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Education in Electromagnetic Fields and Waves

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Traditional course requirements in Electrical Engineering are changing. The required courses, Electromagnetics in the undergraduate and Electromagnetic Fields and Waves in the graduate school, become elective courses as the number of students majoring software and communication increases in Electrical Engineering. The concept of the voltage and the current and the passive electrical components, resistance, inductance, and capacitance (R, L, and C) are no longer necessities for all the students in Electrical Engineering.

Electromagnetic (EM) specialists, however, are needed more than ever in the design and testing of antennas, radio frequency front ends, fast switching semiconductor integrated circuit devices, hand phones, and communication systems, as the wireless interconnections between electronic systems, and 3.5th generation wideband radio communication systems are developing in addition to the existing commercial communication systems and many military electronic systems.

The understanding of the fundamental concept of Electromagnetic Fields is important more than anything not only for EM and microwave researchers and Professors but also for application engineers. Various commercial computer programs computing fields are useful for designing simple devices but limited to the simple geometries and other analytic techniques or physical intuition are needed to cope with more complicated geometries like 3-dimensional electromagnetic compatibility problems in various devices. Fundamental concept and its physical pictures of electromagnetic fields and waves lead to the clue to handle the complicated practical problems.

Three credit hour one term courses, Theory of Electromagnetic Fields, Fields and Waves, and Radiation and Diffraction of Electromagnetic Waves are the theoretical courses, and Microwave Engineering, Opto-Electronics Engineering, and Optical Communication are the application oriented courses at KAIST in the Wireless and Optical Communications Group for the graduate studies. In addition, Special Topics in Electromagnetics and Optical Communications (i. e., Electromagnetic Compatibility, Inverse Scattering, Ray Methods, Non-Linear Optical Fiber, etc.) are offered.

We hope that the course materials and its teaching are oriented toward to enhance student's capability to solve real problems of fundamental values, innovations, and of engineering applications. Various laboratory projects are included in the application oriented courses to enhance student's experimental techniques. M.S. thesis and Ph.D. dissertation are required for the degrees.

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