MIDDLE EAST TECHNICAL UNIVERSITY
ELECTRICAL AND ELECTRONICS ENGINEERING DEPARTMENT

EE 564: ELECTRICAL MACHINE DESIGN

(Spring 2015-2016)

Lecturer: **Ozan Keysan**
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Grading Policy:

Project 1	10%
Project 2	15%
Project 3	20%
Presentation	15%
Final (Open Book)	30%
Participation	10%

You will get NA if you do not submit all of the projects or do not make a presentation.

Course Website: http://keysan.me/ee564

Textbook: Design of Rotating Electrical Machines, Juha Pyrhonen, Tapani Jokinen, Valeria Hrabovcova, 2009

EE 564 LECTURE SYLLABUS

Week	LECTURE
	Review: • Maxwell Equations • Magnetic Materials and Magnetic Circuits • Electromechanical Energy Conversion
	Transformer and Inductor Design (Project-1 Assignment) • Selection of basic dimensions and materials • Calculation of parameters
	Types of Electrical Machines • Classification of electrical machines • Enclosure types, mounting types • Classification according to operating conditions, classes of insulation.

	Sizing of Electric Machines • Limitations (Mechanical, Thermal, Magnetic) • Main Design Parameters
	Magnetic Design of Electrical Machines • Choosing of number of slots • Carter's coefficient, Effective length • Tooth-back core flux
	Project-2 Assignments
	Novel Machines (Presentations) • Linear Machines • Wave Energy Converters • Superconducting Machines • Direct-drive generators • High-speed machines
	Brushless PMDC Machine Design. • Rare-earth permanent magnets • Permanent-magnet sizing • Optimization
	Structural and Thermal Design of Electrical Machines • Design Factors • Cooling Systems • Structural Elements
	Project-3 Assignments

References:

A large set of soft-documents and tutorials will be provided. You can also refer to the books listed below.

1. Lipo T. A., "**Introduction to AC Machine Design"**, University of Wisconsin-Madison, 1996

2. James R Hendershot, **Electrical Machine Design Course**, 2012

3. MIT Open Course-ware, **Electric Machines**, 2013

4. Ion Boldea, "**The induction machine handbook**", 2002.

5. Hanselman D., **Brushless Permanent Magnet Motor Design,** 2003