THE EDUCATION UNIVERSITY OF HONG KONG

Course Outline

Part I

Programme Title	:	Doctor of Education (Mathematics Education – Directed Study)
Programme QF Level	:	7
Course Title	:	Research and Issues in Mathematics Learning
Course Code	:	MTH7122
Department	:	Mathematics and Information Technology
Credit Points	:	3
Contact Hours	:	39 hours
Pre-requisite(s)	:	Nil
Course Level	:	Foundation Stage

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:
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. **Course Synopsis**

This course aims to provide the candidates with an overview of both cognitively and affectively oriented research on the learning of mathematics. It focuses on young children development, student identity, growth of discourses and advanced mathematical thinking. Cognitive and affective theories and models relevant to learning of mathematics will be visited to provide an opportunity to critically reflect upon major issues and research findings concerning students' development of mathematical abilities. The focus is on empowering teachers and practitioners of related-disciplines in cultivating student-centered environments conducive to effective learning.

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

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

CILO$_1$ understand the key issues, theories and current arguments in the psychology of mathematics education;

CILO$_2$ synthesize ideas from a critical analysis of current cognitively and affectively oriented research articles for the improvement in mathematics learning;

CILO$_3$ apply the learned knowledge to their own classrooms or professional practices in making better informed judgments concerning student learning;

CILO$_4$ design and undertake small-scale inquiries into their working environments concerning the psychology of mathematics learning by examining current research with reference to literature.

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

Course Content	CILOs	Suggested Teaching & Learning Activities
Cognitive theories and models relevant to mathematics learning	*CILO$_{1,2}$*	▪ Lecturer-led Q&A ▪ Guided Research Activities
Affective domain on mathematics education	*CILO$_{1,2}$*	▪ Lecturer-led Q&A ▪ Guided Research Activities
Situated cognition and learning in context	*CILO$_{,2,3}$*	▪ Lecturer-led Q&A ▪ Problem-Based Learning Activities
Mathematical problem solving and metacognition	*CILO$_{3,4}$*	▪ Problem-Based Learning Activities ▪ Guided Research Activities
Research and development on specific learning theories/models in mathematics context	*CILO$_{3,4}$*	▪ Problem-Based Learning Activities ▪ Guided Research Activities

4. **Assessment**

Assessment Tasks	Weighting (%)	CILO
(a) A presentation on the articulation of self-selected readings and on possible future research directions.	20	*CILO$_{1,2,3}$*
(b) An analytical and critical essay of around 4000 words on one of the topics in the Content Themes.	80	*CILO$_{1,2,3,4}$*

5. **Required Text(s)**

Nil

6.   Recommended Readings

Alexander, P. A., & Winne, P. H. (Eds.) (2006). *Handbook of educational psychology* (2nd Ed.). Mahwah, N.J.: Lawrence Erlbaum Associates.

Carpenter, T. P., Dossey, J. A., & Koehler, J. L. (Eds.) (2004). *Classics in mathematics education research.* Reston, VA: National Council of Teachers of Mathematics.

*Desoete, A., & Veenman, M. (Eds.) (2006). *Metacognition in mathematics education.* New York: Nova Science Pub., Inc.

*English, L. D. (Ed.) (2004). *Mathematical and analogical reasoning of young learners.* Mahwah, N.J.: Lawrence Erlbaum Associates.

English, L. D. (Ed.) (2008). *Handbook of international research in mathematics education* (2nd Ed.). New York: Routledge.

Ernest, P. (1997). *Social constructivism as a philosophy of mathematics*. Albany, New York: State University of New York Press.

Goodchild, S., & English, L. (Eds.) (2002). *Researching mathematics classrooms: a critical examination of methodology*. Westport, CT: Praeger.

*Gutiérrez, A., & Boero, P. (Eds.) (2006). *Handbook of research on the psychology of mathematics education: past, present and future*. Rotterdam, The Netherlands : Sense Publishers.

Nickson, M. (2004). *Teaching and learning mathematics: a guide to recent research and its applications* (2nd Ed.) London: Continuum.

Royer, J. M. (Ed.) (2005). *The cognitive revolution in educational psychology*. Greenwich, CT: Information Age Pub.

Skemp, R. R. (1987) *The psychology of learning mathematics* (2nd Ed.), Erlbaum, London.

*Steffe, L. P., Nesher, P., Cobb, P., Goldin, G. A. and Greer, B. (Eds.) (1996). *Theories of mathematical learning ,* Mahwah, New Jersey: Erlbaum.

Those marked by (*) are highly recommended.

7.   Related Web Resources
http://www.flaguide.org/cat/math/math/math1.php http://mathforum.org./brap/wrap/
http://www.cut-the-knot.com/front.shtml

8.   Related Journals
Mathematical Thinking and Learning
Teaching Children Mathematics
The Journal of Mathematical Behavior
Mathematics Teaching in Middle Schools

9. **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.

10. **Others**
   Nil

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TPg Courses with other Study Modes

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Course   Title   **:** Research   and   Issues   in   Mathematics   Learning
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Offering Unit   **:** Mathematics and Information Technology
Credit Points   **:** 3

Delivery mode:

☐ **Online learning as the primary delivery mode**

Range of classroom-based contact hours (0-15)	Range of hours for online learning (24-39)	Total No. of Contact Hours

☑ **Directed study mode**

Range of classroom-based contact hours (4-15)	Range of guided independent learning hours (24-35)	Total No. of Contact Hours
6	33	39