

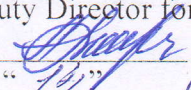
MINISTRY OF EDUCATION AND SCIENCE OF THE KYRGYZ REPUBLIC

NARYN STATE UNIVERSITY
named after S.NAAMATOV

College "Foreign Languages and Computer Systems Programming"

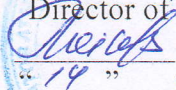
AGREED

Deputy Director for Academic Affairs

 Chorobek kyzy A.
"14" 01 2025

APPROVED BY

Director of "CFL and CSP"

 B.M. Osmonova
"14" 01 2025

WORKING PROGRAM OF THE DISCIPLINE

ASTRONOMY

name of the discipline (module)

Specialty: 050303 "Foreign Language", 230111- Computer Systems Programming

Qualification: Technician programmer, foreign language teacher

Form of study: full-time

Naryn – 2025

Working program of the discipline " _____ " compiled in accordance with the requirements of the state SPE in the specialty _____ approved by the Order of the Ministry of Education and Science of the Kyrgyz Republic No. 863/1 dated May 10, 2022.

Work program with the following parameters:

Technical cycle teacher Asan uulu Askat

Reviewed and approved at the OT technical cycle meeting "10" 01 2025 city, protocol № 3

Cycle Manager

Turdubek kyzy Munara

Reviewed and approved by the Educational and Methodological Council of the college from "14" 01 2025 city, protocol no. 3

Chairman of the UMS

Chorobek kyzy Aizat

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1. EXPLANATORY NOTE

The work program was developed on the basis of the sample program of the general educational discipline " Astronomy " for professional educational organizations.

The working program of the general educational discipline " Astronomy " is intended for the study of physics in professional educational organizations of secondary vocational education, implementing the educational program of secondary general education within the framework of mastering the basic professional educational program of secondary vocational education (OPEP SPO) on the basis of basic general education in the training of skilled workers, employees and mid-level specialists.

General complexity of the discipline

Cycle	Semester	Labor intensity (credit)	Total (hours)	Volume of classroom work (hours)			SRS	Certification form
				aud .	practice .	lab.		
	2	2	48	20			28	credit

The program was developed in accordance with the State Educational Standards of Secondary Vocational Education, the OOP and the curriculum of the specialty 230111 - Computer Systems Programming.

2. General characteristics of the academic discipline " Astronomy

The academic discipline " Astronomy" is based on the aim of developing in students a system of basic concepts of physics and ideas about the modern physical picture of the world, as well as developing the ability to apply physical knowledge both in professional activities and for solving life problems.

Many provisions developed by physics are considered as the basis for the creation and use of information and communication technologies (ICT) - one of the most significant technological achievements of modern civilization.

Astronomy provides the key to understanding numerous phenomena and processes of the surrounding world (in the natural sciences, sociology, economics, language, literature, etc.). Physics forms many types of activities that have a meta-subject nature. These primarily include modeling of objects and processes, application of basic methods of cognition, system-information analysis, formulation of hypotheses, analysis and synthesis, comparison, generalization, systematization, identification of cause-and-effect relationships, search for analogs, control of objects and processes. It is this discipline that allows students to become familiar with scientific methods of cognition, teach them to distinguish hypothesis from theory, theory from experiment.

Astronomy has a very large and ever-increasing number of interdisciplinary connections, both at the level of conceptual apparatus and at the level of instruments. This allows us to consider physics as a metadisciplinary framework that provides an interdisciplinary language for describing the scientific picture of the world.

Possessing logical coherence and relying on experimental facts, the academic discipline " Astronomy" forms a truly scientific worldview in students. Astronomy is the basis of the teaching about the material world and solves the problems of this world.

The study of the general educational discipline "Astronomy" is completed by summing up the results in the form of a differentiated test or exam as part of the midterm assessment of students in the process of mastering the OOP SPO with the receipt of secondary general education (PPKRS, PPSSZ).

3. PLACE OF THE DISCIPLINE IN THE STRUCTURE OF THE BASIC EDUCATIONAL PROGRAM

The discipline "Astronomy" is part of the subject area "Natural Sciences" of the Federal State Educational Standard of Secondary General Education and is studied in the general education cycle of the curriculum of the Basic Educational Standard of Secondary Vocational Education on the basis of basic general education with the receipt of secondary general education.

In the curricula and training programs for mid-level specialists, the academic discipline "Astronomy" is included in the general educational disciplines that are mandatory for mastering regardless of the profile of professional education, the profession or specialty obtained.

4. LIST OF PLANNED LEARNING OUTCOMES IN THE DISCIPLINE, CORRESPONDING WITH THE PLANNED OUTCOMES OF MASTERING THE EDUCATIONAL PROGRAM

Mastering the content of the academic discipline "Astronomy" ensures that students achieve the following results:

- personal:
 - the formation of a scientific worldview that corresponds to the modern level of development of astronomical science;
 - a strong interest in the history and achievements in the field of astronomy;
 - the ability to analyze the consequences of space exploration for human life and activity;
- meta-subject :
 - the ability to use such mental operations as setting a problem, formulating hypotheses, analysis and synthesis, comparison, generalization, systematization, identifying cause-and-effect relationships, searching for analogs, formulating conclusions for studying various aspects of astronomical phenomena and processes that need to be encountered in the professional sphere when completing practical assignments in astronomy;
 - possession of cognitive skills, skills for solving problems that arise when completing practical assignments in astronomy;
 - the ability to use various sources on astronomy to obtain reliable scientific information, the ability to assess its reliability;
 - proficiency in language: the ability to clearly, logically and accurately express one's point of view on various issues of astronomy, to use language tools that are adequate to the astronomical problem being discussed, including composing text and presenting materials using information and communication technologies;
- subject:
 - the formation of ideas about the structure of the Solar System, the evolution of stars and the Universe, the spatio-temporal scales of the Universe;
 - understanding the essence of phenomena observed in the Universe;
 - knowledge of fundamental astronomical concepts, theories, laws and regularities, confident use of astronomical terminology and symbols;
 - the formation of ideas about the importance of astronomy in human practical activities and further scientific and technological development;
 - awareness of the role of domestic science in the exploration and use of outer space and the development of international cooperation in this area.

5. STRUCTURE AND CONTENT OF THE DISCIPLINE

5.1. Structure of the academic discipline

- Volume of academic discipline and types of academic work

Type of academic work	Volume of hours
Maximum teaching load (total)	48
Compulsory classroom teaching load (total),	20
of which practical work	0
Independent work of the student (total)	28
<i>Interim assessment in the form of differentiated credit</i>	

5.2. Contents of sections of the academic discipline

The subject plan, reflecting the content of the discipline (list of sections and topics), structured by types of classes with an indication of their volumes in accordance with the curriculum, is given in the table :

Subject plan and content of the discipline 2nd semester

Calendar-thematic plan and content of the discipline Astronomy

Name sections and topics	Contents of educational material, laboratory and practical work, independent work	Volume of hours	Forms and methods of studying the discipline	Forms and methods of monitoring and assessing learning outcomes
Introduction Astronomy, its importance and connection with other sciences (2 hours)	Astronomy, its connection with other sciences. The role of astronomy in the development of civilization. The structure and scale of the Universe. Features of astronomical research methods. Ground and space telescopes, the principle of their operation. All-wave astronomy: electromagnetic radiation as a source of information about celestial bodies. Practical application of astronomical research. History of the development of domestic cosmonautics. The first artificial Earth satellite, the flight of Yuri Gagarin. Achievements of modern cosmonautics	2	Lecture-conversation	To become familiar with the subject of astronomy. To determine the role of astronomy in the formation of the modern picture of the world and in the practical activities of people. To determine the importance of astronomy in mastering professions and specialties of secondary vocational education
Chapter 1. History of the development of astronomy (6 hours)				
<i>Astronomy in Antiquity (Aristotle, Hipparchus of Nicaea and Ptolemy)</i>	Aristotle's astronomy as "the most physical of the mathematical sciences." Aristotle's cosmology. Hipparchus of Nicaea: the first mathematical theories of the apparent motion of the Sun and Moon and theories of eclipses. Ptolemy (astronomy as the "mathematical study of the sky"). Creation of the first universal mathematical model of the world based on the principle of geocentrism.	1	Lecture-conversation	To become familiar with various theories of the origin of the solar system. To determine the importance of knowledge about the origin of the solar system for mastering professions and specialties of secondary vocational education

<i>Starry sky (changes in the types of starry sky during the day, year)</i>	Starry sky (changes in the types of starry sky during the day, year).	1	Lecture-conversation	To become familiar with the concepts of “planetary configuration”, “synodic period”, “sidereal period”, “planetary configurations and conditions of their visibility”. Learn to perform calculations to determine the synodic and sidereal (stellar) periods of planetary revolution. To determine the importance of knowledge about the configuration of planets for mastering professions and specialties of secondary vocational education
<i>Chronology and its accuracy (solar and lunar, Julian and Gregorian calendars, projects of new calendars)</i>	Chronology and its accuracy (solar and lunar, Julian and Gregorian calendars, projects of new calendars).	1	Lecture-conversation	Get to know the Earth-Moon system (double planet). Determine the significance of lunar exploration by spacecraft. Determine the significance of manned space expeditions to the Moon. Determine the importance of knowledge about the Earth-Moon system for mastering professions and specialties of secondary vocational education

<i>Optical astronomy (civilizational request, telescopes)</i>	Optical astronomy (civilizational request, telescopes: types, characteristics, purpose).	1	Lecture- conversation	To become familiar with the physical nature of the Moon, the structure of the lunar surface, and the physical conditions on the Moon. To determine the importance of knowledge about the nature of the Moon for the development of human civilization. To determine the importance of knowledge about the nature of the Moon for mastering professions and specialties of secondary vocational education
<i>Study of near-Earth space (history of Soviet cosmonautics, modern methods of studying near space)</i>	Study of near-Earth space (history of Soviet cosmonautics, modern methods of studying near space).	1	Lecture- conversation	To become familiar with the terrestrial planets. To determine the importance of knowledge about the terrestrial planets for the development of human civilization. To determine the importance of knowledge about the terrestrial planets for mastering professions and specialties of secondary vocational education
<i>Deep space astronomy (wave astronomy, ground-based and</i>	Deep space astronomy (wave astronomy, ground-based and orbital telescopes, modern methods of deep space study).	1	Lecture- conversation	Get to know the giant planets.

<i>orbital telescopes, modern methods of deep space studies)</i>					To determine the importance of knowledge about giant planets for the development of human civilization. To determine the importance of knowledge about giant planets for mastering professions and specialties of secondary vocational education
Chapter 2. The structure of the solar system (6 hours)					
<i>Origin of the Solar System</i>			1	Lecture-conversation	To become familiar with various theories of the origin of the solar system.
<i>Apparent motion of planets (apparent motion and configurations of planets)</i>			1	Lecture-conversation	To determine the importance of knowledge about the origin of the solar system for mastering professions and specialties of secondary vocational education
<i>Earth-Moon system</i>			1	Lecture-conversation	To become familiar with the concepts of "planetary configuration", "synodic period", "sidereal period", "planetary configurations and conditions of their visibility".
<i>Nature of the Moon</i>			1	Lecture-conversation	Learn to perform calculations to determine the synodic and sidereal (stellar) periods of planetary revolution.

<i>Terrestrial planets</i>	General characteristics of the terrestrial planets. Mercury. Venus. Mars.	1	Lecture-conversation	To determine the importance of knowledge about the configuration of planets for mastering professions and specialties of secondary vocational education Get to know the Earth-Moon system (double planet).
<i>Giant planets</i>	General characteristics of the giant planets. Jupiter. Uranus and Neptune.	1	Lecture-conversation	
Chapter 3. Structure and evolution of the Universe (6 hours)				
<i>Distance to the stars</i>	Distance to stars (determination of distances by annual parallaxes, visible and absolute stellar magnitudes). Spatial velocities of stars (proper motions and tangential velocities of stars, Doppler effect and determination of radial velocities of stars).	1	Lecture-conversation	To study methods for determining distances to stars.
<i>Physical nature of stars</i>	Physical nature of stars (color, temperature, spectra and chemical composition, luminosities, radii, masses, average densities). Relationship between physical characteristics of stars (spectrum-luminosity diagram, mass-luminosity ratio, rotation of stars of different spectral classes).	1	Lecture-conversation	Determine the importance of knowledge about determining distances to stars for studying the Universe.
<i>Types of stars</i>	Binary stars (optical and physical binary stars, stars of certain masses from observations of binary stars, invisible companions of stars).	1	Lecture-conversation	Determine the importance of knowledge about determining distances to stars for mastering professions and specialties of secondary vocational education
<i>Star systems. Exoplanets</i>	Discovery of exoplanets - planets moving around stars. Physical variables, novae and supernovae (Cepheids, other physical variables, novae and supernovae).	1	Lecture-conversation	To become acquainted with the physical nature of stars.
<i>Our Galaxy - Milky Way (galactic year</i>	Our Galaxy (composition - stars and star clusters, nebulae, interstellar gas, cosmic rays and magnetic fields). The structure of the Galaxy, the rotation of the Galaxy and the motion of stars in it. The supermassive black hole in the center of the Galaxy.	1	Lecture-conversation	Determine the importance of knowledge about the physical nature of stars for humans.

<i>Other galaxies</i>	Radio emission of the Galaxy. Mysterious gamma-ray bursts. Other galaxies (discovery of other galaxies, determination of the sizes, distances and masses of galaxies; diversity of galaxies, radio galaxies and the activity of galactic nuclei, quasars and supermassive black holes in galactic nuclei).			
	Distance to stars (determination of distances by annual parallaxes, visible and absolute stellar magnitudes). Spatial velocities of stars (proper motions and tangential velocities of stars, Doppler effect and determination of radial velocities of stars).	1	Lecture-conversation	To determine the importance of modern knowledge about the physical nature of stars for mastering professions and specialties of secondary vocational education

Topics of abstracts (reports), individual projects:

2. General questions of astronomy
3. History of the development of astronomy: from ancient times to the present day.
4. The most important discoveries in astronomy and their impact on science.
5. Methods of astronomical observations: ground-based and space-based.
6. Telescopes: their types and operating principles.
7. Electromagnetic spectrum in astronomy: what and how it is studied.
8. Solar system
9. The Sun: structure, energy source, activity cycles.
10. Lunar exploration: from the first observations to modern missions.
11. Terrestrial planets: features and differences.
12. Gas giants: composition, structure, atmospheres.
13. Dwarf planets: features of their orbits and classification.
14. Asteroids, meteors and comets: similarities and differences.
15. Evolution and formation of the solar system.
16. Stars
17. Stars as energy sources: thermonuclear fusion.
18. Types of stars: classification by spectra and luminosity.
19. Stages of a star's life: from protostar to black hole.
20. Supernovae: nature and significance for the Universe.
21. Binary and multiple star systems.
22. Neutron stars and pulsars: their properties and role.
23. Galaxies and Cosmology
24. Milky Way: structure and position of the solar system.
25. Types of galaxies: classification according to Hubble.
26. Black holes: theory and observational evidence.
27. Quasars and active galactic nuclei.
28. Dark matter and dark energy: modern hypotheses.
29. The expansion of the Universe and Hubble's law.
30. The Big Bang: Theories of the Origin and Evolution of the Universe.
31. Exoplanets and extraterrestrial civilizations
32. Methods for detecting exoplanets .
33. Conditions for the existence of life on other planets.
34. Search for Extraterrestrial Intelligence (SETI) programs.
35. Potentially habitable exoplanets .
36. The future of interstellar travel.
37. Astronomy in human life
38. Navigation by the stars in ancient and modern times.
39. Astronomical phenomena and their influence on culture.
40. Calendar systems: astronomical basis.
41. Astronomy and astrophotography: principles and achievements.
42. Space weather: the impact of solar activity on Earth.
43. Modern research and technology
44. Space observatories: their role in modern astronomy.
45. Artificial Earth satellites: their tasks and orbital features.
46. Major space missions of the 21st century.
47. Radio astronomy: discovery and significance.
48. Prospects for space exploration: space tours and colonization.

The assessment of the student's independent work is assessed in accordance with the table.

Total points	Requirements for the level of independent work
0-10	If a student simply wrote down the conditions for independent work and did nothing
10-25	1. Independent work is performed if the graphic work is not fully completed in a given version, but the student knows how to do it. 2. The tasks set during the practical lesson are completed superficially, or are copied from one side and cannot be explained
25--34	1. Independent work is completed in full, but late in the given version; notes, tables, drawings, sketches, graphs, calculations are not completed correctly and accurately, the analysis of errors made is performed less correctly. 2. The tasks presented during the practical lesson are written out with explanatory notes, schematic drawings and, if available, in the notebook for independent work. 3. If the student can consistently explain to the teacher the tasks he is performing.
35-40	1. The calculation is performed in full within the timeframes specified in the graphical version; the solution to the problem is accompanied by explanatory notes and is written on A4 paper. Notes, tables, drawings, plans, graphs, calculations are performed correctly and accurately, provided that they correctly analyze the errors made. 2. The tasks presented during the practical lesson are written out with explanatory notes, schematic drawings and, if available, in a notebook. 3. If he can consistently explain to the teacher the tasks he is performing.

6. EDUCATIONAL TECHNOLOGIES

Learning Outcomes (mastered skills, acquired knowledge)	Forms and methods of monitoring and assessing learning outcomes
Skills:	
describe and explain physical phenomena and properties of bodies	- evaluation of the results of laboratory work - oral survey
distinguish hypotheses from scientific theories	- written check - evaluation of the results of practical work
draw conclusions based on experimental data	- written verification - evaluation of the results of practical work - evaluation of the results of laboratory work
give examples showing that observations and experiments are the basis for developing hypotheses and theories	- evaluation of the results of laboratory work - evaluation of the results of practical work
give examples of practical use of physical knowledge	- evaluation of the results of laboratory work - oral survey
perceive and, based on the knowledge gained, independently evaluate information contained in media reports, etc.	- oral examination - written verification
apply the acquired knowledge to solve physical problems	- written verification - evaluation of the results of practical work - test control
determine the nature of a physical process using a graph, table, formula	- evaluation of the results of laboratory work - evaluation of the results of practical work
measure a number of physical quantities, presenting the results of measurements taking into account their errors	- evaluation of the results of laboratory work
Knowledge:	
meaning of concepts	- oral examination - test control
meaning of physical quantities	- written verification - evaluation of the results of practical work
the meaning of physical laws	- test control - evaluation of the results of practical work - oral examination
Contribution of Russian and foreign scientists	- oral examination

The forms and methods of monitoring and assessing learning outcomes should allow checking not only the formation of subject-specific learning outcomes in students, but also the development of personal and meta-subject learning outcomes.

Results (personal and meta-subject)	Key performance indicators	Forms and methods of control and evaluation
Personal results		
— a sense of pride and respect for the history and achievements of Russian physical science; physically competent behavior in professional activities and everyday life when handling instruments and devices;	- manifestation of citizenship, patriotism; - knowledge of the history of development and achievements of domestic physical science	Evaluation of the results of observations of the student's activities in the process of mastering the educational program
— readiness to continue education and improve qualifications in the chosen professional activity and an objective understanding of the role of physical competencies in this;	- demonstration of skills and abilities to use knowledge in the chosen professional activity	Evaluation of the compilation of a dictionary of physical terms and symbols
— the ability to use the achievements of modern physical science and physical technologies to improve one's own intellectual development in the chosen professional activity;	- the ability to use the capabilities of the information environment to ensure productive self-education	Evaluation of note-taking when working with primary and secondary sources of information
- the ability to independently obtain new physical knowledge for oneself, using available sources of information;	- demonstration of the development of a natural scientific worldview, readiness for independent, creative activity in a professional environment	Assessment of the composition of a mini-lecture with a presentation for a group presentation
- the ability to build constructive relationships in a team to solve common problems;	- demonstration of interaction with students and teachers during training	Evaluation of participation in collective activities held at different levels

EDUCATIONAL, METHODOLOGICAL, AND LOGISTIC- TECHNICAL SUPPORT OF THE PROGRAM OF THE ACADEMIC DISCIPLINE " ASTRONOMY".

The room of the classroom meets the requirements of the Sanitary and Epidemiological Rules and Regulations (SanPiN 2.4.2 No. 178-02) and is equipped with standard equipment specified in these requirements, including specialized educational furniture and teaching aids sufficient to meet the requirements for the level of training of students. The implementation of the discipline program requires the presence of a Physics classroom.

Equipment of the classroom:

- Seating capacity according to the number of students;
- teacher's workplace;
- a set of teaching aids;
- equipment for laboratory and practical work;
- stand for studying safety rules;
- physical constants stand;
- office passport.

Technical training aids:

- Computer with licensed software;
- Multimedia projector;
- screen and sound aids;
- Power supply kit for physics classroom.

Educational and methodological teaching aids:

- visual aids, sets of educational tables, posters: "Physical quantities-ranks and fundamental constants", "International System of Units SI", "The Periodic Table of Chemical Elements by D. I. Mendeleev", portraits outstanding physicists and astronomers;
- educational and methodological documentation;
- library collection.

9. RECOMMENDED REFERENCES

For students

Textbooks

1. Velyaminov B. A. Astronomy . Basic level. 11th grade : textbook for comprehensive schools / B. A. Vorontsov -Velyaminov, E. K. Straut . - M.: Drofa , 2017.
2. Levitan E. P. Astronomy. Basic level. 11th grade : textbook for comprehensive schools / E. P. Levitan . - M .: Education, 2018 .
3. Astronomy: textbook for prof. education organizations / [E. V. Alekseeva, P.M. Skvortsov , T.S. Feshchenko , L.A. Shestakova], ed. T.S. Feshchenko . - M.: Publishing center "Academy", 2018.
4. Charugin V.M. Astronomy. Textbook for grades 10-11 / V.M. Charugin . - M.: Education, 2018.

Textbooks and reference books

1. Kulikovskiy P.G. Handbook of an amateur astronomer / P.G. Kulikovskiy . - M.: Librocom , 2013.
2. School astronomical calendar. Manual for amateur astronomers / Moscow Planetarium - M., (for the current academic year).

For independent extracurricular work

1. "Astronomy is great!" <http://menobr.ru/files/astronom2.pptx>
<http://menobr.ru/files/blank.pdf>
2. "Do you know astronomy?" <http://menobr.ru/files/astronom1.pptx>

For teachers

1. Gorelik G. E. New words of science — from Galileo's pendulum to quantum gravity. — Library "Quantum", issue 127. Supplement to the journal "Quantum", No. 3/2013. — Moscow: Publishing house of the Moscow Center of Continuous Medical Education, 2017.
2. Kunash M.A. Astronomy 11th grade. Methodological manual to the textbook by B.A. Vorontsov -Velyaminov, E.K. Straut / M.A. Kunash - M.: Drofa, 2018.
3. Kunash M.A. Astronomy. 11th grade. Technological maps of lessons according to the textbook
4. B.A. Vorontsova -Velyaminova, E.K. Strauta / M.A. Kunash - Rostov-on-Don / D: Teacher, 2018.
5. Levitan E. P. Methodological manual for using tables — file:///G:/Astronomy/astronomiya_tablicy_metodika.pdf
6. Surdin V.G. Galaxies / V. G. Surdin . - M.: Fizmatlit , 2013.
7. Surdin V.G. Exploration of distant planets / V.G. Surdin . - M.: Fizmatlit , 2013.
8. Surdin V.G. Astronomical problems with solutions / V.G. Surdin . - LKI Publishing House, 2017.

Internet resources

1. Astronomical Society. [Electronic resource] — Access mode: <http://www.sai.msu.ru/EAAS>
2. Gomulina N. N. Open Astronomy / edited by V. G. Surdin. [Electronic resource] — Access mode: <http://www.college.ru/astronomy/course/content/index.htm>
3. State Astronomical Institute named after P.K. Sternberg , Moscow State University. [Electronic resource] — Access mode: <http://www.sai.msu.ru>

4. Institute of Terrestrial Magnetism, Ionosphere and Radio Wave Propagation named after N.V. Pushkov , Russian Academy of Sciences. [Electronic resource] — Access mode: <http://www.izmiran.ru>
5. Competency-based approach to teaching astronomy using V.M. Charugin's teaching and methodological kit . [Electronic resource] — Access mode: <https://www.youtube.com/watch?v=TKNGOhR3w1s&feature=youtu.be>
6. Corporation Russian textbook. Astronomy for physics teachers. Webinar series .
7. Part 1. Teaching Astronomy as a Separate Subject. [Electronic Resource] — Access Mode: <https://www.youtube.com/watch?v=YmE4YLAzB0>
8. Part 2. The role of astronomy in achieving students' planned results in mastering the basic educational program of secondary general education. [Electronic resource] — Access mode: <https://www.youtube.com/watch?v=gCIRXQ-qjaI>
9. Part 3. Methodological features of the implementation of the astronomy course in class and extracurricular activities in the context of the introduction of the Federal State Educational Standard of Secondary General Education. [Electronic resource] - Access mode: https://www.youtube.com/watch?v=Eaw979Ow_c0
10. News of space, astronomy and cosmonautics. [Electronic resource] — Access mode: <http://www.astronews.ru/>
11. All-Russian astronomical portal. Astronomy of the Russian Federation. [Electronic resource] — Access mode: <http://xn--80aqldeblhj0l.xn--p1ai/>
12. Russian Astronomical Network. [Electronic resource] — Access mode: <http://www.astronet.ru>
13. Universal popular science online encyclopedia "Encyclopedia Krugosvet ". [Electronic resource] - Access mode: <http://www.krugosvet.ru>
14. Encyclopedia "Cosmonautics". [Electronic resource] - Access mode: <http://www.cosmoworld.ru/spaceencyclopedia>
15. <http://www.astro.websib.ru/>
16. <http://www.myastronomy.ru>
17. <http://class-fizika.narod.ru>
18. <https://sites.google.com/site/astronomlevitan/plakaty>
19. <http://earth-and-universe.narod.ru/index.html>
20. <http://catalog.prosv.ru/item/28633>
21. <http://www.planetarium-moscow.ru/>
22. <https://sites.google.com/site/auastro2/levitan>
23. <http://www.gomulina.orc.ru/>
24. <http://www.myastronomy.ru>