The discipline designation	Physiology of Plants
Semester(s) in which the discipline is taught	6
Responsible teacher	Koziyeva Sahobat Uktamovna, Doctor of Philosophy (PhD) in Biological Sciences, Associate Professor Pardayeva Xurshida Olimjonova, Senior teacher
Teaching language	Uzbek and Russian
Connection to the curriculum	Elective subject
Academic workload (including contact hours, independent hours)	Total workload: 120 h Contact hours – Lecture 20 h Seminar -20 h Practical – 20 h Self-Study of Students 60 h
Credits	4
Prerequisites	Developmental Biology, Botany, Biochemistry, Inorganic Chemistry and Organic Chemistry
The aims of the discipline	The aim of the discipline is to reveal the patterns of physiological processes during ontogenesis and adaptation of the plant organism, as well as to identify ways to control these processes to increase the productivity of agricultural crops. Learning outcomes - know the modern approaches and innovations in teaching plant physiology necessary for implementation; - use modern teaching aids in plant physiology classes, teaching basic physiological methods of plant research; - demonstrate knowledge of safety regulations when working in a plant physiology laboratory; - know modern approaches and innovative technologies used in teaching plant physiology and conducting scientific research; - master the terminology of plant physiology; - be able to ensure coherence and consistency of the content, tools, methods and forms of the science of plant physiology; - have skills in processing, summarizing and transmitting information related to the content of training to students; - to form a systematic approach to the problems of modern plant physiology with the possibility of further use of the acquired knowledge for the analysis and assessment of the state of the plant organism; - have the skills to organize classes taking into account modern requirements for classes in plant physiology; - use the acquired knowledge to strengthen the plant organism;
Contents of the lesson	Content 1. Subject of plant physiology, methods, purpose, objectives and history of evolutionary development. 2. Chemical composition of the cell. 3. The structure of the plant cell. Plasma membrane. 4. General information about plant water exchange. Absorption of water using the root. 5. Transpiration. Movement of water in plants. 6. Movement of chloroplasts. Physiological significance of phycobilins.

	7. Light phase of photosynthesis. Electron path during photophospholation. 8.Dark phase of photosynthesis. Control of the photosynthesis process. Photosynthesis and productivity. 9.Plant respiration. Types of breathing. 10.Respiration mechanisms. The influence of external conditions on breathing. 11. Mineral nutrition of plants. Physiological significance of mineral elements. 12.Assimilation of mineral elements by plants. Physiological basis of the use of mineral fertilizers. 13.Growth and development of plants. 14. General information about phytohormones. 15. General information about phytohormones.
Exam form	Written work
Training and examination requirements	Complete assimilation of theoretical and methodological concepts in the subject, the ability to correctly present results, the ability to independently observe objects and study processes related to the subject, draw correct conclusions, complete tasks of the current, intermediate forms of control, and pass the exam in writing at the final control. When drawing up final control questions, deviations from the content of the discipline program are not allowed. The bank of final control questions for each subject is discussed at the meeting and approved by the head of the department. When compiling final control tickets, the final control question bank is used; the number (3-5 questions) of questions in the ticket should be in a 50/50 ratio, depending on the content of classroom and independent learning. No later than 1 week before the start of the final control, tickets signed by the head of the department, enclosed in an envelope, are sealed by the dean's office and opened 5 minutes before the start of the exam in the presence of students. Final control duration is 80 minutes. Answers to final control questions are recorded in notebooks with the seal of the dean's office. After completion of the final control work, the work is immediately encrypted by a representative of the dean’s office, and the notebooks are handed over to the commission for verification. From the moment of completion of the final control, a period of 72 hours is allotted for checking and posting the results on the electronic platform. The teacher who taught the students in this subject is not involved in the process of conducting the exam and checking the students' answers. Student(s) who are dissatisfied with the final control results may submit a written or oral appeal within 24 hours of the publication of the final control results. Complaints submitted after 24 hours from the publication of the final control results will not be accepted.
References	1. B.O. Beknazarov. Textbook "Physiology of plants". Tashkent, 2009 2. Abdullaev R.A., Asomov D.K., Beknazarov B.O., Safarov K.S. "Practical exercises in plant physiology" Study guide. T.: "University", 2004. 3. Khojaev J. Physiology of plants. Textbook. - Tashkent, 2004 4. E. G. Kulikova, Yu. V. Koryagin, N. V. Coryagina. Physiology plant: The manual/. — Penza: PGAU, 2018. — 192 p 5. Medvedev S.S. Physiology plant:text-book. — SPb.: BXV-Peterburg, 2012. — 512 p. 6. Klimentova E.G., Rassadina E.V., Antonova J.A. Physiology plant:The manual. – Ulyanovsk: UlGU, 2014. 7. I. S. Kiseleva, M. G. Maleva, G. G. Borisova, N. V. Chukina, A. S. Tugbaeva. Physiology plant: The methodological manual. – Ekaterinburg: publishing house Ural. un-ta, 2018. – 120 p.
Scope of	**CURRENT CONTROL**

assessment criteria and procedure	**Purpose:** Determining and assessing the student's level of knowledge, practical skills, and competencies on course topics. **Instructions:** The student's activity in daily classes is assessed through the student's mastery of course topics, as well as constructively interpreting and analyzing the educational material, developing module-specific skills, acquiring practical skills (in terms of quality and the specified number) and competencies, solving problem situations aimed at applying professional practical skills, working in a team, preparing presentations, etc. **Current control form:** Activity in lessons Preparing educational materials Working with sources within the subject Using educational technologies Working in a team Preparing presentations Working with projects **INTERMEDIATE CONTROL** **Purpose:** Assessing the student's knowledge and practical skills and level of mastery of lecture material after completing the relevant section of the course. **Form and procedure of intermediate control:** Midterm examination is held during the semester during the training sessions after the completion of the relevant module of the curriculum of the subject. Midterm examination is held once in written form within the framework of this subject. Midterm examination questions cover all topics of the subject. **Independent learning:** **Purpose:** Independent learning is aimed at fully covering the content of this course, expanding the theoretical knowledge acquired, and establishing independent learning activities for students. **Form and procedure of independent education:** ndependent work assignments are completed in the form of an educational project, presentation, case study, problem solving, information search, digest, colloquium, essay, article, abstract, etc. Completed assignments for independent study are placed in the electronic system and checked based on the anti-plagiarism program and evaluated by the subject teacher. In this case, the uniqueness of the completed assignment should not be less than 60%, otherwise the assignment will not be accepted for assessment. The number of independent work assignments, depending on the nature of the subject, should not be less than 3 for one subject (module). Independent work assignments account for 60% of the points allocated for current and intermediate control. Independent learning task 1: Preparation of project work based on independent learning topics Independent learning task 2: Preparing sample video lessons based on specialized subject topics. Independent learning task 3: Preparation of open lesson plans in specialized subjects using interactive methods. Independent learning task 4: Analysis of educational normative documents for specialized subjects and preparation of presentations. **FINAL CONTROL** **Purpose:** The final examination is held at the end of the semester to determine the level of mastery of the student's theoretical knowledge and practical skills in

	the relevant subject. The final examination is held at a specified time according to the examination schedule created by the Registrar's Office on the electronic platform. **Requirements:** The student must have passed the current control, intermediate control and independent learning assignments by the deadline for the final control type in the relevant subject. A student who has not passed the current control, intermediate control and independent learning assignments, as well as who has received a score in the range of "0-29.9" for these assignments and control types, is not included in the final control type. Also, a student who has missed 25 percent or more of the classroom hours allocated to a subject without a reason is excluded from this subject and is not included in the final control type and is considered not to have mastered the relevant credits in this subject. A student who has not passed or was not included in the final control type and has received a score in the range of "0-29.9" for this type of control is considered to be an academic debtor. **Final control form:** The final examination in this subject will be conducted in written form. If the final examination is conducted in written form, the requirements for assessment must also be reflected.
Criteria for assessing student knowledge	

5 stars	**100 points**		**Evaluation criteria**
5	90-100	Excel lent	When a student is considered to be able to make independent conclusions and decisions, think creatively, observe independently, apply the knowledge he has gained in practice, understand, know, express, and narrate the essence of the subject (subject), and have an idea about the subject (subject)
4	70-89,9	Good	When the student is considered to be able to observe independently, apply the knowledge he has gained in practice, understand, know, express, and narrate the essence of the subject (subject), and has an idea about the subject (subject)
3	60-69,9	Satisfactory	When the student is found to be able to apply the knowledge he has gained in practice, understands, knows, can express, and narrate the essence of the subject (subject), and has an idea about the subject (subject)
2	0-59,9	Unsatisfactory	When it is determined that the student has not mastered the science program, does not understand the essence of the science (subject), and does not have an idea about the science (subject)

Course evaluation criteria and procedure	**Control type**	**Total points allocated**	**Control (task) form**	**Distribution of points**	**Qualifying score**

	Current control	30 points	System tasks	20 points (divided by the number of tasks)	18 points
			Student activity (in seminars, practical, laboratory classes)	10 points	
	Intermediate control	20 points	Supervision: Written work	10 points	12 points
			System tasks	10 points (divided by the number of tasks)	
	Final inspection	50 points	Written assignment (5 questions)	50 points (10 points per question)	30 points
	** **Note:** 60% of the points allocated for current and intermediate control are allocated to independent work assignments. Independent work assignments are evaluated as system assignments through the electronic platform.*				