

COURSE DETAIL

COSMOLOGY

Country

Netherlands

Host Institution

Utrecht University

Program(s)

Utrecht University

UCEAP Course Level

Upper Division

UCEAP Subject Area(s)

Physics

UCEAP Course Number

140

UCEAP Course Suffix**UCEAP Official Title**

COSMOLOGY

UCEAP Transcript Title

COSMOLOGY

UCEAP Quarter Units

6.00

UCEAP Semester Units

4.00

Course Description

The course is divided in two parts. The first part of the course starts with a historical introduction to the building of the cosmological model. It is followed by the introduction of key concepts in Einstein's theory of relativity, which then allows for the introduction of the Friedman-Lemaitre- Robertson-Walker cosmological model for an expanding universe. Several observational probes of cosmology are introduced, such as the cosmic microwave background, supernovae and the large-scale structure. From these, the presence and nature of dark energy and dark matter are examined. The course concludes the first part with a description of the earliest moments of the Universe and the building of a complete timeline for its history. The second part of the course focuses on extragalactic astrophysics. The goal is to overcome the assumption of galaxies as single points and understand the origin of their diversity. This diversity presents some structure, which is quantified in so-called "scaling relations" for different galaxy types. How they connect to the supermassive black holes at the centers of galaxies are discussed. Finally, the course looks into the stellar population composition of galaxies and some of the key evolutionary processes and understand how they lead to observed colors and estimates of galactic distances. Assumed previous knowledge includes NS-106B, NS-108B, NS-112B, NS-120B, NS-121B, NS-220B, and Python or other programming language knowledge (e.g. NS-109B). NS- 251B and NS-268B are recommended.

Language(s) of Instruction

English

Host Institution Course Number

NS-378B

Host Institution Course Title

COSMOLOGY

Host Institution Course Details

<https://osiris-student.uu.nl/onderwijscatalogus/extern/cursus>

Host Institution Campus

Utrecht University

Host Institution Faculty

Faculty of Science

Host Institution Degree**Host Institution Department****Course Last Reviewed**

2025-2026

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