ASTROPHYSICS: 4-SEMESTER MASTER'S PROGRAM

LEARNING OUTCOMES
(for educational cycles from the academic year 2023/2024 on)

Description of learning outcomes defined for the curriculum in relation to the second-cycle characteristics of the Polish Qualifications Framework (PQF) for qualifications at level 7:

Symbol of the learning outcome for the curriculum	**Learning outcomes for the Master's program in Astrophysics** The graduate of the Master's program in Astrophysics will achieve the following learing outcomes:	Reference to second-cycle characteristics of PQF (*codes*)
KNOWLEDGE		
AP2_W01	has an in-depth knowledge and understanding of notions and concepts in the field of astrophysics; knows the explanation of the observed astrophysical phenomena	P7S_WG
AP2_W02	has an in-depth knowledge of complex physical processes necessary to understand selected astrophysical phenomena	P7S_WG
AP2_W03	understands the difference between astrophysical phenomena and mathematical models that describe them; knows and understands the approximations used in the simplified descriptions of phenomena and the limited applicability of the adopted models	P7S_WG
AP2_W04	knows and understands the structure and evolution of the Universe as well as its components	P7S_WG
AP2_W05	has an in-depth knowledge of the structure and evolution of stars; knows and understands the processes taking place in the star interior	P7S_WG
AP2_W06	is acquainted with advanced methods of data analysis, computational techniques and simulation methods used in astrophysical research	P7S_WG
AP2_W07	knows and understands selected methods of astrophysics observations, as well as the construction and principles of operation of the corresponding measuring apparatus	P7S_WG
AP2_W08	is acquainted with the latest achievements and current research trends in the field of astrophysics; understands the significance of astrophysical discoveries for the progress of science and civilization	P7S_WG, P7S_WK
AP2_W09	is acquainted with the issues of research ethics and intellectual property protection; understands the importance of legal and ethical rules for conducting scientific activity	P7S_WK
AP2_W10	knows the principles of creating and developing forms of individual entrepreneurship, including the branch of modern technologies	P7S_WK
AP2_W11	is acquainted with the rules of occupational safety and health, in particular while performing research	P7S_WK

SKILLS		
AP2_U01	is capable of explaining complex astrophysical phenomena by referring to notions, laws and processes of advanced physics and astronomy	P7S_UW
AP2_U02	can properly select and adapt existing and/or develop new research methods and tools for modeling phenomena and solving problems in the field of astrophysics	P7S_UW
AP2_U03	is able to efficiently use advanced methods of data analysis, computational techniques and simulation methods	P7S_UW
AP2_U04	can plan and carry out selected astrophysical observations	P7S_UW
AP2_U05	can work out the results of calculations and/or measurements, elaborate them adequately, evaluate critically and interpret properly	P7S_UW
AP2_U06	is capable of using specialist scientific literature, databases and other sources of information in the field of astrophysics; efficiently searches for necessary data and information, critically analyzes and selects them	P7S_UW
AP2_U07	is able, under the guidance of a scientific supervisor, to plan and perform complex and/or unusual research tasks in the field of astrophysics, as well as to formulate and verify the related research hypotheses	P7S_UW
AP2_U08	can present the results of research in the form of an original dissertation, containing the justification for research undertaken, the adopted methodology, the results obtained, their elaboration and significance, as well as conclusions	P7S_UK
AP2_U09	can make a presentation, in both an oral and written form, of selected issues in the field of astrophysics; can present the discoveries and achievements of astrophysics in an intelligible way	P7S_UK
AP2_U10	is able to lead a scientific discussion based on facts and substantive arguments, as well as judge various opinions and positions presented during it based on merit	P7S_UK
AP2_U11	is capable of cooperating with others while implementing the assigned tasks; can organize his/her own work as well as the teamwork	P7S_UO
AP2_U12	is able to plan and accomplish the process of self-education, as well as support others in this area	P7S_UU
AP2_U13	speaks English at the B2+ level of the Common European Framework of Reference for Languages, taking into account the specific academic language and specialist astrophysics terminology	P7S_UK
SOCIAL COMPETENCIES		
AP2_K01	recognizes the limitations of his/her knowledge and abilities; is aware of the need to constantly improve his/her qualifications; considers self-education as a standard and a success factor on the labor market	P7S_KK
AP2_K02	is critical of the received content and opinions; distinguishes scientific theories from pseudoscientific views	P7S_KK

AP2_K03	recognizes the leading role of science in the modern world; appreciates the socio-economic relevance of research activity; is ready to promote the achievements of physics and astronomy	P7S_KO
AP2_K04	represents and promotes a scientific attitude	P7S_KO, P7S_KR
AP2_K05	complies with the rules of professional ethics; is responsible for the actions taken; conscientiously fulfills the entrusted duties	P7S_KR
AP2_K06	demonstrates creativity; thinks and acts in an enterprising manner	P7S_KO