**THE EDUCATION UNIVERISTY OF HONG KONG**

**Course Outline**

**Part I**

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**Programme Title :** Master of Arts in Mathematics and Pedagogy

 Master of Education

**Programme QF Level :** 6

**Course Title :** History and Pedagogy of Mathematics

**Course Code :** MTH6118

**Department :** Mathematics and Information Technology

**Credit Points :** 3

**Contact Hours :** 39

**Pre-requisite(s) :** Nil

**Medium of Instruction :** English

**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. **Course Synopsis**

History and Pedagogy of Mathematics (HPM) is one of the main areas of studies of the ICMI (International Commission on Mathematical Instruction). The development of mathematics and mathematics education in relation to history of mathematics will be discussed in this course. It focuses on topics such as the development of number systems, arithmetic, geometry and algebra in ancient China, as well as their influences on mathematics education.

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

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

CILO1 Recognize the major mathematics development and mathematics education in ancient China.

CILO2 Understand the problems and problem solving strategies appeared in some famous classic mathematics texts in ancient China.

CILO3 Enhance their knowledge of the current trends and issues of integrating history of mathematics in mathematics education.

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

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| **Course Content** | **CILOs** | **Suggested Teaching & Learning Activities** |
| An overview of the major mathematics developments in ancient China.(main ref. A2, A12) | *CILO1* | lectures, discussions, presentations and directed studies using relevant on-line materials |
| The problems and problem solving strategies appeared in some classic mathematics texts in ancient China.(main ref. A5, A6, A7) | *CILO2* |
| The roles of mathematics in the ancient Chinese education systems.(main ref. A8, A13) | *CILO1* |
| The current trends and issues of integrating history of mathematics in mathematics education.(main ref. A1, A3, A9) | *CILO3* |

1. **Assessment**

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| **Assessment Tasks** | **Weighting (%)** | **CILO** |
| (a)  | Quiz | 15 | *CILO1,2,3* |
| (b)  | Group presentation of a lesson design on how to integrate history of mathematics in lesson(s).  | 15 |
| (c) | An individual essay (about 3000 words) on a selected topic of this course. | 70 |

1. **Required Text(s)**

Nil

1. **Recommended Readings**
2. Must-read journal articles
3. S. Goktepe, A. S. Ozdemir (2013). An example of using history of mathematics in classes. European Journal of Science and Mathematics Education, 1(3), pp.125-137.
4. Man, Y.K. (2011). Chinese Mathematics. In Sarah J. Greenwald & Jill E. Thomley (Eds.), The Encyclopedia of Mathematics and Society (Volume I), pp.184-188,. CA: Salem Press.
5. Pinto, H. (2010). The history of mathematics in the classroom. Proceedings of the Sixth European Summer University (ESU6) (edited by Barbin et al), pp. 245-257, Vienna: Verlag Holzhausen GmbH
6. Furinghetti, F. (2007). Teacher education through the history of mathematics, Educational Studies in Mathematics, 66, pp.131–143.
7. Man, Y. K. (2006). A study of the area formulas in Jiuzhang Suanshu and its inspirations to Mathematics teaching. Proceedings of the HPM 2004 & ESU4: History and Epistemology in Mathematics Education, Greece, pp 254-260.
8. Francis Lopez-Real (2004). Using the history of mathematics as a starting point for investigations: some examples on approximations, Teaching Mathematics and Its Applications, 23(3), pp. 133-147.
9. Horng, Wann-Sheng (2000). Euclid versus Liu Hui: A pedagogical reflection. In V. J. Katz (Ed.), Using history to teach mathematics: An International Perspective, pp. 37-48, Washington, DC.: Mathematics Association of America.
10. Siu, M.K., Volkov, A. (1999). Official curriculum in traditional Chinese mathematics: How did candidates pass the examinations ? Historia Scientiarum, 9, pp. 85-99.
11. Jankvist, U. T. (2009). A categorization of the ‘whys’ and ‘hows’ of using history in mathematics education, Educational Studies in Mathematics, 71, pp. 236–261.
12. Lawrence, S. (2006). Maths is good for you: web-based history of mathematics resources for young mathematicians and their teachers, Journal of the British Society for the History of Mathematics, 21, pp. 90-96.
13. 顏富明、張靜嚳 (2011)。以真實學教育觀點談設計學史融入課室之解題活動經驗分享。《台灣數學教師電子期刊》，26，頁1-26。
14. 郭書春(2009)。中國宋元時期的重要數學發展與思想。《香港教育學院數學教育會議2009論文集》，頁157-179，香港教育學院。
15. 林炎全(1997)。中國學課程的演變。《數學傳播》，21(3)，頁31-44。
16. Other references
17. Barbin, E., Kronfellner, M., Tzanakis, C. (ed.) (2010). History and Epistemology in Mathematics Education: Proceedings of the Sixth European Summer University (ESU6), Vienna: Verlag Holzhausen GmbH.Berlinghoff, W.P., Gouvea, F.Q. (2004). Math Through the Ages: A Gentle History for Teachers and Others. Washington: Oxton House and the Mathematical Association of America.
18. Fauvel, J., Maanen, J. V. (2000). History in Mathematics Education: The ICMI Study. Boston: Kluwer Academic Publishers.
19. Furinghetti, F., Kaijser, S., Tzanakis, C. (ed.) (2006). HPM2004 & ESU4: History and Epistemology in Mathematics Education. Iraklion, Greece: University of Crete.Katz, V.J. (ed.) (2000). Using History to Teach Mathematics: An International Perspective. Washington: The Mathematical Association of America.
20. Katz, V.J. (ed.) (2007). The Mathematics of Egypt, Mesopotamia, China, India, and Islam: A Sourcebook. Princeton: Princeton University Press.
21. Lawrence, S. (2009). What works in the classroom: Project on the history of mathematics and the collaborative teaching practice. Proceedings of the Sixth Congress of the European Society for Research in Mathematics Education (edited by Viviane et al), pp. 2752-2761, Lyon: INRP.
22. Martzloff, J-C(1997). A History of Chinese Mathematics. Berlin: Springer-Verlag.
23. Selin, H. (ed.) (2000). Mathematics across Cultures: The History of Non-Western Mathematics. Boston: Kluwer Academic Publishers.
24. Su, Y.-W. (2006). An Action Research of School-centered Professional Development in the HPM Context. In F. Furinghetti, S. Kaijser & C. Tzanakis (Eds.), Proceedings of the HPM 2004 & ESU4, pp.368-382, UppsalaUniversity of Uppsala.
25. Swetz, F. (2002). Legacy of the LuoShu. Illinois: Open Court Publishing.
26. Tzanakis, C., Arcavi, A. (2000). Integrating History of Mathematics in the Classroom: An Analytic Survey. In J. Fauvel & J. van Maanen (Eds.), History in Mathematics Education: An ICMI study, pp. 201-240, Dordrecht, The Netherlands: Kluwer.
27. Viviane, D-G., Sophie S-L., Ferdinando, A. (2009). Proceedings of the Sixth Congress of the European Society for Research in Mathematics Education, Lyon: INRP (France).
28. 劉超、代瑞香、陸書環(2013) 。《數學史與數學教育》。浙江：浙江大學出版社。
29. 李兆華(2010)。《中國數學史基礎》。天津：天津教育出版社。
30. 沈康身(2010)。《歷史數學名題賞析》(1-6冊) 。台北：稻田出版。
31. 肖學平(2008)。《中國傳統數學教學概論》。北京：科學出版社。
32. 汪曉勤、韓祥臨(編)(2002)。《中學數學中的數學史》。北京：科學出版社。
33. **Related Web Resources**<http://www.math.sinica.edu.tw/media/>

<http://www-groups.dcs.st-and.ac.uk/history/Indexes/HistoryTopics.html>

<http://www.math.sfu.ca/histmath>

<http://aleph0.clarku.edu/~djoyce/mathhist/mathhist.html>

<http://math.nmsu.edu/~history/>

<http://math.ntnu.edu.tw/~horng>

<http://www.mathhistory.net/ChineseMathHistory.asp>

<http://www.geocities.com/monicachan006/knownine.html>

1. **Related Journals**

數學傳播

科學月刊

數學教育(EduMath)

台灣數學教師(電子)期刊

Educational Studies in Mathematics

Historia Mathematica

Journal of the British Society for the History of Mathematics

International Journal for the History of Mathematics Education

International Journal of Mathematical Education in Science and Technology

Teaching Mathematics and Its Applications

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

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