Introduction to Astronomy GSS001-D04

Two things fill the mind with ever-increasing wonder and awe, the more often and the more intensely the mind of thought is drawn to them: the **starry heavens above me** *and the moral law within me. By Immanuel Kant*

有二事焉,恒然于心；敬之畏之,日省日甚：外乎者如璀璨星穹,内在者犹道德律令. 钱坤强译

Date & Time: Thursday 19:00–21:50, 2022/02/17–2022/04/21
Classroom: N213
Total Credit Hours: 30

Instructor: Min Ding,
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Office A506a
Phone (853)6555-8375

Grading: 20% Attendance + 10% Involvement + 70% Term Project

Github Classroom: https://github.com/MinaDing/IntroAstronomy/

Wechat Group QR Code: To be announced in the first class.

Intended Learning Outcomes

This course is to provide basic knowledge in astronomy and to introduce scientific thinking method. At the end of this course, you will be able to:
1. Describe the scope of astronomy and astrophysics.
2. Explain how the scientific reasoning and quantification methods are applied in astronomy.
3. Tell the difference between science and fantasy in science fiction.
4. Present an argument and support it with evidence, proof, and/or examples.

Course Schedule

Class	Date	Topics	Contents
1	2/17	Welcome to the Universe!	Introduction to This Course Astronomical Objects Distance and Time Scales History View of Astronomy
2	2/24	Inner Solar System	Solar System Structure Terrestrial Planets Tour to Mars Planetary Gravimetry
3	3/3	Outer Solar System	Outer Solar System Objects Solar System Evolution Impact Cratering
4	3/10	Sci-Fi: Science and Fantasy Impact Cratering	Science Fiction Science Fact and Scientific Reasoning
5	3/17	We Are Stardust	The Sun HR Diagram Stellar Evolution
6	3/24	Galaxy Stargazing	Milky Way and Galaxy Stellarium
7	3/31	Einstein's Universe	Our Universe and Its Evolution Relativity and Time Traveling Quantum Mechanics String Theory Gravitational Waves
8	4/7	Search for life	Astrobiology
9	4/14	Final Presentations	
10	4/21	Final Presentations	
	TBD	Stargazing Activity	

References:

Textbook/Reference Books：

- **[KEY] Welcome to the universe，Neil Tyson et al.** 中文版：概念天文学
- Astronomy Today, Eric Chaisson and Steve McMillan
- Fundamental Astronomy - Hannu Kartunen, Pekka Kroger
- Schaum's Outline on Astronomy - Stacey Palen
- An Introduction to Modern Astrophysics - Bradley Caroll, Dale Oslie
- Astrophysical Concepts - Martin Harwit
- Astronomy Principles and Practice - A. E. Roy, D. Clarke
- An Introduction To Astronomy And Astrophysics - B. Basu
- An Introduction to the Study of Stellar Structure - S. Chandrasekhar
- 天文学教程，胡中为和孙扬
- 大学天文学，孙锦龙
- 大众天文学，C.弗拉马里翁
- 夜观星空(天文观测实践指南)，特伦斯·迪金森等
- 古代天文立法讲座，张闻玉
- Atlas of the Messier Objects, Ronald Stoyan

Online Courses/Notes:

- **[KEY] Astronomy: Exploring Time and Space, Chris Impey , U of Arizona, https://www.coursera.org/learn/astro**
- Astronomy 101: https://astronomy.com/videos/astronomy-101
- Astronomy Notes: http://www.astronomynotes.com/
- Astronomy: https://openstax.org/details/books/astronomy?Instructor%20resourc
- 天文学导论，http://coursehome.zhihuishu.com/courseHome/2063883#teachTeam

Documentary:

- Horizon, BBC,
- Wonders of the Universe, BBC, 2011
- The Story of Science: Power, Proof, and Passion, BBC, 2010
- The Universe, Flight 33 Productions, 2007–2015
- Our Universe 3D, 2013

Sci-Fi:

- Science Fiction Library: http://www.sfcenter.ku.edu/sflib.htm?dt_platform=wechat_friends&dt_dapp=1
- 剑桥物理博士的科幻之旅：重新审视宇宙中的我们，苗千，知乎

Online Projects:

- https://mars.nasa.gov/msip/

观星软件：

- Stellarium，Star Walk