

Subject Description Form

Subject Code	AMA1D01C
Subject Title	The History of Ancient Chinese and World Mathematics
Credit Value	3
Level	1
Planned Student Intake per Year	Optimal class size: _____ 75 _____ Planned number of sessions to be offered: Semester 1: _____ Semester 2: _____ 1 _____ Summer Term: _____
GUR Requirements Intended to Fulfil	<p>Please indicate which of the following GUR requirements the proposed subject intends to fulfil [Please check <u>ALL</u> boxes that may apply.]</p> <p><input type="checkbox"/> Languages and Communication Requirement (LCR)</p> <p><input type="checkbox"/> Requirement in Healthy Lifestyle</p> <p><input type="checkbox"/> Broad Discipline Requirement (BDR) Please specify Broad Discipline Area: _____</p> <p><input checked="" type="checkbox"/> Cluster Area Requirement (CAR) Please check the box(es) below to indicate the cluster area(s) the subject contributes in a major way:</p> <p style="padding-left: 40px;"><input type="checkbox"/> Human Nature, Relations and Development</p> <p style="padding-left: 40px;"><input type="checkbox"/> Community, Organization and Globalization</p> <p style="padding-left: 40px;"><input type="checkbox"/> History, Cultures and World Views</p> <p style="padding-left: 40px;"><input checked="" type="checkbox"/> Science, Technology and Environment</p> <p><input checked="" type="checkbox"/> China-Study Requirement (CSR) More than 60% CSR-related content? Yes <input checked="" type="checkbox"/> or No <input type="checkbox"/> (Please check as appropriate)</p> <p><input type="checkbox"/> Eligible for “English Writing” (EW) designation - include an extensive piece of writing (2,500 words)? Yes <input type="checkbox"/> or No <input type="checkbox"/> (Please check as appropriate)</p> <p><input checked="" type="checkbox"/> Eligible for “Chinese Writing” (CW) designation - include an extensive piece of writing (3,000 characters) Yes <input checked="" type="checkbox"/> or No <input type="checkbox"/> (Please check as appropriate)</p> <p><input type="checkbox"/> Eligible for “English Reading” (ER) designation - include a reading of an extensive text (100,000 words or 200 pages)? Yes <input type="checkbox"/> or No <input type="checkbox"/> (Please check as appropriate)</p> <p><input checked="" type="checkbox"/> Eligible for “Chinese Reading” (CR) designation - include a reading of an extensive text (100,000 characters or 200 pages) Yes <input checked="" type="checkbox"/> or No <input type="checkbox"/> (Please check as appropriate)</p>
Medium of Instruction	<p>Please check the appropriate box:</p> <p><input checked="" type="checkbox"/> English <input checked="" type="checkbox"/> Cantonese* <input type="checkbox"/> Putonghua* <input type="checkbox"/> Others* (Please specify: _____)</p> <p>Justification(s): For the part on Ancient Chinese History of mathematics, teaching materials would include those written in Chinese, and thus, the medium of instruction would include Cantonese. However, for the part of western-world History of Mathematics, English would be the major medium of instruction.</p> <p><small>* In line with the University policy, English will be the medium of instruction except for the Chinese culture- or Chinese literature-related subjects, which will normally be taught in Putonghua as recommended by the Working Group. For other subjects to be offered in Cantonese, Putonghua or other languages, justifications should be provided for special consideration.</small></p>

Student Study Effort Required	Class contact:	
	▪ AMA Lecture	26 Hrs.
	▪ AMA Tutorial	13 Hrs.
	▪ CBS Lecture/Tutorial	TBA Hrs.
	Total class contact	45 Hrs.
	Other student study effort:	
	▪ Self Study	16 Hrs.
	▪ Assignments	8 Hrs.
	▪ Project (including drafting for CW requirement)	34 Hrs.
	▪ Preparation for quizzes (for CR requirement)	20 Hrs.
	Total student study effort	117 Hrs.
Pre-requisite and/or Exclusion(s) <i>(Note 2)</i>	Nil	
Objectives <i>(Note 3)</i>	<p>(a) To introduce the historical development of mathematics of Ancient China and the world, and to expand students' intellectual capacity beyond their disciplinary domain so as to enable them to tackle professional and global challenges from a multidisciplinary perspective, and in a holistic manner.</p> <p>(b) To let students gain an enhanced understanding of China through ancient Chinese mathematics (CSR).</p> <p>(c) To nurture student's overall cultural appreciation via the learning of ancient worlds' mathematics.</p> <p>(d) To enhance student's Chinese Writing (CW) skills through Project writings and Assignments, and through instructional activities conducted by CBS staff.</p> <p>(e) To cultivate student's Chinese Reading (CR) skills so that they can demonstrate their understandings of the selected articles on Ancient Chinese Mathematics.</p>	
Intended Learning Outcomes <i>(Note 4)</i>	<p>Upon completion of the subject, students will be able to:</p> <p>(a) relate popular mathematical theories and results to their historical roots, and to comprehend popular Chinese literature of ancient Chinese mathematics (CR). (Relating mathematical theories to their historical roots would involve <u>higher order thinking</u>, whereas, to comprehend literature on ancient Chinese mathematics would involve <u>literacy</u>).</p> <p>(b) identify the achievements made by ancient Chinese as well as by other cultures in mathematics, and able to write about it (CR+CW). (To write about ancient Chinese mathematics would involve <u>literacy</u>, whereas, to be able to identify the achievement of mathematics of ancient Chinese and of other cultures would enhance students' interests, attitude, skills and intellectual capacity beyond their disciplinary domain to prepare for <u>life-long learning</u>).</p> <p>(c) apply simple ancient mathematical techniques to solve for ancient mathematical problems. (To be able to apply any mathematical techniques involve <u>higher order thinking</u>).</p>	

	<p>(d) determine time line of events for the development of mathematics in ancient China and other ancient cultures. (To be able to determine time line of events would enhance students' interests, attitude, skills and intellectual capacity beyond their disciplinary domain to prepare for <u>life-long learning</u>).</p> <p>(e) identify some famous mathematicians and give a brief account their major contributions in history of mathematics (CW). (To be able to give a brief historical accounts of ancient mathematicians would involve literacy, whereas, to be able to identify famous mathematicians would enhance students' interests, attitude, skills and intellectual capacity beyond their disciplinary domain to prepare for <u>life-long learning</u>).</p>
<p>Subject Synopsis/ Indicative Syllabus <i>(Note 5)</i></p>	<p><u>中國古代數學</u></p> <p>介紹先秦至清代中國數學發展、數學技巧及傑出數學家。比對中國古代與世界各地的數學發展歷程。題目包括：</p> <ol style="list-style-type: none"> 1 概論 2 開方術 3 海島算經（唐代初年） 4 中國剩餘定理 5 測圓海鏡（金代） <p><u>Development of Mathematics outside China</u></p> <p>We study and compare mathematics in different civilizations in different historical periods.</p> <p><u>Ancient Time</u> Brief introduction to mathematics in ancient Egypt, Mesopotamia, Greece, India, and the Islamic world</p> <p><u>Modern Time</u> Mathematics in Medieval and Renaissance Europe; The introduction of algebra; Pre-calculus and calculus in the 17th Century; Development of analysis, probability and statistics, algebra and number theory, and geometry in the 18th Century.</p>
<p>Teaching/Learning Methodology <i>(Note 6)</i></p>	<p>Teaching of the subject is mainly through a traditional Lecture/Tutorial manner. Projects will be used to assess Writing requirement (CW) and quizzes will be used to asses Reading requirement (CR).</p> <p>Individual assignments and projects will be assigned to students. For the projects, students are required to write at least 3000 characters of Chinese (CW). AMA is responsible for the mathematics materials, whereas, CBS is responsible for the Chinese writing skills (CW).</p> <p>Four sets (of no less than 50 pages each) of additional materials written in Chinese will be assigned to students as reading materials (CR). Quizzes in the form of multiple choice questions will be conducted via the CBS system to test students on their understandings of the materials.</p>

Presentations will be given by the students during tutorials followed by in-class and small group discussions, and reports will be submitted afterwards. Students would have to research for literature review, making use of our library and the internet extensively to source historical materials not presented in lectures and tutorials.

Topics on Projects could be, but not limited to the followings:

1. 談古今中外如何估算圓周率 π 。
2. 論李善蘭的尖錐求積術。
3. 論中國古代高次方程的數值解法。
4. 中國古代如何應用重差術解決有關測量的問題。

Assessment Method

(Note 7)

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)				
		a	b	c	d	e
1. Assignments	10%	✓	✓	✓		✓
2. Quizzes (to assess CR requirement)	20%	✓	✓			✓
3. Project/Presentation (to assess CW requirement)						
Marked by CBS	10%	✓	✓			
Marked by AMA	40%			✓	✓	✓
4. Exam	20%	✓	✓		✓	✓
Total	100 %					

Continuous Assessment comprises of assignments, project/presentation and quizzes. A written exam (predominately with multiple choice questions) is held at the end of the semester.

Reading List and Reference

Please indicate clearly in this section if the subject should have an “R” designation. If so, subject proposers should also indicate clearly which items on the Reading List constitute the expected reading requirement and include the page numbers.

“R” designation reading list:

- (1) 吳文俊、白尚恕、沈康身，《劉徽研究》，九章出版社，1993。
pp. 79-86, 87-103, 104-121, 385-394, 402-413. (total 65 pages)
- (2) 郭金彬、孔國平，《中國傳統數學思想史》，科學出版社，2004。
pp. 284-336. (total 53 pages)
- (3) 紀志剛，《南北朝隋唐數學》，河北科學技術出版社，1999。
pp. 1-44, 356-386. (total 75 pages)
- (4) 孔國平，《李冶朱世傑與金元數學》，河北科學技術出版社，1999。
pp. 36-80, 291-311. (total 66 pages)

Total number of pages for “R” designation reading list : 259 pages.

Textbook

- 錢寶琮，《中國數學史》，科學出版社，1981。

	References
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- 李儼、杜石然，《中國數學》，1986。
- Li Yan, Du Shiran, John N. Crossley, Anthony W.C. Lun, 《Chinese Mathematics A Concise History》，Oxford Science Publications, 1987.
- 李迪，《中國數學史簡編》，遼寧人民出版社，1984。
- Victor J. Katz, 《A History of Mathematics》，2004.