香港城市大學
City University of Hong Kong

Developing a flipped-classroom and problem-solving based innovative Materials Science and Engineering course

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Abstract:

Students enrolled into the MSE Department since Semester A of 2018/19 have to take a core course entitled “Introduction to Materials Science and Engineering” under the new four-year undergraduate curriculum. This Bachelor core course will teach fundamentally important concepts of materials classification, crystal structures, materials processing and properties, with an ultimate aim of understanding the materials structure-processing-property relationship. One of the most important challenges for the students to learn and for the lecturer to teach this subject is the extremely diverse academic background of our MSE undergraduates, ranging from materials science and engineering, physics, chemistry, biology, mechanical and electronic and electrical engineering. Therefore, it is important to invoke students’ interest in studying this physics-centered materials science subject. In order to achieve effective teaching and learning, the PI proposes to, in addition to carrying out conventional classroom lecturing, implement three novel teaching methodologies, including flipped-classroom teaching, problem-solving based group study, and tutorial-assisted lecturing. The first approach is expected to train undergraduate students’ capability of self-studying and self-learning. The second approach is critical for improving the students’ cooperation and research capabilities, and the third one is expected to help them better understand lecture materials and master abstractive physical concepts and complex mathematical derivations. The PI believes that these three new components significantly enhance the teaching and learning effectiveness of conventional classroom lecturing.