Middle East Technical University

Electrical and Electronics Engineering Department

EE361 – Electromechanical Energy Conversion I

Fall 2016/2017

Instructors:	**Office:**	**Classroom:**
Sec.1: Ahmet Rumeli	E-117	DZ-13
Sec.2&4: Ozan Keysan (Coordinator)	C-113	EA-208/EA-306
Sec.3: Muammer Ermiş	E-103	EA-209
Sec.5: H. Bilge Mutluer	GE Grid Sol.	EA-307

Coordinator Assistant: Mesut Uğur (*ugurm@metu.edu.tr*)

Office: *C-114* Tel: (0312) 210 *4402*

Grading Policy:

- Midterm-1 20%
- Midterm-2 20%
- Final 30%
- Laboratory 20%
- Homework 6%
- Attendance 4%
- Electrical Safety Exam 3% (bonus)

Notes:

- Please check **ODTUClass** (http://odtuclass.metu.edu.tr) web site for all announcements related to the course
- You need to attend all experiments to receive a passing grade. Otherwise you will receive NA and will not be able to take a resit exam.
- You need to have a formal excuse to get a make-up for experiments and exams.

Text Books:

- (Main Text) Fitzgerald, Kingsley, and Umans, Electric Machinery, McGraw Hill, 7th edition, 2013.
- (Supplementary) Guru and Hızıroğlu, Electric Machinery and Transformers, Oxford University Press, 2001

TOPICS:

Week	Subject	Guru	Fitzgerald
	INTRODUCTION		
1	Why Energy Conversion?		
1	Power System, Electromechanical Energy Conversion		
1	A short review of Turkish Power System		
	MAGNETIC CIRCUITS		
1	Magnetic Circuits	2.4, 3.3	1.1
1-2	Flux Linkage, Inductance & Energy	2.5	1.2
2	Magnetic Materials	2.3	1.3
2-3	AC Excitation & Losses	2.7	1.4
3	Permanent Magnets	2.8	1.5-1.7
	TRANSFORMERS		
4	Ideal Transformer	4.3	2.3
4-5	Equivalent Circuits, Power & Variable Frequency Transformers	4.4	2.4
5	Short-circuit & Open-circuit Tests	4.7	2.4-2.5
5-6	Auto-transformers & Multi-circuit Transformers	4.9	2.6
6-7	Transformers in Three-phase Circuits	4.1	2.7
7	Per-unit System	4.8	2.8
7	Electrical Safety		
	ELECTROMECHANICAL ENERGY CONVERSION		
8	Forces & Torques in Magnetic Field Systems	3.1	3.1
9	Energy Balance	3.1	3.2
9	Singly-excited Systems	3.7	3.3
9	Determination of Magnetic Force (torque)	3.7	3.4
9-10	Multiply-excited Systems	3.8	3.6
10	Permanent Magnet Systems		3.7
10	Dynamic Equations & Analytical Techniques		3.8
	DC MACHINES		
11	Introduction: Principle of Operation	5.1-5.6	7.1
11	Commutation Action, Induced EMF	5.7	7.2
12	Electric-Magnetic Circuit Aspects, Equivalent Circuit		7.4-7.5
12	DC Generators	5.9-5.10	7.9-7.10
13	DC Motors	6.1	7.9.7.10
14	Speed Control of DC Motors	6.8-6.9	11.1

Middle East Technical University

Electrical and Electronics Engineering Department

EE361 – Electromechanical Energy Conversion I

Frequently Asked Questions

1. **I am retaking this course, should I attend to the laboratory sessions again?**
   You don't have to attend to the laboratory sessions again, if your previous score from the laboratory was above 60/100. Please apply to the coordinator assistant to verify.

2. **What is the electrical safety exam?**
   Before attending to the laboratory sessions, you need to get a passing grade (minimum 60/100) from the electrical safety exam. Handouts will be given and students are supposed to study the notes before the exam.

3. **I have overlapping lectures. Can I attend to a different section?**
   As long as you informed both lecturers, you are free to attend to a different section. Your attendance grades will be transferred to your registered section.

4. **When will you announce the laboratory groups?**
   You will be sent some electronics forms to make your choice of laboratory sessions in the next few days. You are supposed to make 3 choices of 4 hour slots.

5. **I don't have any 4-hour slot available for laboratory sessions. What should I do?**
   It's your responsibility to arrange a suitable slot for laboratory work. Please make necessary changes during the add/drop week.

6. **Will everyone be assigned to their first choice of laboratory session?**
   Unfortunately, no. The selection will be *first-come, first-served*. If the session you prefer is full, you may be assigned to your second or third choice. However, it is possible to swap lab sections, if both parties agree.

7. **How many experiments are there?**
   There will be 5 laboratory sessions.

8. **I missed one laboratory session. Can I take a make-up experiment?**
   Provided that you have an official excuse, you can take a make-up. If you inform the lab coordinator immediately, you will be able to attend to a different session, otherwise you have to wait until the end of the semester.

9. **Why are we assigned MATLAB homeworks?**
   Please visit: **http://*keysan.me/okst/***

10. **I have a problem not listed above. Who should I contact to?**
    For minimum hassle, please follow the following order to resolve your problems.
    - First inform the course assistant by email (Mesut Uğur, ugurm@metu.edu.tr)
    - Visit the course assistant in person (Mesut Uğur, Room: C-114) during office hours.
    - Email the course coordinator (Ozan Keysan: keysan@metu.edu.tr)
    - Contact the course coordinator (Ozan Keysan, C-113, Tel: 0312 210 *7586*)