



## Electromagnetics

Prof. Mitra Ghergherehchi, College of Information & Communication Eng.  
School of Electrical and Electronic Eng. Sungkyunkwan University

### SHORT COURSE DESCRIPTION

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This course will provide an understanding of the fundamental principles underlying the theory of electromagnetic fields and waves, and the ability to apply this theory to the solution of simple engineering problems. The course will cover: static electric and magnetic fields, Maxwell's equations, induction, the wave equation and electromagnetic waves, electromagnetic energy transfer, active and passive circuit elements, AC circuits, filters, transmission lines.

### READING MATERIALS

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Recommended reading for the course is:

Sadiku, Matthew: Elements of Electromagnetics, 6th Edition, Oxford University Press.

### COURSE REQUIREMENTS AND GRADING

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This course assumes knowledge of Freshman Physics and Engineering Mathematics II.

Students undertaking this course will be graded pass/fail, with a pass being a grade of 60 or above out of 100. SKKU regulations require students to attend at least 80% of all classes, and students who fail to meet this requirement will be graded fail. Students found guilty of academic dishonesty will be graded fail.

The final mark for the course will be based on the following assessment modes:

Class participation: 10%

Midterm 30%

Final: 40%

Assignment: 20%

### COURSE SCHEDULE

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#### – WEEK I –

Thursday (27 June)

**Vector Calculus**

Friday (28 June)

**Electrostatics and Gauss's Law**

#### – WEEK II –

Monday (1 July)

**Electric Potential and applications of Gauss's Law**

Tuesday (2 July)

**Dipole fields, Magneto statics**

Wednesday (3 July)

**Ampere's Law, Solenoids, Magnetic Forces**

Thursday (4 July)

**Vector Potential-**

**Thursday 4 July midterm exam: (2:30 to 4)**

– WEEK III –

Monday (8 July)

**Electrodynamics, Induction**

Tuesday (9 July)

**Continuity Equation, Displacement Current**

Wednesday (10 July)

**Wave Equation and Electromagnetic Waves**

Thursday (11 July)

**Capacitors and Energy Density in Electric Field;**

– WEEK IV –

Monday (15 July)

**Inductors and Energy Density in Magnetic Field**

Tuesday (16 July)

**Energy Flow and Poynting Vector**

Wednesday (17 July)

**AC Circuits Using Complex Analysis, High and Low Pass Filters**

Thursday (18 July)

**Transmission Lines**

Friday (19 July)

**Final Exam**