
SYLLABUS for course ASTB03 (online synchronous), Fall 2021

Title: Great Moments in Astronomy

Lecturer: Prof. Pawel Artymowicz

location and time : Mon 7-9pm on zoom, login via Quercus.

Calendar and planned topics of lectures (L1-L24), assignments (1-4),
exams (midterm, final). Deadline time for submission of assignment to
Quercus/Assignments is the start of the lecture on a given date.

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13 Sep L1-2:

Organization of the course. A brief tour of the Universe.

Ancient discoveries of sky cycles and planets.

20 Sep L3-4:

Greek materialists and the beginning of Physics and Astronomy:

Plurality and diversity of worlds predicted by Leukippos, Democritos.

Pythagoras, Plato, vs. Aristotle.

27 Sep L5-6:

Hellenistic science: Archimedes. Antikythera Mechanism or

how the first computers were astronomical.

Ptolemy's Almagest - exposition of geocentric model

Mikołaj Kopernik: Scientific revolution begins

4 Oct L7-8: (*** 1st written assignment due ***)

Mikołaj Kopernik: Scientific revolution begins

Tycho Brahe and the greatest pre-telescopic discoveries

Johannes Kepler: a mystic finds the laws of orbital motion

/Mo 11 Oct = Thanksgiving, no meeting/

18 Oct L9-10:

Gallileo Gallilei: great telescopic observer, dubious science martyr.

R. Hooke, E. Halley, and I. Newton: rivalry and collaboration,

the greatest book in the history of science

25 Oct L11-12: (*** 2nd written assignment due ***)

Astrophysics emerges. Spectroscopy does the impossible.

How were Uranus and Neptune discovered?

1 Nov L13-14: (### L13 is an in-class midterm 19:00-20:00 ###)

The 19th cent. instrumentation race before the state funding era:

F.W. Herschel, W. Parsons, J. Lick; G.E. Hale

8 Nov L15-16:

The 1920 Great Debate: the different universes of Curtis

and Shapley. Edwin Hubble and the world of galaxies.

19th century women find a meter stick to measure the universe.

15 Nov L17-18: (*** 3rd written assignment due ***)

Einstein and Eddington: 20th century interplay of physics and astronomy

Does gravity bend the light? What makes the sun(s) shine?

The long-standing puzzle of missing neutrinos and its solution

in a lab 2100 m underground in Sudbury, ON.

22 Nov L19-20: [deadline to drop courses w/o academic penalty]

Friedmann, Lemaitre, Hubble, and the cosmology of expanding universe.

Invention of black holes.

Chandra's voyage on a steamship: White dwarfs and black holes.

Pulsars: Discovery and physics.

29 Nov L21-22: (*** 4th written assignment due ***)

Low-mass black holes as endpoints of stellar evolution.

Hubble Space Telescope and the supermassive black holes.

The dark dominance: dark matter, dark energy in modern cosmology

Prediction and discovery of gravitational waves.

6 Dec L23-24:

Habitable and inhabitable: space observatories and the exploration of the solar and extrasolar planets.

A. Wolszczan, M. Mayor, G. Marcy. Voyagers, Galileo probe, Kepler Space telescope.

Current theoretical understanding of planetary systems.

SETI (search for extraterrestrial intelligence).

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?? Dec FINAL EXAM, online, 2.5 hr duration
