

MIT feedback on Learning Outcomes

8 November, MISIS

General remarks

- High-level LO help to formulate Program LO
- Program LO more specific for the area
- LO should be observable in assessment
- “Hard skills” LO listed before “soft skills” LO

Biomedical technology (MIPT)

- ***Program overview:*** The bachelor's program and its profile matches the priority development direction of National Research University MIPT - "Biophysical and medical technology, pharmaceuticals." Successful graduates of the program will be qualified to continue training towards master's degree in this field. Graduates will be able to work productively in a broad range of academic and commercial, biological, medical, pharmaceutical and other groups. Student's training will encompass research, analysis, design, innovation, production as well as technological, organizational and administrative approaches. Students will be able to apply models and methods of mathematics and physics in biology, chemistry, engineering, technology and economy.
- ***Program objectives:*** To train engineers of highest qualification with the goal to promote technological development and to increase competitive advantage of Russia in biomedical technology at a time of the acceleration of progress of science and technology and globalization of the world economy.

Biomedical technology (MIPT)

- 1) The ability to use knowledge gained in training to formulate problems and get solution in engineering and science
- 2) The ability to use learned methods and understanding to solve new problems, possibly using interdisciplinary knowledge

It is not clear how #2 outcome differs from outcome #1

Biomedical technology (MIPT)

3) The ability to speak and write clearly, logically and reasonably, to define point of view and analyze the audience.

3) Students will be able to apply these skills to conduct scientific and general discussions

Nouns -> verbs

Biomedical technology (MIPT)

6) Understanding of health, safety, legal aspects and responsibilities involved in engineering activities; understanding the impact of engineering solutions to the society and the environment; understanding of the code of ethics and standards of engineering practice

This seems to be 3 separate outcomes

Biomedical technology (MIPT)

12) Knowledge of foundations of project and business management as well as understanding of the general risks and complications related to changing environment

Not sure what underlined portion means

Biomedical technology (MIPT)

13) Ability to understand and take responsibility for the quality and outcomes of the personal work.

13) Students will be able to describe the importance of taking responsibility for the quality and outcomes of their personal work

Outcomes should be measurable

Mathematical methods and models in engineering (HSE)

- ***Program overview:***

This program aims to prepare graduates with a Bachelor of Engineering and Technology within a field of Applied Mathematics. The program structure is based on four main components in Bachelor training, taking into account the requirements of future professional activity:

- The basic training in mathematics and the natural sciences;
- The training in information science and programming, the using the information and communication technologies (ICT) in engineering design, including in-depth learning of programming languages, creation methods of information management systems, control systems and information processes in technical objects, high-performance computing,
- The training in engineering design, from a technical and economic feasibility of projects, their legal basis, the choice of methods and design solutions to project management and evaluation;
- The training within a field of professional communication, including foreign language skills and various forms of oral and written communication, presentation which includes an execution of other technical documents.

Development of professional competencies of the graduates is enhanced by use of acquired basic knowledge and skills in specific subject fields. Special emphasis is put on development of research competencies, the exposure to the wide engineering context. These areas are reflected both to specialized and integrated courses (such as data analysis and visualization, computational optimization, high performance computing, etc.), ensuring the achievement of educational outcomes in the main fields: basic knowledge, engineering analysis and designing, research, practice, personal and interpersonal competence.

Mathematical methods and models in engineering (HSE)

- 1) Knowledge of basic mathematic and natural sciences

What do you want your students to do with their knowledge of mathematics and science?

Mathematical methods and models in engineering (HSE)

2) Comprehension and analysis of socially important problems and processes of modern society giving the broader social context of professional and engineering tasks

It is unclear what is meant here. Conduct needs analysis of engineering solutions? Identifying socially relevant engineering problems? Understanding societal impacts of engineering?

Mathematical methods and models in engineering (HSE)

6) To identify, formulate, and solve engineering problems, to analyze and interpret data.

This seems like two different outcomes:

- To identify, formulate, and solve engineering problems
- To analyze and interpret data

Mathematical methods and models in engineering (HSE)

9) Knowledge of interdisciplinary integration of a project implementation, project team-working skills

9) Student will be able to work in teams, including interdisciplinary teams.

Mathematical methods and models in engineering (HSE)

12) Working skills in research laboratory

- Students will be able to select and execute appropriate laboratory techniques?
- Students will be able to design experiments, select and execute appropriate laboratory techniques, and analyze and interpret data?
- Are there specific laboratory skills that you want students to develop?

Mathematical methods and models in engineering (HSE)

15) To carry out organizational and management calculations in project work

Can you be more specific? Budgetary calculations? Develop project timelines?

Mathematical methods and models in engineering (HSE)

18) To use modern means of communication working in professional community

18) Students will be able to appropriately implement communication tools when working in a professional setting

In General:

- Many of the programs have VERY general/broad learning objectives; e.g., "Students will be able to solve engineering problems". As you know, objectives and outcomes should be tailored to the specific program and the needs of the discipline.

In General:

- Many programs lead with objectives that are related to the "softer" skills (teamwork, communication, etc.) – Putting the technical outcomes/objectives first may be better from a logistic, and possibly political perspective.

Yours,
MIT Teaching and Learning Lab