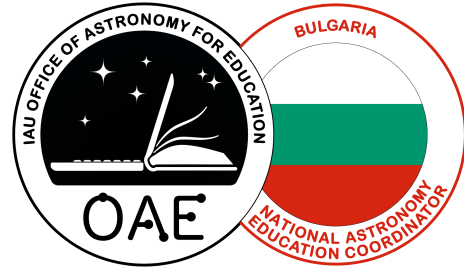


# Astronomy Education in Bulgaria



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This overview is part of the project "Astronomy Education Worldwide" of the International Astronomical Union's Office of Astronomy for Education.

More information: <https://astro4edu.org/worldwide>

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**Structure of education:** For students in Bulgaria school lasts 12 years, divided in three levels: primary school (years 1-4), middle school (years 5-7) and high school (years 8-12), with students usually starting at age 7 and graduating at 19. According to changes introduced in 2019 high school was formally divided into two sublevels: years 8-10 and 11-12 with the latter including specialized subjects. Education is compulsory until the age of 16.

**Education facilities:** Public schools are currently dominant in numbers, with private schools on the rise. Typical class sizes range from 20 to 30. The state of school buildings may vary, but running water is obligatory by healthcare protocols and there usually is internet access, albeit in certain classrooms, usually where IT classes are being held.

**Governance and organisation:** The educational processes are generally overseen by the Ministry of Education and Science. A committee within the Ministry sets the curriculum for the entire country for any given school subject.

**Teacher Training:** Teachers need to have obtained a university diploma – they could have majors in Pedagogy or subject majors (e.g. Physics). In the latter case an additional module to the BSc in Pedagogy/Education or an equivalent MSc is necessary for teaching in a public school. Once on the job teachers undergo additional training usually comprised of separate short (~2 day) courses, valid for qualification credit. These courses may be organized by a list of licensed firms and by scientific institutions.

**Astronomy in the curriculum:** Astronomy appears sporadically in the school curriculum, mainly in the subjects called "Human and Nature" (until 6th grade) and "Physics and Astronomy" (starting from 7th grade). The following topics are included in the general (non-specialized) program:

Human and Nature, 4th grade (entirely qualitative):

- Difference between a planet, a satellite and a star
- Names of the Solar System planets

Human and Nature, 5th grade (entirely qualitative):

- Motion of planets (circular approximation), the two types of planets in the Solar system
- Lunar phases
- Seasons
- Recognizing Polaris and some famous constellations (Ursa Major, Orion, Cassiopeia, dependent on the textbook used)

- The concept of multiple galaxies in the universe with the Sun being part of the Milky Way
- Examples of space missions

Physics and Astronomy, 7th grade:

- Parameters of the planets in the Solar system, types of planets, minor planets: main belt asteroids, TNOs and comets
- Types of galaxies, basic cosmology (expansion of the Universe)

Physics and Astronomy, 10th grade:

- Connection between physics of the microcosmos and astrophysics: thermonuclear fusion in stars
- Luminosity of a star (the Stefan-Boltzmann law)
- Hertzsprung-Russell diagram and basic concepts in stellar evolution
- Compact objects (WD, NS, BH)
- The Hubble law, the existence of CMB

**Astronomy education outside the classroom:** The formal education in Astronomy in Bulgaria is complemented with many extracurricular activities. Main organizations in this regard are the local astronomical observatories (formally branded as Centers for personal development), some of which have planetariums, and the astronomical clubs. These centers organize school groups and/or public lectures. There are approximately 10 such centers in major cities, including Varna, Stara Zagora, Dimitrovgrad, Haskovo, Yambol, Silistra, Gabrovo and Smolyan, where the biggest planetarium is located. The local observatories, like the Astronomical Observatory at the University of Sofia, are public and educational facilities that provide Open Doors Days and popular science lectures. In the last years the weekly Workshop in Astronomy, organized by the Dept. of Astronomy at the Faculty of Physics at the University of Sofia, has more than 35 events per year with 100-300 regular attendees on each lecture. The history of the Workshop of Astronomy dates back more than a century ago.

On professional scientific level, Bulgaria has a number of professional observatories. The largest professional observatory in Bulgaria is the National Astronomical Observatory Rozhen at the Institute of Astronomy, Bulgarian Academy of Sciences. NAO Rozhen is an important regional center on the Balkans in terms of instrumentation and is equipped with a 2m telescope and several smaller telescopes. The Institute of Astronomy also operates the Belogradchik Observatory. In addition to the Astronomical Observatory in Sofia, the University of Sofia has a professional observatory, SAO Plana, dedicated to research and students' training. The University of Shumen also operates its own professional one. The access to observational facilities and world class education and scientists, makes the decision to study Astronomy in Bulgaria a popular choice among potential students.

Astronomers in Bulgaria also work on a regular level with high-school students. The National Astronomy Olympiad (since 1998), organized with the support of the Ministry of Education and Science, serves as a useful tool for selecting students, highly motivated to study Astronomy and giving them more advanced education in Astronomy during the preparatory summer camp for the International Astronomy Olympiad. A 12-person committee comprising of astronomers at the Institute of Astronomy at the Bulgarian Academy of Sciences, the University of Sofia, and educators at schools and local observatories, creates and grades the Olympiad problems. A total of 100 students (7th -12th grade) are qualified for the national round and 18 students are qualified for the summer camp, where 5 students are selected for the national team.

The Varna Astronomical Observatory and Planetarium hosts the annual National Youth Astronomical Conference, where school students are given the opportunity to present their own observations and research projects. School students have also participated with their original research projects in competitions such as Catch a Star, Odysseus and Young Talents, which is the national qualification round for the European Contest for Young Scientists.

A main event for education in observational astronomy is the Beli Brezi Summer School in Astronomy and Astrophysics, annually attended by 60-70 high school students, university students and professional astronomers. The Beli Brezi School takes place annually in the Eastern Rhodope Mountains near Kardzhali since 1970. Similar schools and camps are organized by some local observatories and schools. Some of these are held at the Rozhen Observatory, some – on different observational sites across the country.

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**The International Astronomical Union's National Astronomy Education Coordinator (NAEC)**

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