



İTÜ FEN EDEBİYAT FAKÜLTESİ FİZİK BÖLÜMÜ 34469 MASLAK, İSTANBUL

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**FIZ213E Electricity and Magnetism (CRN 20963)**

**SPRING 2021**

<b>LECTURE HOURS</b> Monday 8:30-10:29 Wednesday 8:30-10:29 Friday 8:30-9:29	<b>OFFICE</b>  Physics Dept. B4-110.
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**TENTATIVE OUTLINE**

- Coulomb's Law and Electric Field:** Matter and Electric charge, Coulomb's Law, Electric Field
- Gauss's Law:** The Concept of Flux, Gauss's Law and Applications of the Gauss's Law, Electrostatic Properties of a Conductor.
- Electric Potential:** Electric Potential Energy, Electric Potential, Potential Difference, Equipotential Surfaces.
- Capacitance and Dielectrics:** Capacitors and Capacitance, Electric Energy and Electric Energy Density, Electrostatic Properties of Insulators.
- Current and Resistance:** Flow of Charge, Resistance and Ohm's Law, Drude Model of The Metal, Conduction in Semiconductors.
- Energy and Current in DC Circuits:** EMF and Internal Resistance of a battery, Electric Energy and Power, Kirchhoff's Rules.
- The Magnetic Field:** Magnetic Field, Motion of Charged Particles in Magnetic Field, Magnetic Force on a Current-Carrying Conductor, Force and Torque on a Current Loop, Applications of a Charged particle in a Magnetic Field, The Hall Effect.
- Sources of the Magnetic Field:** The Biot-Savart Law, Amper's Law, Applications of Amper's Law, Magnetic Flux and Gauss's Law for Magnetic Fields.
- Faraday's Law:** Faraday's Law, Mot,onal EMF's, Generators, Induced Electric Field.
- Inductance:** Self Induced EMF's and Self Inductance, LR Circuits, Energy Transfers in LR Circuits, Mutual Inductance.
- Electromagnetic Oscillations and AC Circuits:** LC Oscillations, Series RLC Circuit, AC Source , Series RLC Circuit Driven by an AC Source.
- Maxwell's Equations and Electromagnetic Waves:** Maxwell's Equations, The Wave Equation of  $\vec{E}$  and  $\vec{B}$  , Electromagnetic Waves, Energy and Momentum in Electromagnetic Waves ( Electromagnetic Energy Flow and the Poynting Vector, Electromagnetic Wave Intensity, Radiation Pressure, Emission of Electromagnetic Waves).

**REFERENCES**

- UNIVERSITY PHYSICS, Young & Freedman, 12<sup>th</sup> ed., Pearson Pub.
- Physics 2, WE Gettys, FJ Keller, MJ Skove, Mc Graw Hill & Literatür Yayıncılık
- Physics for Scientist and Engineers with Modern Physics, R Serway, 4<sup>th</sup>ed. Saunders College Publishing.
- PRINCIPLES of PHYSICS, 9th Ed., Halliday, Resnick, J. Walker, J. Wiley Pub., 2011.
- Sears and Zemansky's UNIVERSITY PHYSICS, 13th Ed., HD Young, RA Freedman, Pearson Pub., 2011.
- PHYSICS for Scientists and Engineers, 3th Ed., PM Fishbane, SG Gasiorowicz, ST Thornton, Pearson Pub., 2005.
- ÜNİVERSİTE FİZİĞİ Cilt 2, Young ve Freedman (çeviri), Pearson Ed. Yayıncılık.
- TEMEL FİZİK Cilt 2, PM Fishbane, S Gasiorowicz, ST Thornton (çeviri), Arkadaş Yayıncılık.
- FİZİK, DC Giancoli (çeviri), 4. Baskı, Pearson-Akademi Yayıncılık, 2007.
- FİZİK Cilt 2, R Serway (çeviri) Palme Yayıncılık.
- FİZİK Cilt 2, WE Gettys, FJ Keller, MJ Skove (çeviri), Mc Graw Hill & Literatür Yayıncılık.
- FİZİĞİN TEMELLERİ PROBLEMLER Cilt 2, R Resnick, D Halliday (çeviri), Arkadaş Yayıncılık.

**QUIZZES**

In-class quizzes will be given. The problems on the quizzes will be closely related to those discussed in class.  
Every Friday 08:30-09:29

**VF CONDITION**

at least half of the homework must be submitted and at least 5 of the totally 10 quizzes must have taken.  
YOU MUST COLLECT 12 POINTS OVER 60 UNTIL THE FINAL.

**PROBLEM SETS**

Given weekly (every Friday) and due, in lecture, Friday at 8:30  
Later on, the answers will be posted

**LATE PROBLEM SETS NOT ACCEPTED**

**MIDTERM:** 26 April 2021 Sunday, 08:30-11:29

**FINAL EXAM:** Between 14-27 June 2021

**GRADING**

Quizzes 10%, Problem Sets 20%, Midterm Exam 30%, Final Exam 40%