彈性週數試行計畫_18 週課綱

國立清華大學課程大綱【格式】

科號	11110GEC 150401	組別		學分	3	人數限制	160
上課時間	T7T8T9			教室	綜四 121		
科目中文名稱	前近代科學史						
科目英文名稱	Introduction to the History of Pre-Modern Science						
任課教師	Alexei Volkov (琅元)						
擋修科目				擋修分數			

請勾選	此科目對應之系所課程規畫所欲培養之核心能力 Core capability to be cultivated by this course	權重（百分比） Percentage
☑	自我瞭解與溝通表達 Self-awareness, expressions & communication	10%
☑	邏輯推理與批判思考能力 Logical reasoning & critical thinking	30%
☑	科學思維與反思 Scientific thinking & reflection	30%
☑	藝術與人文涵養 Aesthetic & humanistic literacy	10%
☑	資訊科技與媒體素養 Information technology & media literacy	10%
☑	多元觀點與社會實踐 Diverse views & social practices	10%

一、課程說明	I. The main goal of this course is to provide the students with the basic knowledge of the history of science in pre-modern era, that is, in the period *preceding* the Scientific Revolution that took place in Western Europe in the 17th century. The course will include the following topics: 1. The beginnings of science in ancient Babylon (divination, medicine, mathematics), Egypt (astronomy and mathematics), Greece (philosophical foundations, logic, mathenmatics, astronomy); 2. Medieval science in East and West: (a) Medieval European Science; (b) Islamic science; (c) Ancient and Medieval Chinese science (mainly, work on mathematics and astronomy); 3. The meeting between the Western and Chinese scientific traditions that happened in the 17th century. II. The study of pre-modern science will give the students the opportunity to learn about the origins of science in various cultural and social settings and to understand the most general laws of evolution of scientific knowledge.
二、指定用書	No textbook for the course will be suggested. The power-point shows of the lectures will be posted on the e-learning website of the Tsing-Hua University http://moodle.nthu.edu.tw/ (all students enrolled in this course will have access to it); each time the powerpoint show of the lecture will be posted after the class. The teaching materials (see the section 參考書籍 below) will be made available to the students in electronic form on request.
三、參考書籍	O. E. Neugebauer, *The Exact Sciences in Antiquity*. New York: Dover publications, 1969. R. J. Gillings, *Mathematics in the Time of the Pharaohs*, MIT Press, 1972. E. Robson. “Neither Sherlock Holmes nor Babylon: A reassessment of Plimpton 322.” *Historia Mathematica* 28 (2001), 167-206. C. Boyer, *A History of Mathematics*, Wiley, 1989. D. Lindberg, *The Beginnings of Western Science*. University of Chicago Press, 2007. J. Lukasiewicz, *Aristotle's Syllogistic from the Standpoint of Modern Formal Logic*, Clarendon Press, 1998. Ch. H. Kahn, *Anaximander and the origins of Greek cosmology*, Hackett, 1994. Th. Heath (1913). *Aristarchus of Samos, the ancient Copernicus*, London: Oxford University Press, 1913. E. Grant, *Science and religion, 400 B.C. to A.D. 1550: from Aristotle to Copernicus*, Johns Hopkins University Press, 2006. R. Rashed, Regis Morelon. *Encyclopedia of the history of Arabic science*, Routledge, 1996. J. Needham and Wang Ling, *Science and Civilisation in China*, Vol 3, Cambridge University Press, 1959. Sun Xiaocun and J. Kistemaker, *The Chinese sky during the Han: constellating stars and society*, Brill, 1997. P. M. Engelfriet, *Euclid in China: the genesis of the first Chinese translation of Euclid’s Elements, books I-VI*, Brill: 1998. C. Jami, P. Engelfriet, and G. Blue (eds.), *Statecraft and intellectual renewal in late Ming China: the cross-cultural synthesis of Xu Guangqi (1562-1633)*, Brill: 2001. [For more details see section 5 “教學進度” below.]

四、教學方式	There will be a mid-term test (3 hours, in class, *open book*, multiple choice) and a final exam (3 hours, in class, multiple choice). The exams questions will be related only to the instructor's lectures, not to the students' presentations.		
五、教學進度	週次 /date	主題課程說明	每週指定閱讀
	1 9/13	Introduction; explanation of the grading system; short overview of the course.	n/a
	2 9/20	Egyptian science and technology: astronomy, mathematics, engineering.	O. E. Neugebauer, *The Exact Sciences in Antiquity*. New York: Dover, 1969; Richard J. Gillings, *Mathematics in the Time of the Pharaohs*, MIT Press, 1972.
	3 9/27	Babylonian mathematics, astronomy, astrology, divination, and astrology.	O. E. Neugebauer, *The Exact Sciences in Antiquity*. New York: Dover, 1969; J. Høyrup. "Sub-scientific mathematics: Observations on a pre-modern phenomenon." *History of Science*, 28 (1990), 63-86; E. Robson. "Neither Sherlock Holmes nor Babylon: A reassessment of Plimpton 322." *Historia Mathematica* 28 (2001), 167-206.
	4 10/04	Early Greek science (1): Thales and Pythagoras; mathematical theory of music; paradoxes; three construction problems. Plato and his Academia.	C. Boyer, *A History of Mathematics*, Wiley, 1989. W. C. Salmon (ed.), *Zeno's paradoxes*, Hackett, 2001. David Lindberg, *The Beginnings of Western Science*. University of Chicago Press, 2007.
	5 10/11	Early Greek science (2): Aristotle and his Lyceum; syllogistics.	D. Lindberg, *op.cit*.; J. Lukasiewicz, *Aristotle's Syllogistic from the Standpoint of Modern Formal Logic*, Clarendon Press, 1998.
	6 10/18	Early Greek science (3): the *Elements* of Euclid.	Th. L. Heath (tr.), *Euclid's Elements*, Green Lion Press, 2002.
	7 10/25	Early Greek science (4): School of Stoics, their science and logic.	B. Mates, *Stoic logic*, Berkeley: University of California Press, 1973.
	8 11/01	Greek, Hellenistic, and Roman cosmologies: Anaximander of Miletus, Aristarchus of Samos, Ptolemy, Martianus Capella.	Ch. H. Kahn, *Anaximander and the origins of Greek cosmology*, Hackett, 1994; Th. Heath, *Aristarchus of Samos*, London: Oxford University Press, 1913; W. Harris, R. Johnson, E.L. Burge Stahl. *Martianus Capella and the seven liberal arts*, New York: Columbia University Press, 1991.
	9 11/08	Midterm exam	n/a
	10 11/15	Science and Early Christianity: St. Augustine, Isidore of Seville. Byzantine and Islamic science.	E. Stump and N. Kretzmann (eds.), *The Cambridge companion to Augustine*, Cambridge University Press, 2001; St. A. Barney (tr.), *The Etymologies of Isidore of Seville*, Cambridge University Press, 2006; Ed. Grant, *Science and religion, 400 B.C. to A.D. 1550: from Aristotle to Copernicus*, Johns Hopkins University Press, 2006; R. Rashed, R. Morelon. *Encyclopedia of the history of Arabic science*, Routledge, 1996.

	11 11/22	Science in European universities in the early second millennium AD; N. Copernicus and T. Brahe, J. Kepler and Galileo. Beginning of Scientific Revolution.	Ed. Grant, *Science and religion, 400 B.C. to A.D. 1550: from Aristotle to Copernicus*, Johns Hopkins University Press, 2006; V. E. Thoren, *The Lord of Uraniborg: a biography of Tycho Brahe*, Cambridge University Press, 1990; J.V. Field, *Kepler's geometrical cosmology*, University of Chicago Press, 1981; Galileo Galilei, *Dialogue concerning the two chief world systems*, foreword by A. Einstein, University of California Press, 1967.
	12 11/29	Early science in China: Chinese mathematics. Counting instruments and mathematical treatises.	J.-C. Martzloff, *A history of Chinese mathematics*, Springer, 1997; Li Yan, and Du Shiran. *Chinese mathematics: A concise history*, Clarendon Press, 1987.
	13 12/06	Chinese geometry and geometrical algebra; algebra of the Song and Yuan dynasties; system of mathematics education.	J. Needham and Wang Ling, *Science and Civilisation in China*, Vol 3, part 1, Cambridge University Press, 1959; J.-C. Martzloff, *op.cit*; U.Libbrecht, *Chinese Mathematics in the Thirteenth Century, the Shu-shu chiu-chang of Ch'in Chiu-shao*. Cambridge, MA: MIT Press, 1973.
	14 12/13	Chinese astronomy: earliest Chinese astronomical records; star maps; computation of calendar.	Needham and Wang Ling, *Science and Civilisation in China*, Vol 3, part 2, Cambridge University Press, 1959; Sun Xiaocun and J. Kistemaker, *The Chinese sky during the Han: constellating stars and society*, Brill, 1997.
	15 12/20	Jesuit order and its scientific activities (part 1): M. Ricci and his work in China; Ricci's and Xu Guangqi's Chinese translation of the *Elements* of Euclid.	P. M. Engelfriet, *Euclid in China: the genesis of the first Chinese translation of Euclid's Elements, books I-VI*, Brill: 1998; C. Jami, P. Engelfriet, and G. Blue (eds.), *Statecraft and intellectual renewal in late Ming China: the cross-cultural synthesis of Xu Guangqi (1562-1633)*, Brill: 2001.
	16 12/27	Jesuit order and its scientific activities (part 2): Johann Adam Schall von Bell and Ferdinand Verbiest and their work in China.	R. Attwater, *Adam Schall, a Jesuit at the court of China, 1592-1666*, London: Chapman, 1963; J.W. Witek (ed.), *Ferdinand Verbiest (1623-1688): Jesuit missionary, scientist, engineer and diplomat*, Steyler Verlag, 1994.
	17 01/03	Final exam	n/a
	18 01/10	Last class; explanation of the final exam, discussion of students' examination papers	n/a
六、成績考核	Evaluation system: Team presentation: 15%; Quizzes: 20%; Midterm: 30%; Final exam: 35%.		
七、講義位址 http://	Powerpoints of all lectures will be posted on NTHU elearning site.		