

Strengthening Teaching Competences
in Higher Education
in Natural and Mathematical Sciences



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Assessment of student knowledge

(How to evaluate Math students)

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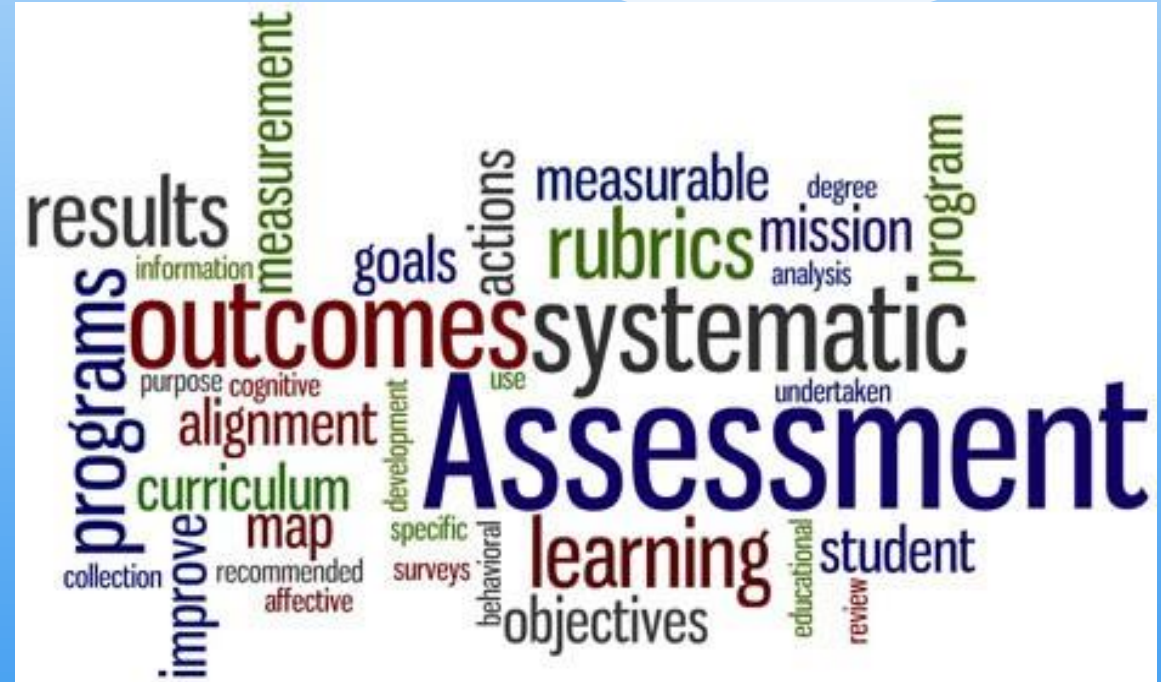


Content:

- General information about University of Novi Sad
- Questions
- Assessment cycle
- Student monitoring
- Evaluation instruments
- Student evaluations through Internet



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- 14 faculties and 3 scientific institutes in 4 Central European University cities
- European Capital of Culture 2022
- In European Youth Capital 2019
- 50,000 students and 5,000 staff
- Comprehensive university providing nearly all fields of science and higher education
- The University offers around 350 accredited study programs at the level of Bachelor, Master, Specialist and Doctoral studies, carried out at its Faculties and within its Centers for Interdisciplinary and Multidisciplinary Studies



The University that connects four historic cities of the Autonomous Province of Vojvodina, in the north of the Republic of Serbia:

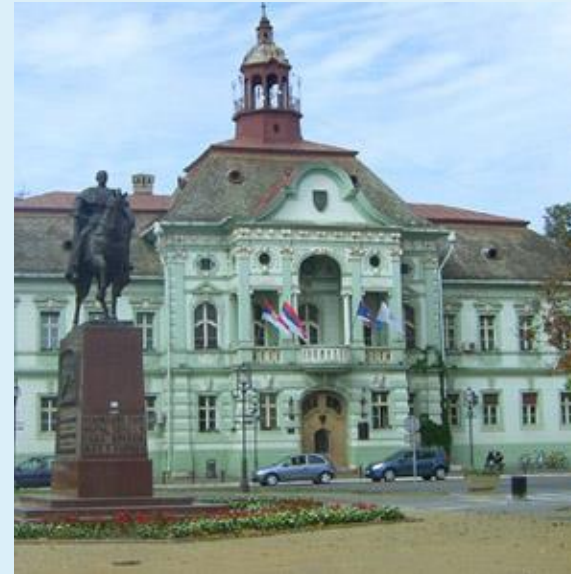
NOVI SAD



SOMBOR



SUBOTICA



ZRENJANIN



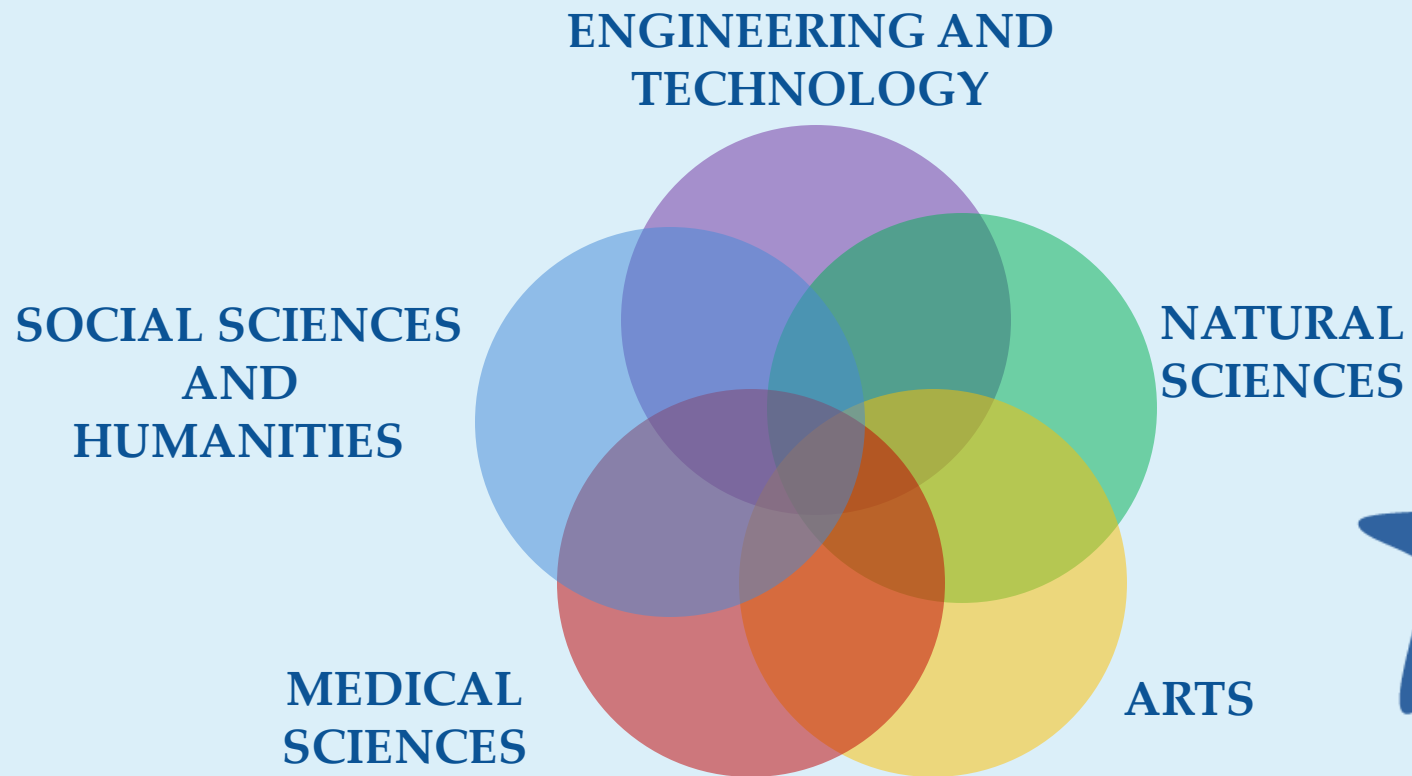


UNIVERSITY OF NOVI SAD

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GENERAL INFORMATION

Comprehensive University



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14 faculties

- FACULTY OF PHILOSOPHY in Novi Sad
- FACULTY OF AGRICULTURE in Novi Sad
- FACULTY OF LAW in Novi Sad
- FACULTY OF TECHNOLOGY in Novi Sad
- FACULTY OF ECONOMICS in Subotica
- FACULTY OF TECHNICAL SCIENCES in Novi Sad
- FACULTY OF MEDICINE in Novi Sad
- FACULTY OF SCIENCES in Novi Sad
- ACADEMY OF ARTS in Novi Sad
- FACULTY OF CIVIL ENGINEERING in Subotica
- “MIHAJLO PUPIN” TECHNICAL FACULTY in Zrenjanin
- FACULTY OF SPORT AND PHYSICAL EDUCATION in Novi Sad
- FACULTY OF EDUCATION in Sombor
- TEACHER TRAINING FACULTY IN THE HUNGARIAN LANGUAGE in Subotica



QUESTIONS:

How to link evaluation and learning outcomes?

How to prepare instruments for different evaluations?

How to evaluate a student?

How does evaluation and self-evaluation affect student achievement and motivation?

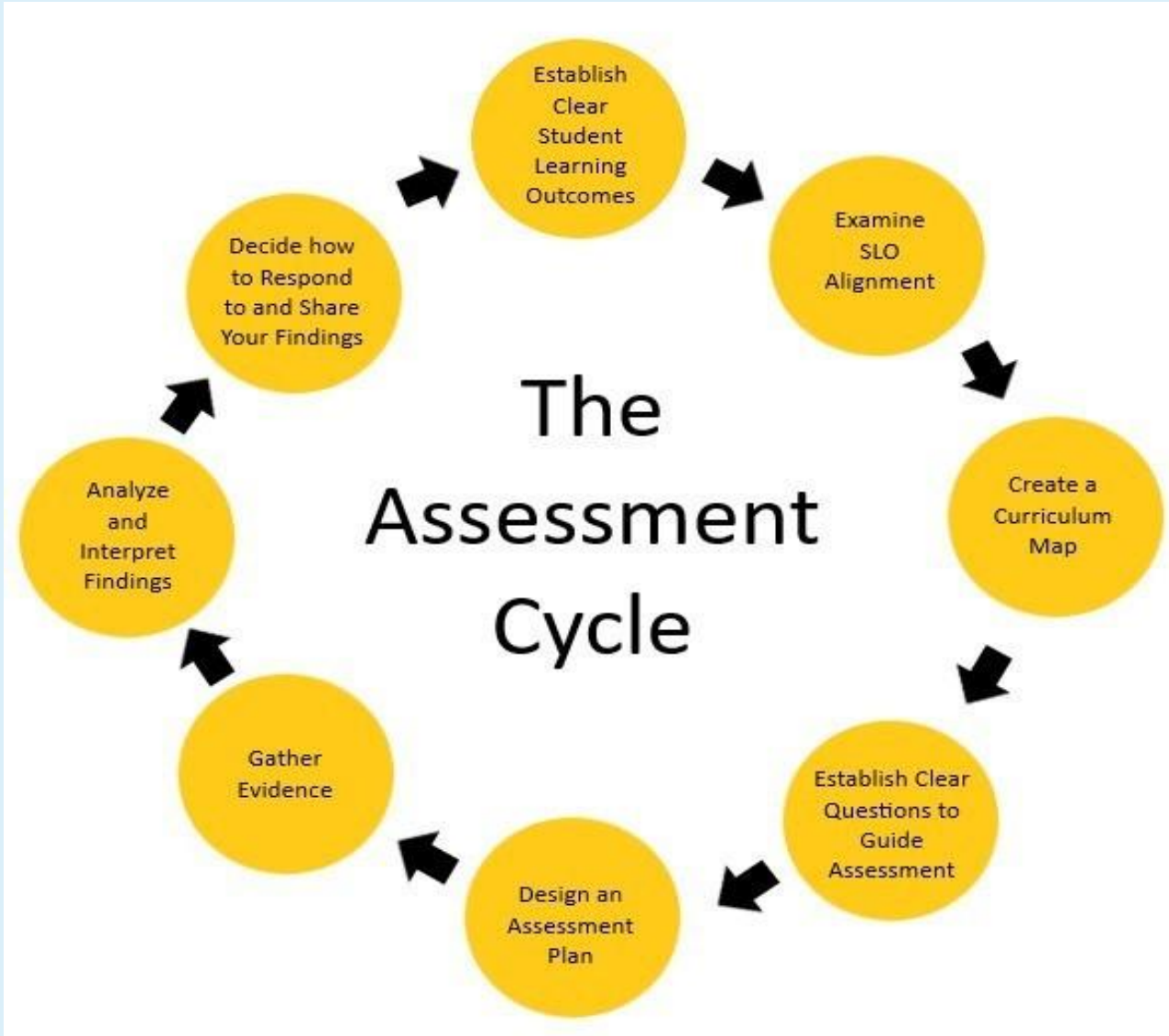
How to assess the quality of evaluation?

How to test knowledge and examine students online?



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Assessment cycle (study program)

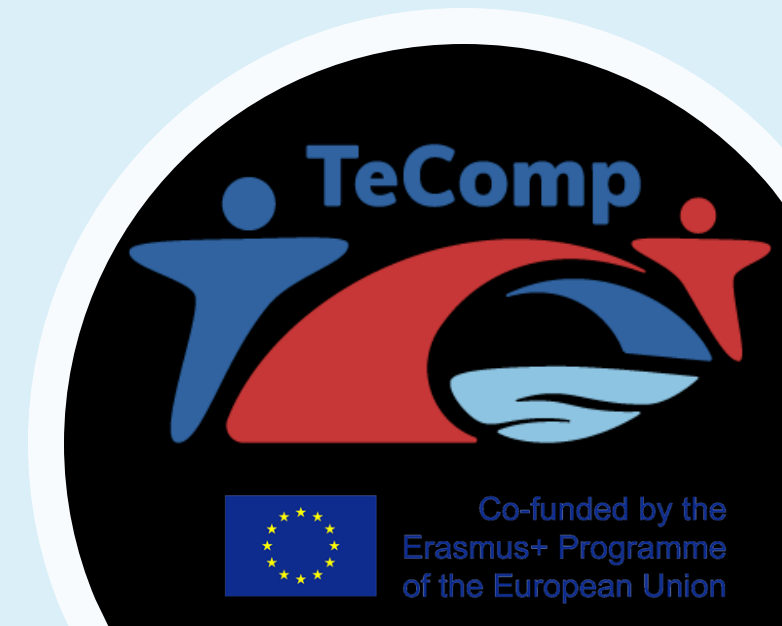


Student learning Outcomes (SLO)
Department and program faculty first agree on what it is that students should learn, or what students graduating from their program should be, know, or be able to do. Each department or program then develops clearly written and agreed upon [Program Learning Goals and Outcomes](#).



Situation in Serbia

- At universities in Serbia, evaluation and assessment is largely, almost 100%, left to the subjectivity of teachers in an individual subject without coordination at the level of programs or institutions, it is very important to pay far more attention to this important segment of teaching.



Student monitoring and evaluation

- Evaluation should start from the learning goals and outcomes of the study program as a whole and also of a particular course.
- What is actually monitored and evaluated is the achievement of those goals and outcomes, which are defined in the curriculum.
- Learning goals (of a subject) are the starting elements for the realization of a subject. All other elements of the organization of a subject follow from the goals and learning outcomes associated with them.
- The goals of individual courses are directly related to the goals of the study program.
- Learning outcomes are related to the goals and represent clear statements about what the student will be able, know or be able to do when he / she masters the subject.
- Monitoring a student's work on a subject means monitoring the achievement of goals and the adoption of outcomes.



Elements of the monitoring

- Initial test (START)
- Monitoring during the teaching process (RACE)
- Final check (FINISH)
- Feedback (TIME-OUTS)

EVALUATION INSTRUMENTS

It is very difficult to choose a task and the type of task that will measure the student's achievement in a relevant way.

In the task, the teacher should be aware of the following aspects:

- Purpose (goal) of the task
- Formulation (it is important that the task is formulated clearly and precisely)
- Time and working conditions (it is important to estimate the time needed to complete the task and to define whether the student is allowed to have a calculator, computer, literature, etc.)
- Evaluation of the task (it is important that the teacher is aware in advance how the task or parts of the task will be evaluated).

Evaluation instruments

Different types of test tasks:

- 1. completing the answer
- 2. dichotomous questions
- 3. multiple choice with one correct answer
- 4. multiple choice with multiple correct answers
- 5. connectivity issues
- 6. open questions

Evaluation instruments

- Seminar papers
- Final work (thesis)
- Self-evaluation

• The principles of evaluation

- 1) objectivity in evaluation according to established criteria;
- 2) relevance of assessment;
- 3) use of various assessment techniques and methods;
- 4) fairness in evaluation;
- 5) regularity and timeliness in assessment;
- 6) evaluation without discrimination and separation on any basis;
- 7) respect for the current conditions in which the assessment takes place.

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Possible grading errors

- 1. Personal approach (too strict, too mild)
- 2. Halo effect (influence of previous information)
- 3. Giving higher grades so that the students have a higher average

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Example of study program Mathematics

The learning outcomes of the entire program state that the successful student will, after graduation, gain a basic understanding of the system of mathematical disciplines and the relations between them, and essentially understand the basic concepts and results of the basic branches of mathematics.

Example of study program Mathematics

- Looking at individual subjects, the objectives of the course are formulated mainly as "learning" some theoretical things and mastering some techniques.
- Course outcomes are often formulated in such a way that the outcome is that the student will master a certain mathematical area, with the ability to creatively solve problems and understand the connections of the presented material with other areas of mathematics.
- Sometimes the outcomes of a subject are defined as minimal and desirable. If a minimal outcome is achieved, then the student receives a passing but lower grade, and if a "desirable" outcome is achieved, the candidate will get a higher grade.

Knowledge verification through internet

YES OR NO

Example of study program Mathematics

- The question is whether it is possible to check the adoption of learning outcomes online?

Conclusion

- It is important to connect Assessment cycle of study program with assessments of students
- At universities in Serbia, evaluation and assessment is largely, almost 100%, left to the subjectivity of teachers in an individual subject without coordination at the level of programs or institutions
- It is important to carefully choose evaluation instrument
- It is possible to check the adoption of learning outcomes online





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