**THE EDUCATION UNIVERSITY OF HONG KONG**

**Course Outline**

**Part I**

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| **Programme Title** | **:** | Master of Arts in Mathematics and Pedagogy  |
| **Programme QF Level** | **:** | 6 |
| **Course Title** | **:** | Technology for Mathematics Teaching: an Inquiry Approach |
| **Course Code** | **:** | MTH6134 |
| **Department** | **:** | Mathematics and Information Technology |
| **Credit Point** | **:** | 3 |
| **Contact Hours** | **:** | 39  |
| **Pre-requisite(s)** | **:** | Nil |
| **Medium of Instruction** | **:** | English supplemented with Chinese |
| **Course Level** | **:** | 6 |

**Part II**

The University’s Graduate Attributes and seven Generic Intended Learning Outcomes (GILOs) represent the attributes of ideal EdUHK graduates and their expected qualities respectively. Learning outcomes work coherently at the University (GILOs), programme (Programme Intended Learning Outcomes) and course (Course Intended Learning Outcomes) levels to achieve the goal of nurturing students with important graduate attributes.

In gist, the Graduate Attributes for Undergraduate, Taught Postgraduate and Research Postgraduate students consist of the following three domains (i.e. in short “PEER & I”):

* **P**rofessional **E**xcellence;
* **E**thical **R**esponsibility; **&**
* **I**nnovation.

The descriptors under these three domains are different for the three groups of students in order to reflect the respective level of Graduate Attributes.

The seven GILOs are:

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| 1. Problem Solving Skills |
| 2. Critical Thinking Skills |
| 3. Creative Thinking Skills |
| 4a. Oral Communication Skills |
| 4b. Written Communication Skills |
| 5. Social Interaction Skills |
| 6. Ethical Decision Making |
| 7. Global Perspectives |

1. **CoursSynopsis**This course aims to introduce the use of ICT in teaching and learning school mathematics guided by an inquiry approach. Through questioning, investigation, and experimentation with mathematical concepts, students will develop knowledge and insight in the technological pedagogical content knowledge of mathematics. This course extends the learning of the course “Instructional Design in Mathematics” into the specific domain of application of ICT.

The course starts with an introduction to the socio-cultural framework of learning community and inquiry, and the pedagogical significance of using ICT in the mathematics classroom. These will be followed by introducing students to different ICT environments in mathematics education that are relevant to school mathematics; specifically, calculator, spreadsheet, dynamic geometry, graphing, dynamic statistic and web-based resources. Students will engage in using different ICT environments to explore school mathematics concepts and design teaching tasks under an inquiry and collaborative approach.

1. **Course Intended Learning Outcomes** (CILOs)

*Upon completion of this course, students will be able to:*

CILO1 develop sound understanding of an inquiry approach of teaching and learning

* + - * 1. Show understanding of the basic ideas behind inquiry approach
				2. Able to apply inquiry approach in mathematics teaching

CILO2 develop sound understanding of the pedagogy of ICT in mathematics

1. Show understanding of the basic ideas behind the pedagogy of ICT in mathematics
2. Able to integrate ICT in mathematic teaching

CILO3 demonstrate an operative and pedagogical understanding of different ICT environments in school mathematics, in particular,

1. Calculator and Graphing
2. Spreadsheet and Dynamic Statistic
3. Dynamic Geometry
4. Web-based Resources

CILO4 demonstrate ability to design teaching and learning task using an inquiry and collaborative approach in specific ICT environment, in particular, to

1. Plan the task
2. Implement the task
3. Observe the pedagogical significance of the task
4. Reflect on the values of the task
5. Feedback on how to improve the task

**3. Content, CILOs and Teaching & Learning Activities**

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| **Course Content** | **CILOs** | **Suggested Teaching & Learning Activities** |
| Inquiry Learning, Learning Community | *CILO1* | Lectures, Hands-on activities, Inquiry and collaborative learning activities, Student presentations, On-line discussion |
| Technology Pedagogical Content Knowledge | *CILO2* |
| Use of Calculator and Spreadsheet in Mathematics Teaching | *CILO3* |
| Use of Dynamic Geometry in Mathematics Teaching | *CILO3* |
| Use of Graphing and Dynamic Statistic in Mathematics Teaching | *CILO3* |
| Use of Web-based Resources in Mathematics Teaching | *CILO3* |
| ICT Teaching Task Design 1 | *CILO1,2,3,4* |
| ICT Task Design 2 | *CILO1,2,3,4* |
| Student Presentation 1 | *CILO1,2,3,4* |
| Student Presentation 2 | *CILO1,2,3,4* |

1. **Assessment**

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| **Assessment Tasks** | **Weighting (%)** | **CILO** |
| (a) | Presentation | 20 | *CILO1,2,3* |
| (b)  | Teaching Task Design | 40 | *CILO1,2,3* |
| (c) | Reflective Essay (around 3000 words) | 40 | *CILO1,2,3* |

1. **Required Text(s)**

Nil

1. **Recommended Readings**

Fuglestad, A.B. (2007). Teaching and teachers’ competence with ICT in mathematics in a community of inquiry. In Woo, J. H., Lew, H. C., Park, K. S. & Seo, D. Y. (Eds.). *Proceedings of the 31st Conference of the International Group for the Psychology of Mathematics Education*, *2*, 249-256. Seoul: PME.

Fuglestad, A.B. (2009). ICT for Inquiry in Mathematics: A Developmental Research Approach. Journal of Computers in Mathematics and Science Teaching. 28 (2), 191.

Jaworski, B. (2006). Theory and practice in mathematics teaching development: Critical Inquiry as a mode of learning in teaching. *Journal of Mathematics Teacher Education*, *9*, 187-211.

Jaworski, B. (2007) Developmental research in mathematics teaching and learning. Developing learning communities based on inquiry and design. In Canadian Mathematics Education Study Group Proceedings of 2006 Annual Meeting (pp. 3-16). Calgary,Canada: University of Calgary.

Jonassen, D.H., Peck, K.L. & Wilson, B.G. (1999). *Learning with Technology: A Constructivist Perspective*. Prentice Hall

Kennewell, S. (2001). Using Affordances and Constraints to Evaluate the Use of Information and Communication Technology in Teaching and Learning. *Journal of Information Technology for Teacher Education*, 10, 101-116.

Oldknow, A. & Taylor, R. (2000). *Teaching Mathematics with ICT*. London and New York: Contiuum.

Wells, G. (2001). The development of a community of inquirers. In G.Wells (Ed.), *Action, talk, and text: Learning and teaching through inquiry*. New York: Teachers College Press.

1. **Related Web Resources**

<http://www.dynamicgeometry.com>

<http://www.geogebra.org>

<http://www.keypress.com/>

<http://www.cabri.com/>

1. **Related Journals**

Canadian Journal of Science, Mathematics and Technology Education

International Journal for Technology in Mathematics Education

International Journal of Computers for Mathematical Learning

Journal of Computers in Mathematics and Science Teaching

International Journal of Mathematical Education in Science and Technology

1. **Academic Honesty**

The University adopts a zero tolerance policy to plagiarism. For the University’s policy on plagiarism, please refer to the *Policy on Academic Honesty, Responsibility and Integrity with Specific Reference to the Avoidance of Plagiarism by Students* (<https://www.eduhk.hk/re/modules/downloads/visit.php?cid=9&lid=89>). Students should familiarize themselves with the Policy.

1. **Others**

Nil

Last update: 18-07-2017