Lecture Hours

All lectures will be recorded and published on YouTube channel.

There will be also optional synchronous recitation/ Q&A sessions on Mondays 13:40-15:30. These sessions will be recorded and published in the ODTUClass.

Course Coordinator:

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Grading:

- One Midterm Exam: 20%
- Final Exam: 30%
- Laboratory/Simulation Projects: 25%
- Homeworks: 20%
- Participation/In Video Questions: 5%

Laboratory Sessions:

There will be five online asynchronous laboratory sessions. You are required to watch a laboratory session video, and given a practical problem and a Matlab/Simulink simulation template. You'll be required run the simulation file to answer the lab questions and submit a report with a group of three people.

Course Contents:

The following materials will be available to students:

- Weekly Asynchronous lecture videos (~60-90 min/ week), available on YouTube channel.
- Weekly synchronous recitation hours, recordings will be avaiable on ODTUClass
- Lecture presentations (and annotated copies during lectures)
- Laboratory videos and Matlab/Simulink simulation templates
- Solved problem sets, previous exam solutions

Online Lecture's Presentations

- Week#1: Review of energy conversion
  (http://jblevins.org/presentations/ee362_energy_conversion_review.html)
- Week#2: Multiply Excited Systems
  (http://jblevins.org/presentations/ee362_multiply_excited.html)
- Week#3: Rotating MMF Concept
  (http://jblevins.org/presentations/ee362_rotating_mmf2.html)
- Week#4: Introduction to Synchronous Machines
  (http://jblevins.org/presentations/ee362_synchronous_motors.html)
- Week#5: Synchronous Machine Standalone Operation
  (http://jblevins.org/presentations/ee362_synchronous_equivalent.html)
- Week#5: Synchronous Machine Operating Modes
  (http://jblevins.org/presentations/ee362_synchronous_parallel_power.html)

- Week#6: Synchronous Machine V-curves, Stability Regions
  (http://jblevins.org/presentations/ee362_synchronous_v_curves.html)
- Week#7: Salient Pole Synchronous Machines
  (http://jblevins.org/presentations/ee362_power_salient.html)
- Week#9: Induction Motors
  (http://jblevins.org/presentations/ee362_induction_motors.html)
- Week#10: Equivalent Circuit of Induction Machines
  (http://jblevins.org/presentations/ee362_induction_motor_equivalent_circuit.html)
- Week#11: Power Flow of Induction Motors
  (http://jblevins.org/presentations/ee362_induction_motor_power_torque.html)
- Week#11: Torque in Induction Motors
  (http://jblevins.org/presentations/ee362_induction_motor_torque_curve.html)
- Week#12: Starting Methods and Operating Modes of Induction Motors
  (http://jblevins.org/presentations/ee362_induction_motor_starting_current.html)
- Week#13: Control of Induction Motors
  (http://jblevins.org/presentations/ee362_induction_motor_control.html)
- Week#14 : Single Phase Induction Motors
  (http://jblevins.org/presentations/ee362_single_phase_induction.html)

Last Year's Presentations

- Week#1: Introduction (http://jblevins.org/presentations/ee362_intro.html)
- Week#1: Review (http://jblevins.org/presentations/ee362_review.html)
- Week#2: Induction in a coil- Rotating MMF
  (http://jblevins.org/presentations/ee362_induction.html)
- Week#3: MMF Distribution
  (http://jblevins.org/presentations/ee362_mmf_distribution.html)
- Week#4: Pole-pitch, harmonics, electrical angle
  (http://jblevins.org/presentations/ee362_winding_factors.html)
- Week#4: Double-layer windings, induced voltage
  (http://jblevins.org/presentations/ee362_double_layer.html)
- Week#5: Induced Voltage Example
  (http://jblevins.org/presentations/ee362_mmf_exercise.html)
- Week#6: Equivalent Circuit of Induction Motors
  (http://jblevins.org/presentations/ee362_induction_motor_equivalent_circuit.html)
- Week#6: Power Flow of Induction Motors
  (http://jblevins.org/presentations/ee362_induction_motor_power_torque.html)
- Week#7: Torque in Induction Motors
  (http://jblevins.org/presentations/ee362_induction_motor_torque_curve.html)
- Week#7: Starting Current in Induction Motors
  (http://jblevins.org/presentations/ee362_induction_motor_starting_current.html)
- Week#8: Recitation Hour (http://jblevins.org/presentations/ee362_recitation.html)
- Week#8: Control of Induction Motors
  (http://jblevins.org/presentations/ee362_induction_motor_control.html)
- Week#9: Synchronous Machines
  (http://jblevins.org/presentations/ee362_synchronous_motors.html)
- Week#10: Synchronous Machine Standalone Operation
  (http://jblevins.org/presentations/ee362_synchronous_equivalent.html)
- Week#11: Synchronous Machine Operating Modes
  (http://jblevins.org/presentations/ee362_synchronous_parallel_power.html)
- Week#12: Synchronous Machine V-curves, Stability Regions
  (http://jblevins.org/presentations/ee362_synchronous_v_curves.html)
- Week#12: Salient Pole Synchronous Machines
  (http://jblevins.org/presentations/ee362_power_salient.html)
- Week#13: Recitation (http://jblevins.org/presentations/ee362_recitation2.html)
- Week#14 : Single Phase Induction Motors
  (http://jblevins.org/presentations/ee362_single_phase_induction.html)

How can I convert slides to pdf?: In Chrome, use print preview then save to pdf.

You can download PDF versions of all presentations from this link. Note that, PDF versions can be out-dated, so please check the html versions for the newest version.

Textbooks

- Electric Machinery & Transformers, Guru and Hızıroğlu, Saunders College Publishing, 3rd ed. 2001.
- Electric Machinery, Fitzgerald, Kingsley and Umans, McGraw-Hill, 6th ed. 2003.

Online References:

- Electric Machinery & Transformers, Guru: Available as e-book from METU Library
- Electric Machines and Drives - UoM
- TU Delft Electrical Machines and Drives Course
- University of Nevada-EE430
- ECE-320
- Andy Knight-Electrical Machines
- Electrical Machine Animations
- Real-Reactive Power