

Teaching-learning methods and relevant activities

Basic Methods for teaching and learning:

- Lecture, seminar, laboratory and practical work;
- Learning and field practice;
- Coursework / project;
- Bachelor's, master's and doctoral thesis;
- E-learning;
- Consultation.

The lecture is a creative process in which the lector and the student are participating simultaneously. The main goal of the lecture is to understand the idea of the provisions of the subject to be studied, which implies the creative and active perception of the presented material. In addition, attention should be paid to the basic provisions of the material, definitions, marks and assumptions. Critical analysis of key issues, facts and ideas are needed. The lecture should provide scientific and logically consistent understanding of the basic provisions of the subject without overloading the details. Therefore, it must be logically completed. In addition, facts, examples, charts, drawings, experiments, and other visuals should serve to explain the idea of the lecture.

The lecture should provide the correct analysis of the dialectical process of science and should be based on the possibility of students' free thinking in the concrete environment, mainly focused on understanding and comprehending of the major scientific problems.

The material heard on the lecture is formulated as a whole system of knowledge with **independent work** of the student. The student should have the interest regarding the book and other sources of information and a desire to study the issues independently, which is a means of stimulating independent thinking, analysis and conclusions.

Due to the main purpose of the lecture, the right to deliver it should be given only to experienced teachers, since their theoretical knowledge, practical experience and pedagogic skills are the guarantees of high level of lecture. While processing the methodological issues of the lecture, the teacher should pay attention to the sequence of the material transfer, the lecture style, the connection with the audience. The lecture should take place through active participation of students, using a wide range of methods and visuals.

Theoretical material that is delivered during the lecture is well understood through seminars, laboratory and practical exercises.

The purpose of the **seminar** (work in the group) is to allow students to master the topics they have heard on the lecture. Leading professor or the lector will indicate a student or group of students to find and process additional information, prepare the presentation, write essay and other. On the seminar hearing of reports and discussions are held, as well as conclusions are made. The teacher of the seminar coordinates the process of conducting these processes.

Laboratory work is more prominent and gives an opportunity to perceive the event or process. In the laboratory, the student studies how to conduct the experiment. During laboratory studies, the student must acquire to organize, regulate and work

on the device. The skills obtained in experimental training labs allow to understand theoretical material delivered on the lectures. It implies the following types of actions: setting up the tests, showing video material, as well as the material of dynamic nature, and so forth.

The purpose of **practical work** is the gradual study of theoretical material through solving specific tasks. This helps the student to master and use theoretical material independently. The head of practical training should focus on the methods of solving tasks, fulfilment of drawings, sketches, and schemes, as well as application of appropriate techniques in calculations, and so on.

Practice (learning and work) helps the student to enhance and strengthen the obtained knowledge. It develops the ability to use knowledge in practice, using the methods that are used to study the subject to solve problems. It combines all the methods of learning that help the student to develop practical skills. In this case, on the basis of the acquired knowledge the student independently performs a certain action, such as pedagogical practice, field work, etc.

Coursework/project is a creative process. Every new building, machine, instrument, automatic device, etc. is created according to the project. The design process is a combination of theory and practice. In the course of the study, the student performs graphic assignments and course projects, which are actually the student's first independent work, which is carried out under the leadership of the pedagogue.

Bachelor's, Master's and Doctoral Work is the final stage of a separate cycle of teaching at higher education institution and its purpose is to systematize the obtained theoretical and practical knowledge and provide a reasonable solution for specific scientific, technical, economic or productive tasks. The work should reveal the level of research methods and experiments related to the issues and the student's readiness for independent work in the future professional activities. The work is led by an experienced teacher.

E-learning implies teaching by internet and multimedia means. It includes all components of the teaching process (goals, content, methods, means, etc.), which are realized by specific means. E-training is of three types:

- Full-time learning - when the teaching process takes place within the contact hours of the teacher and students, and the training material is delivered through electronic course;
- Distance learning means conducting the study process without the physical attendance of the professor. The whole training course is carried out electronically;
- Hybrid (full-time / distance) - the main part of the study is carried out distantly, and a small part is carried out within the contact hours.

Consultations, with the help of the teacher, should help the student to learn to work independently, master the literature and work on other sources properly, as well as clear up the issues raised during independent work.

Appropriate activities of teaching and learning methods

One particular issue cannot be studied in the teaching process only with one method and one activity. The teacher has to use different methods and activities

during the teaching process, and in most cases the activities are merged. The activities in the teaching process complement each other.

We offer you the most common activities and their definitions. The teacher will select the required activity from the specific goal and objective.

1. **Discussion / debate** are one of the most common activities of interactive teaching. Discussion process increases the quality and activity of students' engagement. Discussion can be turned into arguments and this process is not limited to the questions asked by the teacher. It develops the ability of the student to reason and justify their opinion.
2. **Cooperative learning** is a learning strategy when each member of the group is obliged not only to examine himself but also to help his/her team-mate to study the subject better. Each member of the group works on the problem, until all of them master the issue.
3. **Collaborative work** - By using this activity, teaching implies division of the students' group and assignment of teaching tasks to them. The group members individually work on the issue and in parallel share their opinions with other members of the group. Due to the set objective, it is possible to divide the functions among the members during the group's working process. This strategy provides all students maximum engagement in the learning process.
4. **Problem based learning** is an activity which uses a specific problem as the initial stages of obtaining new knowledge and integration process.
5. **Case study** - the teacher will discuss concrete cases with the students, and study the issue thoroughly. For example, in the safety of engineering, it can be a case of a particular accident or disaster, in the political science - concrete, for example, the Karabakh problem (Armenia-Azerbaijan conflict) analysis and etc.
6. **Brain storming** - this activity implies to form and promote radically different opinion, idea on concrete issue/problem. This activity contributes to the development of a creative approach to the problem. Its application is effective in case of a large number of students and consists of several main stages:
 - Problem / issue determination in a creative perspective;
 - In a certain period of time, without criticism, note the ideas expressed by the listeners (mainly on the board);
 - Determination of assessment criteria to determine the establish the conformity of the idea with the aim of the research;
 - Assessment of selected ideas with predetermined criteria;
 - By process of elimination, distinguish those ideas that are most relevant to the issue.
 - Demonstration of the highest evaluation idea as the best way to solve the set problem.
7. **Role and situational games** - games that are fulfilled according to predefined scenario allow students to look at the issue differently. It helps them to develop an alternative viewpoint. Like discussions, these games also formulate the student's ability to express and protect his/her position independently.
8. **Implication**. It is quite effective in terms of achieving the result. In many cases, it is better to provide the students with audio and visual materials simultaneously. The study material can be demonstrated by both the teacher and the student. This activity helps us to demonstrate different levels of learning material, to specify what students will have to do independently; at the same time, this strategy visually reflects the essence of the topic/ problem. Demonstration may be simple.

9. Induction is such a form of transmitting any knowledge when the process of thinking in the course of the study is directed towards generalization, in other words when delivering the material the process is going from concrete to general.

10. **Deduction** is such a form of transmitting any knowledge, which based on general knowledge represents logical process of discovering new knowledge in other words, the process is going from general to concrete.

11. **Analysis** helps us to divide the study material into constituent parts. This will simplify the detailed coverage of individual issues within a difficult problem.

12. The synthesis implies the composition of one whole by grouping individual issues. This activity contributes to the development of the problem to be seen as a whole.

13. **Verbal or orally transmitted.** Narration, talking and so forth belong to this activity. In this process the teacher orally transmittes and explains study material and the students actively perceive and learn it through listening, remembering and thinking.

14. **The script** implies the following activities: making extracts, records, notes, theses, abstract or essay and other.

15. **Explanation** is based on the discussion on the issue. The teacher gives a concrete example from the material, which is discussed in detail within the given topic.

16. **Action-oriented training** requires active involvement of the teacher and student in the teaching process, where the practical interpretation of theoretical material is of special significance.

17. Project planning and presentation. When working on the project, the student uses the acquired knowledge and skills to solve the real problem. This increases students' motivation and responsibility. Working on the project includes planning, surveying, practical activity and the performance of the results in accordance with the selected issue. The project will be deemed implemented if its results are presented in a clear and convincing way. It can be performed individually, in couples or in groups; also within a subject or within a few subjects (integration of the subjects); after completion, the project can be presented to a big audience.