Able to Conduct Experiments on Wind Energy Conversion Techniques.
- Will be Able to Conduct Experiments on Various Energy Storage Techniques.

Topical Outline and Schedule

DATE		WEEK 1
SPECIFIC OBJECTIVES		Learning Course Content Emphasizing the importance of the topic
TOPIC (S)		<ul style="list-style-type: none">• Introduction the content of the course.
LEARNING ACTIVITIES		Describe the content of the course, discussing the applications and importance of the topic.
OUT OF CLASS WORK ASSIGNMENT		Reading relevant documents.
DATE		WEEK 2
SPECIFIC OBJECTIVES		Learning Prime Energy Types and Converted Energy Types
TOPIC (S)		<ul style="list-style-type: none">• Prime Energy Sources• Energy Conversion and Secondary Energies,
LEARNING ACTIVITIES		Learning the components, properties and of energy Discussions with student participation
OUT OF CLASS WORK ASSIGNMENT		<ul style="list-style-type: none">• Read relevant materials
DATE		WEEK 3

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SPECIFIC OBJECTIVES	<ul style="list-style-type: none"> • Learning about Power Electronics & Electric Power System
TOPIC (S)	<ul style="list-style-type: none"> • Information on Power Electronics Lab Equipment • Power System Fundamentals
LEARNING ACTIVITIES	Students will be Able to Identify, Factors Affecting the Energy Policy in general. Start discussing Turkey's energy outlook.
OUT OF CLASS WORK ASSIGNMENT	Read relevant papers and books
DATE	WEEK 4
SPECIFIC OBJECTIVES	<ul style="list-style-type: none"> • Power Electronics Experiments
TOPIC (S)	<ul style="list-style-type: none"> • Rectifier Experiments
LEARNING ACTIVITIES	Laboratory Tests
OUT OF CLASS WORK ASSIGNMENT	Read complementary books and Laboratory Sheets Prepare Laboratory Report
DATE	WEEK 5
SPECIFIC OBJECTIVES	<ul style="list-style-type: none"> • Energy Conversion and Electrical Machines
TOPIC (S)	<ul style="list-style-type: none"> • DC Machine Tests
LEARNING ACTIVITIES	Laboratory Tests
OUT OF CLASS WORK ASSIGNMENT	Read complementary books and Laboratory Sheets Prepare Laboratory Report
DATE	WEEK 6
SPECIFIC OBJECTIVES	Transformers in Power
TOPIC (S)	Transformers
LEARNING ACTIVITIES	Laboratory Tests
OUT OF CLASS WORK ASSIGNMENT	Prepare Laboratory Report Read Complementary Books and Laboratory Sheets
DATE	Read complementary books and Laboratory Sheets

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SPECIFIC OBJECTIVES	<ul style="list-style-type: none"> AC Machines
TOPIC (S)	Induction Machines
LEARNING ACTIVITIES	Laboratory Tests
OUT OF CLASS WORK ASSIGNMENT	Prepare Laboratory Report Read Complementary Books and Laboratory Sheets
DATE	WEEK 8
SPECIFIC OBJECTIVES	Generator
TOPIC (S)	DC and AC Generators
LEARNING ACTIVITIES	Experiments
OUT OF CLASS WORK ASSIGNMENT	Prepare Laboratory Report Read Complementary Books and Laboratory Sheets
DATE	WEEK 9
SPECIFIC OBJECTIVES	<ul style="list-style-type: none"> Wind Power
TOPIC (S)	<ul style="list-style-type: none"> Measurement of Wind Power
LEARNING ACTIVITIES	Discussions with student participation Experimental Studies
OUT OF CLASS WORK ASSIGNMENT	Prepare Laboratory Report Read Complementary Books and Laboratory Sheets
DATE	WEEK 10
SPECIFIC OBJECTIVES	<ul style="list-style-type: none"> Solar Cells
TOPIC (S)	<ul style="list-style-type: none"> Experiments on Solar Cell Energy Conversion
LEARNING ACTIVITIES	Discussions with student participation Experiments in Laboratory
OUT OF CLASS WORK ASSIGNMENT	Laboratory Report Read Complementary Books and Laboratory Sheets
DATE	WEEK 11
SPECIFIC OBJECTIVES	<ul style="list-style-type: none"> Solar Power
TOPIC (S)	<ul style="list-style-type: none"> Measurements on Solar Power

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LEARNING ACTIVITIES	Laboratory Studies
OUT OF CLASS WORK ASSIGNMENT	Prepare Laboratory Report Read Complementary Books and Laboratory Sheets
DATE	WEEK 12
SPECIFIC OBJECTIVES	<ul style="list-style-type: none"> • Power System
TOPIC (S)	<ul style="list-style-type: none"> • Electric Power Experiments
LEARNING ACTIVITIES	Laboratory Tests
OUT OF CLASS WORK ASSIGNMENT	Prepare Laboratory Report Read Complementary Books and Laboratory Sheets
DATE	WEEK 13
SPECIFIC OBJECTIVES	<ul style="list-style-type: none"> • Energy Storage
TOPIC (S)	<ul style="list-style-type: none"> • Battery Systems
LEARNING ACTIVITIES	Discussions with student participation TESTS
OUT OF CLASS WORK ASSIGNMENT	Prepare Laboratory Report Read Complementary Books and Laboratory Sheets
DATE	WEEK 14
SPECIFIC OBJECTIVES	<ul style="list-style-type: none"> • Review Studies
TOPIC (S)	<ul style="list-style-type: none"> • Repeat studies
LEARNING ACTIVITIES	Discussions with student participation
OUT OF CLASS WORK ASSIGNMENT	Preparing for final exam
DATE	WEEK 15
SPECIFIC OBJECTIVES	<ul style="list-style-type: none"> • Evaluate students via final exam
TOPIC (S)	<ul style="list-style-type: none"> • Final Exam
LEARNING ACTIVITIES	None

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OUT OF CLASS WORK ASSIGNMENT	None
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Instructional Methods

1. Lecturing in class
2. Leaving reading and teaching materials in the web page
3. Experiments and Lab Reports
4. 1 Final Exam

In developing methodological strategies, it is best to discuss them between teachers and students in an environment of freedom and mutual agreement in order to ensure that the students make them their own and take responsibility for their execution and for attaining the goals of this course.

The following strategies may be used in this class:

1. A review of the literature.
2. Check of the reading.
3. Analysis of assigned readings.
4. Group discussions.
5. Individual and group discussions.
6. Preparation of reports.
7. Preparation of a didactic plan.
8. Carrying out a micro-class.

Instructional Materials and References

- Power Electronics Books
- Laboratory Experimental Sheets
- Energy Conversion & Electrical Machines Books
- IEA World Energy Outlooks 2015,14, 13, 12, 11..
- Tuncay R. Nejat, Altın Vural vd, Vizyon 2013 Tübitak Energy Panel Raporu, 2004
- BP's Statistical Review of World Energy , June 2015

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Assessment Criteria and Methods of Evaluating Students

Grade	Coefficient
AA	4.00
BA	3.50
BB	3.00
CB	2.50
CC	2.00
DC	1.50
DD	1.00
FF	0.00
VF	0.00

Distribution of Grade Elements

In-Term Studies	Quantity	Percentage
LAB Performance		40
LAB Reports		30
Total		70
End-Term Studies	Quantity	Percentage
Final EXAMINATION	1	30
Total		100
Contribution Of In-Term Studies To Overall Grade		% 70
End-Term Studies		% 30
Total		100