Electromagnetics
Professor Ian McArthur, University of Western Australia

SHORT COURSE DESCRIPTION
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, the wave equation and plane wave solutions, electromagnetic energy transfer, reflection of electromagnetic waves, transmission lines.

READING MATERIALS
The textbook for the course is:

COURSE REQUIREMENTS AND GRADING
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%
In class quizzes: 45%
Written examination: 45%

COURSE SCHEDULE

– WEEK I –

Tuesday (26 June): 9.00 - 9.20 Introduction and overview; 9.30 – 11.00 Lecture: Vector Calculus; 11.15 – 11.45 Problem class

Wednesday (27 June): 9.00 – 10.30 Lecture: Electrostatics and Electric Potential; 10.45 – 11.45 Problem class

Thursday (28 June): 9.00 – 10.30 Lecture: Gauss’s Law and Dipole Fields; 10.45 – 11.45 Problem class

Friday (29 June): 9.00 – 10.30 Lecture: Electrostatic Boundary Value Problems; 10.45 – 11.45: In class quiz 1 and marking

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– WEEK II –
Monday (2 July): 9.00 – 10.30 Lecture: Lecture: Magnetostatics, Ampere’s law; 10.45 – 11.45 Problem class

Tuesday (3 July): 9.00 – 10.30 Lecture: Vector Potential, Magnetic Dipoles, Magnetic Forces; 10.45 – 11.45 Problem class

Wednesday (4 July): 9.00 – 10.30 Lecture: Faraday’s Law; 10.45 – 11.45 Problem class

Thursday (5 July): 9.00 – 10.30 Lecture: Magnetism and Magnetic Moments; 10.45 – 11.45: In class quiz 2 and marking

– WEEK III –

Monday (9 July): 9.00 – 10.30 Lecture: Maxwell’s Equations; 10.45 – 11.45 Problem class

Tuesday (10 July): 9.00 – 10.30 Lecture: Electromagnetic Waves; 10.45 – 11.45 Problem class

Wednesday (11 July): 9.00 – 10.30 Lecture: Electromagnetic Energy Transfer; 10.45 – 11.45 Problem class
Thursday (12 July): 9.00 – 10.30 Lecture: Reflection of Electromagnetic Waves; 10.45 – 11.45: In class quiz 3 and marking

– WEEK IV –

Monday (16 July): 9.00 – 11.30 Written Examination

Tuesday (17 July): 9.00 – 10.30 Lecture: Transmission Lines; 10.45 – 11.45 Problem class

Wednesday (18 July): 9.00 – 10.30 Lecture: Applications of Transmission Lines; 10.45 – 11.45 Problem class