

## The Hong Kong Polytechnic University

### Subject Description Form

Please read the notes at the end of the table carefully before completing the form.

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| <b>Subject Code</b>                                   | CHC1M49P   |
| <b>Subject Title</b>                                  | History of Scientific and Technological Interactions between China and the World<br>中外科技交流史  |
| <b>Credit Value</b>                                   | 3  |
| <b>Level</b>  | 1  |
| <b>Pre-requisite/<br/>Co-requisite/<br/>Exclusion</b> | Nil.   |
| <b>Objectives</b>                                     | <p>This subject aims to provide a general introduction to the history of science and civilization in China, focusing on the scientific exchanges between China and foreign countries in various social and cultural contexts. The central question of “Why did modern science not originate in China?” (The Needham Question) will be explored. Equipped with the historical knowledge of the development of Chinese science, this course will also help students to apply their critical and independent thinking to answer the related question of why the Scientific Revolution took place in Europe in a comparative way.</p> <p>The course will be divided into two parts, which will elaborate on the diversity of different cultures, emphasizing the essential role of mutual exchanges in the progress of human civilizations. The first part of the course will cover the global dissemination of major ancient Chinese technological inventions. In contrast, the second part will focus on the transmission of Indian, Islamic, and European sciences in China. Through analyzing primary source materials and secondary scholarly literature, students will understand the contributions of Chinese science and technology to world civilization. Additionally, they will develop a deep knowledge of the significant interactions between Chinese and Western civilizations since the Age of Discovery, particularly the introduction of Western science in China. The course also aims to equip students with fundamental ideas and research methodologies in the history of science.</p> |
| <b>Intended Learning Outcomes</b><br><i>(Note 1)</i>  | <p>Upon completion of the subject, students will be able to:</p> <p>(a) have a basic understanding of some important figures, historical events, and writings of the scientific exchanges between China and the world from ancient times to the fifteenth century.</p>   |

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|   | <ul style="list-style-type: none"> <li>(b) understand the scientific exchanges between China and Europe during the Ming and Qing dynasties from a global historical perspective.</li> <li>(c) reflect on the development of modern science in China and the Needham Question.</li> <li>(d) have a more comprehensive understanding of the leading scholars in the relevant fields, and their views on the history of scientific exchanges between China and the World.</li> <li>(e) read and analyse basic historical materials on the history of cross-cultural and scientific exchanges and apply the theories and methodologies in the study of the history of science.</li> <li>(f) fulfil Chinese reading and writing requirements.</li> </ul>   |
| <p><b>Subject Synopsis/<br/>Indicative Syllabus</b><br/><i>(Note 2)</i></p> | <ul style="list-style-type: none"> <li>(1) Introduction to the history of cross-cultural and scientific exchanges</li> <li>(2) “The Four Great Inventions” and their global influences</li> <li>(3) Scientific and technological exchanges along the Silk Road during the Tang dynasty</li> <li>(4) Scientific and technological exchanges between China and the Islamic World during the Song, Yuan and Ming dynasties</li> <li>(5) The Scientific Revolution and its meaning in global perspective</li> <li>(6) The Jesuits and the calendar reform in the late Ming Dynasty</li> <li>(7) The introduction of Western firearms and the military revolution during the Ming and Qing dynasties</li> <li>(8) Imperial power and science: the Kangxi Emperor and Western learning</li> <li>(9) The introduction of European medicine to the court</li> <li>(10) The divergence of modern science: court science during the Yongzheng and Qianlong periods</li> <li>(11) The spread of Chinese science and technology and European views of Chinese science</li> <li>(12) The introduction of Western science and technology and the modernization of science in the late Qing Dynasty</li> <li>(13) The “Needham question” and its implications</li> </ul> |
| <p><b>Teaching/Learning Methodology</b><br/><i>(Note 3)</i></p>             | <p>There will be two 50-minute lectures and one 50-minute tutorial each week. The lectures will provide a theoretical framework that covers key themes and concepts relevant to the course subject. They will also offer case studies and analyze different themes addressed in each session. Tutorials are designed to facilitate students’ in-depth discussions of the chosen topics from readings, enhance students’ public presentation and academic writing skills. Students are required to prepare class readings before joining tutorial discussion and presentation. At the beginning of the semester, students will select a topic concerning the exchanges of science between China and the world to study with and later deliver oral presentations in tutorials. Students are required to submit a written final essay developed from a self-selected topic and in accordance with the instructor’s suggestions.</p>   |

**Assessment Methods in Alignment with Intended Learning Outcomes**

(Note 4)

| Specific assessment methods/tasks | % weighting  | Intended subject learning outcomes to be assessed (Please tick as appropriate) |   |   |   |   |    |
|-----------------------------------|--|--|---|---|---|---|----|
|                                   |  | a  | b | c | d | e | f  |
| 1. mid-term quiz                  | 20%  | √  | √ | √ | √ | √ | CR |
| 2. oral presentation              | 30%  | √  | √ | √ | √ | √ | CR |
| 3. final essay                    | 50%<br>(10% graded by the CLC and 40% by the subject instructor) | √  | √ | √ | √ | √ | CW |
| <b>Total</b>                      | <b>100 %</b>   |  |   |   |   |   |    |

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

1. The mid-term quiz, comprising choice questions, are ideal forms to assess the students' understanding of the historical and conceptual knowledge about the history of scientific and technological exchanges between China and other countries. They will not only offer an effective way for the students to command the necessary knowledge and information learned from the lectures but also enable them to acquire a deeper understanding of the course content. Students are required to study the readings included in the Chinese required reading list.

2. Oral presentations can best assess the students' overall grasp of the knowledge and skills acquired from lectures and their own readings. It offers opportunities for students to raise questions, communicate their historical arguments to others, and interact with each other. It also lays foundation for students to undertake independent research. Students are required to study the readings included in the Chinese required reading list.

3. The final essay of 2000-3000 words, done in accordance with the instructor's comments and feedbacks, will best assess the students' grasp of the knowledge, concepts, ideas, and skills learnt from the subject and enhance their ability to articulate their research findings in written forms. Students must obtain a D or above on the Writing Requirement assignment to pass the subject.

**Student Study Effort Expected**

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| Class contact:              |         |
| ▪ lectures                  | 26 Hrs. |
| ▪ tutorials                 | 13 Hrs. |
| Other student study effort: |         |

|                                    |  |          |
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|                                    | <ul style="list-style-type: none"> <li>▪ Reading</li> </ul>  | 40 Hrs.  |
|                                    | <ul style="list-style-type: none"> <li>▪ Writing</li> </ul>  | 30 Hrs.  |
|                                    | <ul style="list-style-type: none"> <li>▪ Preparation for presentation and discussion</li> </ul>  | 12 Hrs.  |
|                                    | Total student study effort   | 121 Hrs. |
| <b>Reading List and References</b> | <p><b>Chinese required readings (total 230 pages):</b></p> <ol style="list-style-type: none"> <li>1. (英) 李約瑟: 《文明的滴定: 东西方的科学与社会》, 北京: 商務印書館, 2018, 页 44-110。英文版: <i>The Grand Titration: Science and Society in East and West</i>, London: Allen &amp; Unwin, 1969, pp.55-122.</li> <li>2. (英) 李約瑟: 《中國科學技術史》, 北京: 科學出版社, 2018, 页 153-259。</li> <li>3. (美) 艾爾曼: 《中國近代科學的文化史》 (<i>A Cultural History of Modern Science in China</i>), 上海: 上海古籍出版社, 2019, 页 15-35、93-126。</li> </ol> <p><b>Chinese supplementary readings:</b></p> <ol style="list-style-type: none"> <li>4. 《中國科學技術史》叢書, 北京: 科學出版社, 1998-。</li> <li>5. 李約瑟著, 柯林·羅南改編: 《中華科學文明史》(上下), 上海: 上海人民出版社, 2014。</li> <li>6. 魯桂珍, 李約瑟著: 《針灸: 歷史與理論》, 台北: 聯經出版事業公司, 1995。英文版: <i>Celestial Lancets: A History and Rationale of Acupuncture and Moxa</i>, Cambridge, UK: Cambridge University Press, 1980.</li> <li>7. 杜石然等: 《中國科學技術史稿》, 北京: 北京大學出版社, 2012。</li> <li>8. 方豪: 《中西交通史》(上下), 上海: 上海人民出版社, 2008, 2015。</li> <li>9. 潘吉星: 《中外科學之交流》, 香港: 香港中文大學出版社, 1993。</li> <li>10. 潘吉星: 《中國古代四大發明: 源流、外傳與世界影響》, 合肥: 中國科學技術大學出版社, 2002。</li> <li>11. 潘吉星: 《中外科學技術交流史論》, 北京: 中國社會科學出版社, 2012。</li> <li>12. 鈕衛星: 《唐代域外天文學》, 上海: 上海交通大學出版社, 2019。</li> <li>13. (美) 孟德衛: 《1500-1800: 中西方的偉大相遇》, 北京: 新星出版社, 2007。英文版(第4版)</li> <li>14. (美) 艾爾曼: 《科學在中國(1550-1900)》 (<i>On Their Own Terms: Science in China, 1550-1900</i>), 北京: 中國人民大學出版社, 2016。</li> <li>15. 范行准: 《明季西洋傳入之醫學》, 上海: 上海人民出版社, 2012。</li> <li>16. 樊洪業: 《耶穌會士與中國科學》, 北京: 中國人民大學出版社, 1992。</li> <li>17. 韓琦: 《通天之學: 耶穌會士和天文學在中國的傳播》, 北京: 三聯書店, 2018。</li> <li>18. 韓琦: 《中國科學技術的西傳及其影響(1582-1793)》, 河北人民出版社, 1999。</li> </ol> |          |

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|  | <p>19. 李伯重：《火槍與賬簿：早期經濟全球化時代的中國與東亞世界》，北京：三聯書店，2017。</p> <p>20. (美)歐陽泰：《從丹藥到槍炮：世界史上的中國軍事格局》，北京：中信出版集團，2019。</p> <p>21. 黃一農：《社會天文學史十講》，上海：復旦大學出版社，2004。</p> <p>22. 黃一農：《紅夷大炮與明清戰爭》，成都：四川人民出版社，2022。</p> <p>23. 周維強：《佛郎機銃在中國》，北京：社會科學文獻出版社，2013。</p> <p>24. 劉大椿：《西學東漸》，北京：中國人民大學出版社，2018。</p> <p>25. 劉大椿：《師夷長技》，北京：中國人民大學出版社，2019。</p> <p>26. 熊月之：《西學東漸與晚清社會》，上海：上海人民出版社，1995。</p> <p>27. 范發迪：《知識帝國：清代在華的英國博物學家》，北京：中國人民大學出版社，2018。英文版：<i>British Naturalists in Qing China: Science, Empire, and Cultural Encounter</i>, Cambridge, Mass.; Harvard University Press, 2009.</p> <p>28. (美)克羅斯比：《哥倫布大交換：1492年以後的生物影響和文化衝擊》，北京：中信出版集團，2018。</p> <p>29. (美)柯浩德(Harold J. Cook)：《交換之物：大航海時代的商業與科學革命》，北京：中信出版集團，2022。</p> <p><b>English supplementary readings:</b></p> <p>30. Sivin, Nathan. "Why the Scientific Revolution Did Not Take Place in China—or Didn't It?" <i>Chinese Science</i> 5 (1982), pp.45–66.</p> <p>31. Hashimoto, Keizo. <i>Hsü Kuang-ch'i and Astronomical Reform—The Process of the Chinese Acceptance of Western Astronomy 1629-1635</i>. Osaka: Kansai University Press, 1988.</p> <p>32. Needham, Joseph. <i>Science and Civilisation in China</i>. Cambridge, UK: Cambridge University Press, 1954.</p> |
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Note 1: Intended Learning Outcomes

Intended learning outcomes should state what students should be able to do or attain upon subject completion. Subject outcomes are expected to contribute to the attainment of the overall programme outcomes.

Note 2: Subject Synopsis/Indicative Syllabus

The syllabus should adequately address the intended learning outcomes. At the same time, overcrowding of the syllabus should be avoided.

Note 3: Teaching/Learning Methodology

This section should include a brief description of the teaching and learning methods to be employed to facilitate learning, and a justification of how the methods are aligned with the intended learning outcomes of the subject.

Note 4: Assessment Method

This section should include the assessment method(s) to be used and its relative weighting, and indicate which of the subject intended learning outcomes that each method is intended to assess. It should also provide a brief explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes.