

ELEC-C9430

# Electromagnetism

(5 cr)

Period IV - Spring 2022

# Teachers:

## — Ari Sihvola (teacher-in-charge)

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## — Stefan Andersson (assistant)

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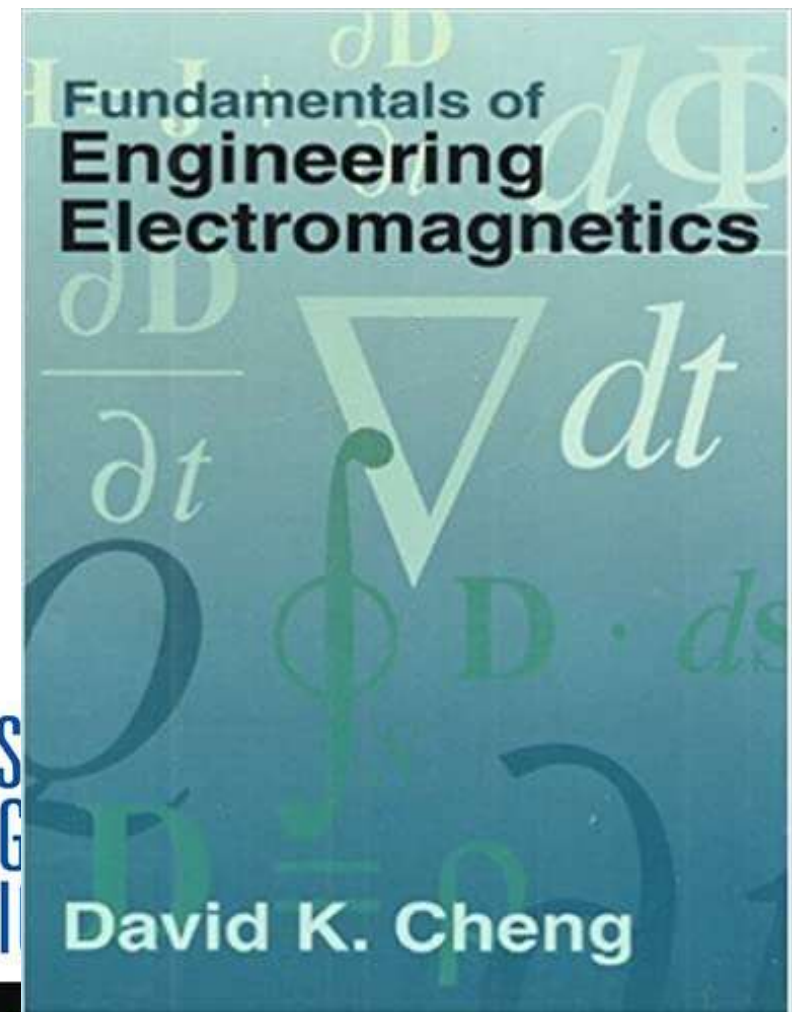
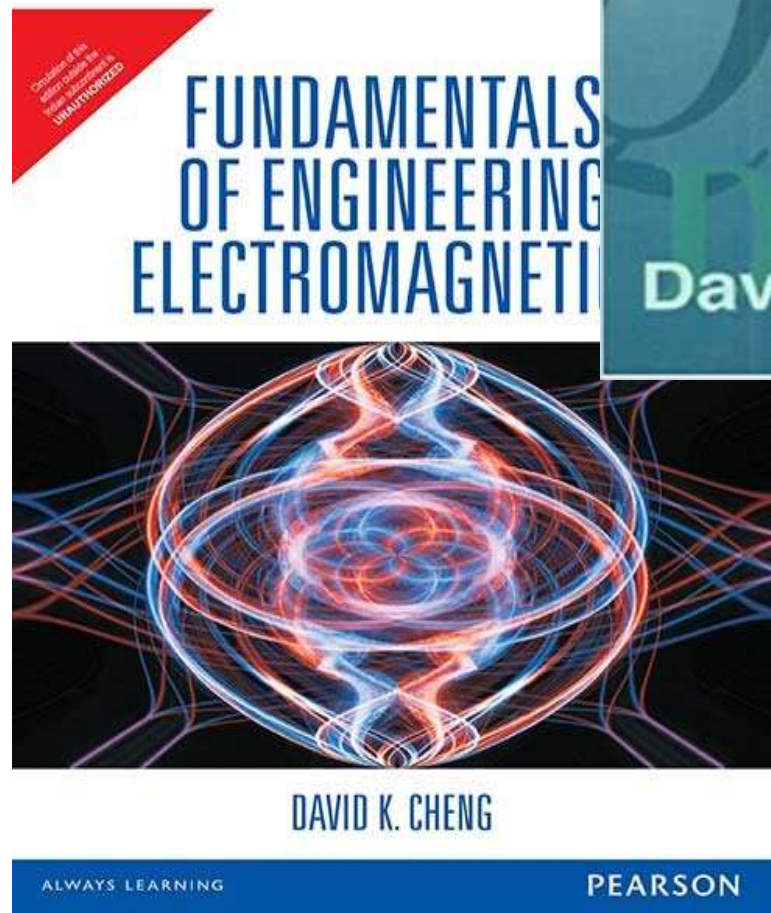
# Lectures / exercises

- Mondays 12–14, Wednesdays and Thursdays 10–12
- (quarter past hour) 12:15, 10:15
- Lecture halls in Maarintie 8: TU7 and TU6
- see MyCourses for the Zoom link
- Weekly homeworks to be returned by Sunday evening
- Exam on 13 April at 13–16 in Hall TU1
  - one A4 sheet of notes can be taken to the exam
- Retake exam on 16 May
- Weight of homework grade and exam: 50/50

# Textbook:

David K. Cheng:  
*Fundamentals of  
Engineering  
Electromagnetics*

(Addison–Wesley,  
Pearson,  
several editions  
over the years)



Week	Dates	Book chapters	Topic
<b>1</b>	February 28 – March 3	<b>1 and 2</b>	Electromagnetic model, field concepts. Vector algebra, vector analysis.
<b>2</b>	March 7–10	<b>3</b>	Electrostatics. Coulomb's law, scalar potential, electric dipole, permittivity, conductors and insulators, capacitance, electrostatic energy and forces.
<b>3</b>	March 14–17	<b>4 and 5</b>	Static electric currents, Ohm's law, conductivity. Magnetostatics, Biot-Savart's law, vector potential, permeability, magnetic dipole, inductance.
<b>4</b>	March 21–24	<b>6</b>	Faraday's law, Maxwell equations for dynamic electromagnetic fields. Complex representation of time-harmonic fields.
<b>5</b>	March 28–31	<b>7</b>	Plane waves in lossless and lossy media. Attenuation of waves, Wave reflection from planar interfaces. Brewster angle.
<b>6</b>	April 4–7	<b>(8,9) 10</b>	Electromagnetic radiation. Fields generated by a Hertzian dipole.