

**Monika SROKA-BIZOŃ, Jolanta TOFIL**  
Silesian University of Technology  
Geometry and Engineering Graphics Centre  
Krzywoustego Street No 7, 44-100 Gliwice, Poland  
phone/fax: +48 32 237 26 58

e-mail: monika.sroka-bizon@polsl.pl  
jolanta.tofil@polsl.pl

## **PROBLEMATIC ASPECTS OF DEVELOPING CURRICULUMS OF GEOMETRICAL AND GRAPHICAL COURSES ON THE EXAMPLE OF THE CURRICULUM OF THE COURSES “TECHNICAL DRAWING” IMPLEMENTED AT THE FACULTY OF ENERGY AND ENVIRONMENTAL ENGINEERING IN THE ACADEMIC YEAR 2016/2017**

**Keywords:** *geometry and engineering graphics, technical drawing.*

In 2005 in the paper titled *Developing of geometry and engineering curriculum for civil engineering course*, which has been presented at the International Conference of Engineering Education – ICEE 2005, Gliwice, the authors, together with Ewa Kalinowska, stated: *Education of the modern engineer should ensure his fluid adaptation to changing economic and social conditions resulting from rapid development in technology. Curriculums of technical education must strictly fulfill the needs of a future engineer.* [2] In 2017, the above statements are still current, because they are the universal principles, which should characterize an engineering education. Flexibility, modifiability and adaptability to changing external conditions should characterize curriculums of engineering studies. University teachers, developing and implementing curriculums of engineering studies, need to demonstrate such features even more.

The main assumption of the authors starting the development of the conception of the curriculum implementation of the course Technical Drawing in 2016/2017 was the creation of interesting, from the point of view of the student, classes, during which it would be possible to acquire the widest possible range of knowledge, useful at a further stage of education and in future professional practice. Cognitive interests of students, developed as a result of participating in interesting classes, should encourage them to explore on their own knowledge within the course during implementation and after completing the course Technical Drawing.

Based on the five specific outcomes of education set out in the course description chart, there was formulated one main outcome of education specifying that the achieved outcome of education, as a result of implementation of a curriculum, should be mastery by students

the principles of mutually unambiguous mapping of the spatial elements on the plane, which are necessary in engineering practice for preparing and reading of drawings. [3]

The method of education adopted by the authors in the implementation of the syllabus was based on preparing teaching material and direct working with the students, that is on word and observation (multimedia presentation – lecture); as well as on the method based on practical activity of students – laboratories and on activating methods – brainstorming, resolving problems.

During the lectures in the form of presentations developed in PowerPoint there were presented basic issues of Technical Drawing, included in the course description chart. Materials from the lectures in the form of PDF files along with supporting materials have been shared under a dedicated course at the Remote Educational Platform. A separate lecture part were computer programs courses, as an introduction to laboratory classes. Contents presented during lectures formed the basis of delivered design classes, during which students solved drawing tasks on the basis of individually selected assumptions.

The main assumptions of the implementation of design classes were the simultaneous use of freehand sketches and two basic techniques of technical drawing preparation:

- a drawing prepared manually with the use of drawing tools (Fig. 1,2),
- a drawing prepared using a computer aided design program (CAD programs – AutoCAD and Inventor). (Fig. 3,4)

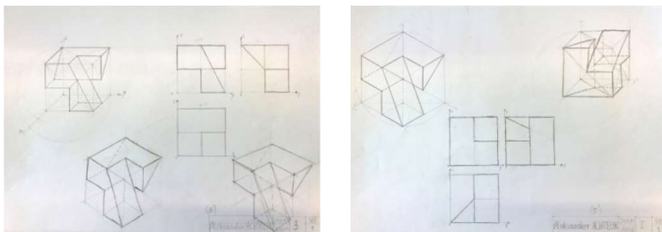


Fig. 1,2 One of the first exercise of the course Technical Drawing in 2016/2017 academic year.

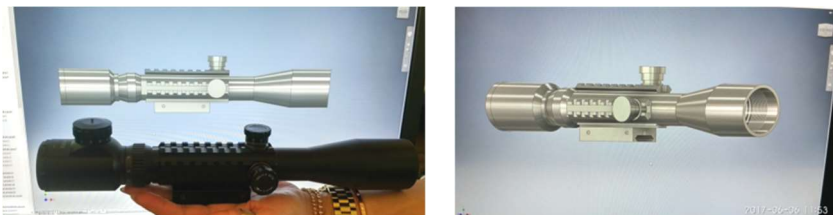


Fig. 3,4 The final exercise of the course Technical Drawing in 2016/2017 academic year.

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