



香港城市大學  
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# Learning through design and simulation: an active way of teaching electromagnetic courses

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## **Abstract**

As one of the most important branches of physics, electromagnetism is difficult to teach using conventional passive approaches because of the complicated mathematics and abstract concepts, such as the divergence and curl of vector fields. Besides, conventional teaching approaches leave a large gap between mastering textbook knowledge and making discoveries. To address these issues, the PI plans to develop a student-centered active teaching method by implementing “learning through design and simulation” in electromagnetic courses. In particular, the PI will develop an “electromagnetic design and simulation” package with fruitful practical examples covering both textbook knowledge and research topics (for example, metamaterials). By implementing these examples using commercial-free software, such as the student edition of CST Studio Suite or FEKO, students can acquire intuitive understanding of electromagnetic concepts and grasp the underlying physical laws. Students are then guided to design new electromagnetic structures and study their properties by carrying out simulations, through which they can gain the necessary experience and skills for conducting independent research and making discoveries. The PI expects the “learning through design and simulation” approach to benefit the implementation of the Discovery-Enriched Curriculum.