This specialism aims to develop teachers’ understanding of various issues and global trends in science education (e.g. STEM education) to enable them to contribute more effectively towards initiating, designing and implementing innovative teaching in science education in Hong Kong or worldwide.

**Who would benefit from this specialism?**
Science teachers and professionals directly involved with science education or related fields. This specialism would also be suitable for those who are interested in STEM education.

**Mode of study:**
To be available in full-time and part-time mode only (2-year part-time study and 1-year full-time study)

**Outline of Specialist Courses:**

**Course 1: Science Curriculum and Assessment (6 credits)**
This course discusses the history of the science curriculum and the long-running debate between science education as preparation for professional practice and science education for all. Current science curriculum initiatives overseas and forces shaping the science curriculum in Hong Kong will be examined. Consideration relating to a smooth transition within science education through different learning stages and the move towards greater integration between various science disciplines will be discussed. Philosophies underpinning movements such as STSE, and Scientific Literacy will be examined. Assessment in science education will also be examined in the contexts of assessing learning in public examinations and international comparative studies such as the TIMSS and PISA. Assessment: 100% coursework.

**Course 2: Teaching and Learning in Science (6 credits)**
This course gives an overview of theories and research on the teaching and learning of science. It begins with an overview of students' common difficulties in learning science. Findings in children's understanding of science over the school years will be considered in light of a range of learning theories. Issues relating to approaches to teaching science including use of analogies, diagrams, modelling and mental visualization will be discussed. In addition, examples of investigation of teachers’ pedagogical content knowledge, beliefs, professional noticing, assessment related to the teaching and learning of science will be examined. Assessment: 100% coursework.

**Course 3: Trends and Issues of Science Education (6 credits)**
This course looks at major trends and issues in science education with particular reference to the following: gender, socio-cultural perspectives, language (teaching science to second language learners, language across the curriculum), nature of talk through different theoretical perspectives (between teacher and
students, between students and students), learning progression of key scientific ideas at different levels of study, attitudes towards science and school science, transition between primary and secondary school science (in terms of, e.g., language and conceptual demands). It also examines the role of mobile digital technology in shaping the goals and means of developing science instruction and building learning environments.

Assessment: 100% coursework.

**Course 4: Assessment in Science Education (6 credits)**

This course considers the importance of assessment for learning and quality assessment of learning in science. A wide range of strategies, such as questioning, practical work, scientific inquiry, probing and building student conceptual understanding, skills and attitudes in doing science, will be examined. Assessment literacy related to setting of assessment items and assessment rubrics will be discussed.

Assessment: 100% coursework.

**Specialist elective:**

**Specialist elective: Classroom Practice of STEM Education (6 credits)**

This module adopts the integration of scientific inquiry and engineering practice model (Weber and Sansone, 2016) and aims to introduce a variety of cross disciplinary hands-on and mind-on STEM exemplars activities/projects (e.g., monocular telescope making, conducting dough inquiry learning project, molecular gastronomy menu) which not only enhance students’ generic skills, such as problem-solving skills, critical thinking skills and creativity etc., but also facilitate students’ innovative designs through practical solutions. Besides, how Micro:bit, Arduino and other e-learning tools can be introduced and integrated into existing science and STEM curriculum pragmatically so as to enhance students' learning and teachers’ teaching will be discussed. The module aims to promote teachers’ capacity to promote STEM education both within and beyond the classroom.

In addition to four specialist core courses and a specialist elective, students will also have to complete:

- a research methods course “Methods of Research and Enquiry” (12 credits); plus
- either an option of a DISSERTATION (18 credits),
- or an option of two elective courses and a PROJECT (6 credits each).