

## **DESIGN PROJECTS OF IPD EDUCATION AT THE BUDAPEST UNIVERSITY OF TECHNOLOGY AND ECONOMICS**

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***Abstract:** A basic characteristic feature of the industrial design engineering education at the Budapest University of Technology and Economics is that it is considerably practice oriented and is based on the so called “learning by doing” principle. It means that students from the very beginning of their studies work on individual projects, they design and model products and even build their prototypes in workshops.*

***Key words:** Integrated, Industrial, Design, Projects, Education.*

### **1. INTRODUCTION**

Founded on joint research projects carried on with departments of the Faculty of Industrial Design Engineering at TU Delft, professional preparation of the establishment of the IDE course at the Budapest University of Technology and Economics got started in 1992. The full-time, five-year programme with 60 first-year students was started in academic year 1996/97. The aim of the course is that the students are in possession of such knowledge and skills, besides a high-level technical education, which enable students to acquire an innovative behaviour. The graduating new experts thus have a creative way of thinking. They are able to approach and manage a development task in a comprehensive, interdisciplinary way and consequently are able to work together with representatives of other fields; moreover they possess those skills and professional knowledge that are necessary for the overall management of the product development process. The industrial design engineer is able to utilise his knowledge and skills successfully in the wide range of consumer durable and the scope of his activity comprehends the whole product innovating process: raising the idea of a new product, design and production, as well as the introduction of the new product in the market, and even recycling. An engineer graduating from this specialisation can work as an industrial product designer, a consultant or even researcher. It derives from the nature of the course that a very intensive and close co-operation with the business sphere including local industry and the small and medium-sized enterprises as well as

Hungarian branches of the international industrial and business world is essential. A basic characteristic feature of the industrial design engineering education is that it is considerably practice oriented and is based on the so called “learning by doing” principle. It means that students from the very beginning of their studies work on individual projects (they design and model products and even build their prototypes in workshops).

The course has an interdisciplinary character and consists of the following four main areas:

- Engineering, material science, construction and technology
- Aesthetics, design and social sciences
- Ergonomics and psychology
- Economics, law, marketing and management

The basic specific feature of the course is the complex design project, which is a constant part of the curriculum already from the second semester. Projects are carried out by students individually or in groups in studios, workshops and other practical sites. The design projects form 25% of the total amount of credits (300) necessary to get the degree. Thus the subject “Integrated product design” plays a key role in the course. In the curriculum of the IDE course great emphasis is laid on practical classes that help develop application skills (modelling, CAD/CAM, marketing, product assessment, etc.) and also on design projects which include all steps of the innovation process starting from outlining design ideas until the preparation of prototypes.

An academic year is divided into two semesters, each consisting of 14 contact weeks. The fundamentals of the course are in the first 6 semesters, and the specialisation within industrial design engineering are in the following 4 semesters. The specialisation includes real industrial projects and diploma project. The candidates must take a special exam, where their freehand drawing ability and their creativity is tested. There are 50-60 students on one year.

## **2. THE IPD EDUCATION IN THE COURSE**

The aim and contents of the “Integrated product design”:

- Complex design projects
- Application of design methodology
- Individual and teamwork
- Learning by doing

- Project orientation
- Making prototypes in the workshop
- Evaluation with 3P method (product, process, presentation)
- Diploma project

Our task is the formation of a homogenous and comprehensive way of thinking – necessary to industrial design engineering – through the continuous integration and practical application of the subjects of the course.

The product development is

- process
- system orientated process
- making new product
- problem recognition, composing and solving process
- integrated process
- organisational process
- cost orientated process
- time limited process
- consumer orientated process
- market orientated process

The “Integrated product design” subjects follow each other consecutively from the 2nd semester to the 9th semester. Students have to work out the tasks individually or in groups. Usually 3-4 students form in a group.

*The models, made by students can be seen on the next pictures.*

## **2.1 INTEGRATED PRODUCT DESIGN I.**

Students have to work out 2 projects during the semester.

- I. project:* – learning of design process
- working in team
  - simple tasks to develop creativity: designing a cardboard bridge
  - acquiring the basis of making models



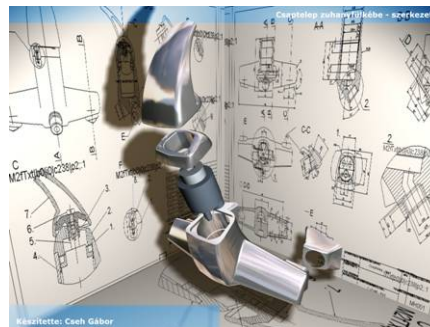
### 2.3 INTEGRATED PRODUCT DESIGN III.

Students have to work out 2 projects during the semester.

- I. project:*
- designing a kind of operating mechanism
  - preparing models



- II. project:*
- designing products with given functions
  - making technical drawings and virtual model of the product

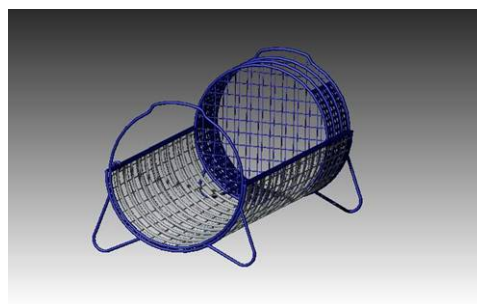
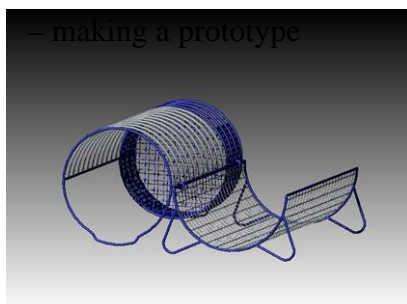


### 2.4 INTEGRATED PRODUCT DESIGN IV.

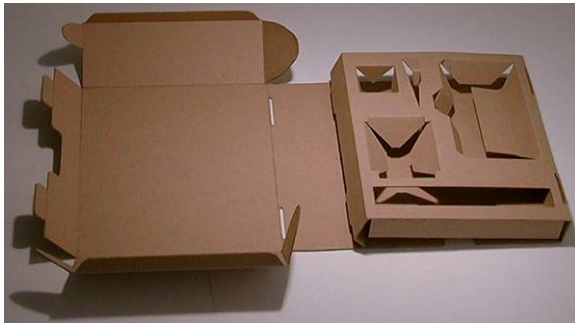
Students have to work out 2 projects during the semester.

- I. project:*
- designing a household product made of metal

– making a prototype



*II. project:* – packaging design of a given product and making model



## 2.5 INTEGRATED PRODUCT DESIGN V.

Students have to work out 1 project during the semester.

- free product idea (students choose the products)
- designing a new product
- preparing a feasibility study
- making a prototype



## 2.6 Integrated product design VI.

Students have to work out 1 project during the semester.

- analysis of given products finding weak points
- redesign and simulation
- working out plans for further developing

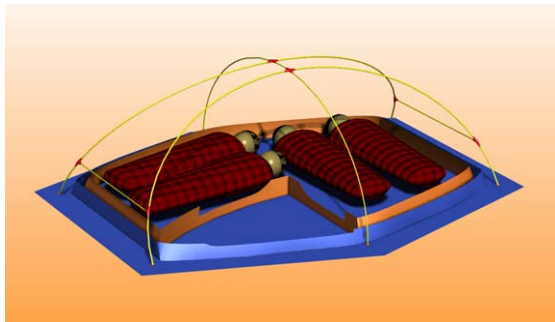
– making virtual model and a prototype



## 2.7 INTEGRATED PRODUCT DESIGN VII.

Students have to work out 1 project during the semester.

- product development at a virtual company
- making and showing a prototype

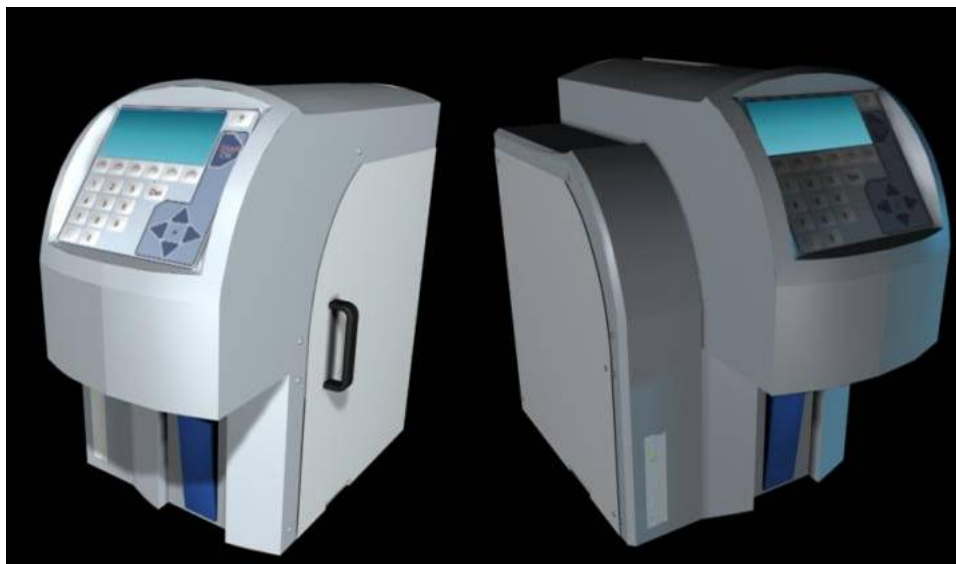


## 2.8 INTEGRATED PRODUCT DESIGN VIII.

Students have to work out 1 project during the semester.

- industrial product development at a company

– making documentation and a prototype



The diploma project is an integrated industrial design assignment chosen from a list of given topics by the student in the last semester. The ratio of the real industrial tasks in the diploma projects is 40 %, but we would like to increase this figure.

### 3. CONCLUSION

Results and advantages:

- Way of thinking in process
- teamwork
- skills of presentation
- increasing sense of aesthetics
- making documentation
- making model

Insufficiencies and problems:

- imperfect engineering knowledge
- connections of electives
- many kinds of tasks, different levels
- certain roles in a group
- different view of mentors
- not enough real industrial projects
- insufficient financial background
- insufficient infrastructure

### 4. REFERENCES

Andras VARGA, Dr. Tibor BERCSEY: Experiences and results of IPD education at the Budapest University of Technology and Economics, Magdeburg, 2002