



Ultimate Question of Life, the Universe and Everything: Module 2: History
of Astronomy
Educational subject description sheet

Basic information

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|--|--|-------------------------------------|
| Field of study AGH UST International Courses | Didactic cycle 2022/2023 | |
| Speciality All | Subject code POGJOS.A1000000.624eda72b6e21.22 | |
| Department Generic subjects | Lecture languages English | |
| Study level any level | Mandatory Elective | |
| Study form Full-time studies | Block General Modules | |
| Education profile General academic | Subject related to scientific research No | |
| | USOS code 140-INT-xS-221 | |
| Subject coordinator | Justyna Topolska | |
| Lecturer | Justyna Topolska | |
| Period Winter semester | Examination Assessment | Number of ECTS points 3.0 |
| | Activities and hours Lecture: 24, Project classes: 6 | |

Goals

| | |
|----|--|
| C1 | The main aim of this course is to provide a long-term understanding of astronomical theoretical questioning in order to gather a working knowledge of History of Astronomy and to gain perspective on contemporary issues. |
| C2 | 19/03/-721 is the oldest Babylonian observation preserved within Ptolemy's Almagest and 18/11/1915 is the date of Einstein's presentation of his computation of Mercury's perihelion, in between there is a continuity of recording observational data, making accurate instruments and elaborating predictive models. This course aims to put the student in the role of first rank astronomers of various periods and countries, trying to do the best they can to go one step further, as astronomers of our time still do. |

Subject learning outcomes

| Code | Outcomes in terms of | Directional learning outcomes | Examination methods |
|---|--|-------------------------------|---------------------|
| Knowledge - Student knows and understands: | | | |
| W1 | Concrete knowledge: • factual: astronomical terminology, astronomical grids, calendar issues • conceptual: historical periodization, epistemes and paradigms • procedural: using tables to compute planetary positions and celestial phenomena • metacognitive: elaborating a model from scratch | | Test |
| Skills - Student can: | | | |
| U1 | Cognitive Process Dimension: • Remember: timeline and geographic situation • understand: find a set of parameters and design experiments to determine their value • apply: incorporate data in a model in order to produce a result • analyse: explore the coherence of a set of results • evaluate: compare the computed results to observational data, discuss the reliability of the model • create: hypothesizing alternative models | | Project |
| Social competences - Student is ready to: | | | |
| K1 | Student can provide the speaker with the constructive critic | | Project |

Programme content that ensure achieving learning outcomes for the module

19/03/-721 is the oldest Babylonian observation preserved within Ptolemy's Almagest and 18/11/1915 is the date of Einstein's presentation of his computation of Mercury's perihelion, in between there is a continuity of recording observational data, making accurate instruments and elaborating predictive models. This course aims to put the student in the role of first rank astronomers of various periods and countries, trying to do the best they can to go one step further, as astronomers of our time still do.

Calculation of ECTS points

| Activity form | Average amount of hours* needed to complete each activity form |
|-----------------|--|
| Lecture | 24 |
| Project classes | 6 |

| | |
|---|--------------------|
| Preparation of project, presentation, essay, report | 50 |
| Student workload | Hours 80 |
| Workload involving teacher | Hours 30 |

* hour means 45 minutes

Study content

| No. | Course content | Subject learning outcomes | Activities |
|-----|----------------|---------------------------|------------|
|-----|----------------|---------------------------|------------|

| | | | |
|----|---|------------|--------------------------|
| 1. | <p>Opening lecture : what if you had never seen the blue planet and you are looking at the sky?</p> <ul style="list-style-type: none"> · How to get data using stellarium? · Presentation of a list of projects (some are courses to create on a specified topic, others are results to obtain using specific theoretical tools) · Presentation of the bibliography and of the digital resources · first stage: Babylonian records and calendar issues <p>6 lectures:</p> <ol style="list-style-type: none"> 1) Babylonian A and B systems; Hipparcus stars catalogue (instrumental point of view) 2-3) Ptolemy's Great Mathematical Syntaxis (theoretical and practical approaches) 4) Al-Battani, Al-Biruni, Ibn al-Haytham, Ibn al-Shatir : a step by step rupture I 5) Copernic, Brahe, Galileo, Kepler : a step by step rupture II 6) Calculus! 7) three bodies, one big issue <p>Closing lecture : Perihelion precession of Mercury, a long-term perspective</p> <p>3 short programs associated with the course:</p> <ol style="list-style-type: none"> 1) Calendar issues 2) Instruments (gnomon, armillary sphere, astrolabe and another one that has never been constructed) (in collaboration with AGH?) 3) Observatory across time. Observatory in astronomy and laboratory in collaboration with AGH? <p>Student projects: group work and full sessions (student teaching and presentation of projects results, research papers analysis...)</p> | W1, U1, K1 | Lecture, Project classes |
|----|---|------------|--------------------------|

Course advanced

Teaching methods:

Socratic questioning, Oxford debate, Case study, E-learning, Project, Discussion, Lectures

| Activities | Examination methods | Credit conditions |
|-----------------|---------------------|-------------------|
| Lecture | Test | >51% |
| Project classes | Project | >51% |

Additional info

Examination:

- Project (approximately one third); (cross-examination with AGH module 1 leader)
- computational practice (approximately one third);
- test on history of astronomy and epistemology (approximately one third)

Requirements and method of completing particular forms of classes

One extra class will to to repass all fails.

Method of calculating the final grade

33% -test, 33% project, 33%computational practice

Method and procedure for compensating for missed coursework resulting from student absence from classes

Self-studying

Entry requirements

- Students with scientific background or engineering profiles
- English level B2

Ideally, students should follow Module 1 before Module 2 but both courses can be followed independently by students from both universities.

Attendance requirements for particular classes, with indication whether student attendance is compulsory

Obligatory, 1 lecture can be missed

Literature

Obligatory

1. The Hitchhiker's Guide to the Galaxy, Douglas Adams