As the engineering landscape transforms, professionals in this sector increasingly need problem-solving skills that span a range of disciplines, as well as refined management and leadership abilities.

"Developing next-generation mobile phones, for example, requires technical knowledge from more than one engineering subject area," says Wincy Yang, associate professor, Department of Industrial and Systems Engineering, The Hong Kong Polytechnic University (PolyU).

"Engineers aspiring to assume senior positions should be prepared for an increasing level of integration between the various fields of academic study, as well as more complex demands from the market. They also need good interpersonal and leadership skills," remarks Dr Yang.

In the light of this need for all-round leadership in the business sector, the PolyU launched a master of science degree in integrated engineering (MScIE) in 2009. A first of its kind in Hong Kong, the programme equips students with knowledge across different engineering disciplines, along with management and leadership skills, and training on innovative concepts, project management and costing models.

**Multi-faceted approach**

The MScIE programme includes three mandatory subjects, namely accounting for engineers, management and control of engineering operations, and management of innovation and technology; and four electives selected from a broad array of subjects offered by the university's Departments of Electrical Engineering, Electronic and Information Engineering, Industrial and Systems Engineering and Mechanical Engineering. These cross-departmental studies help students specialise in their particular field of interest.

"The programme draws on multidisciplinary expertise from the university's Faculty of Engineering, with the full support of more than 200 staff members from different departments," Dr Yang points out.

"The key strength of this programme is its extensive resources backup." Another noteworthy feature is the multi-disciplinary group project that allows students to integrate engineering knowledge within a management context. Students are expected to hone their interpersonal skills and enhance their leadership competence while working on this assignment.

Dr Yang explains that students from a mix of engineering disciplines work together in groups of four on one of 27 different project options, with the ultimate goal of developing and marketing a new product. Every student ends up leading one of the four main tasks: formulating a marketing strategy, product design, design for manufacture, and advertising and drawing up a distribution strategy.

The project simulates a real-life business scenario, where engineers lead teams of fellow workers from different engineering backgrounds. "Apart from combining different streams of expertise, they also have to ensure that their projects are market-driven, Innovative, technically workable and cost-effective," notes Dr Yang.

Assessments are based on examinations, presentations, progress reports and the final product. Team leaders are required to prepare additional reports on the tasks they led, detailing the problems they encountered and how they solved them.

**Towards leadership**

The MScIE programme is structured to allow as much flexibility as possible. Students have between 12 months and two and a half years to complete their study and must obtain the qualification within five years. Every student ends up leading one of the four main tasks: formulating a marketing strategy, product design, design for manufacture, and advertising and drawing up a distribution strategy.

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