Piloting of dual higher education programs within TUM:

main achievements and accomplishments

SUMMARY

1. Dual Higher Education Model at TUM

2. Partner companies

3. Bachelor's Degree Programs with dual study at TUM

4. in-company training

5. Promotion of dual education at TUM

6. The infrastructure developed within the project

7. Final remarks

2ND COOPERA EXPERT WORKSHOP
**CHISINAU, MOLDOVA, 3-4 NOVEMBER 2022**

DUAL HIGHER EDUCATION MODEL AT TUM
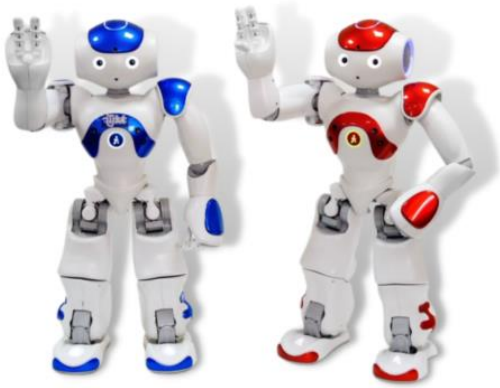
The main goal of the DHEM is to improve work capacity, compatibility and continuity between the requirements of the business environment and the initial training of university students.

The aim is to put students in a position from which they can develop and try their ways of solving problems during the practice phases.

TUM follow an integrated model in existing programmes *Robotics and Mechatronics* and *Automatics and Informatics*, introducing changes in the study process.
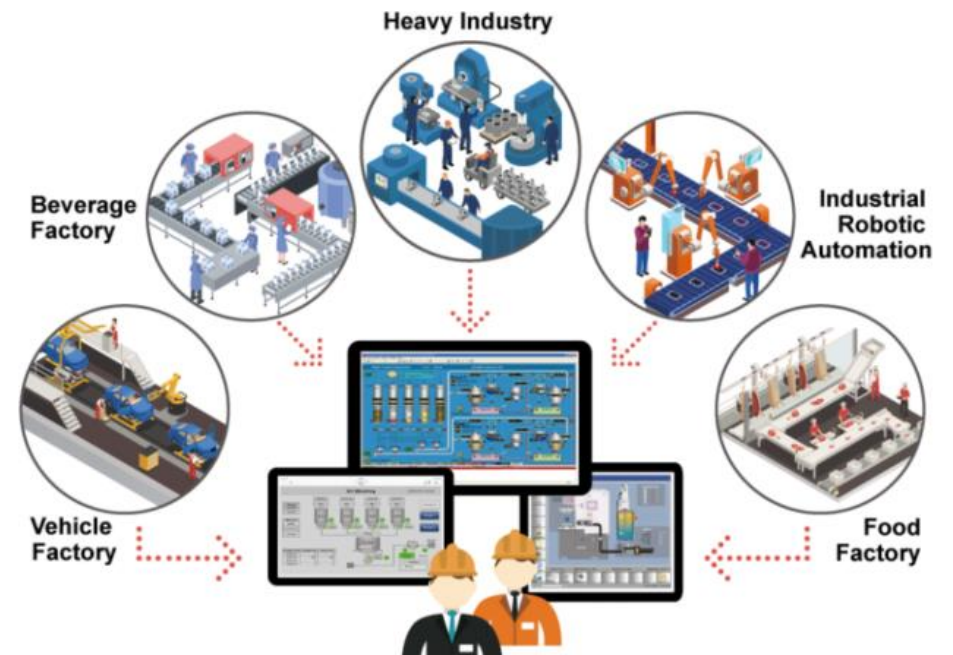
DUAL HIGHER EDUCATION MODEL AT TUM

According to the model approved at TUM after the discussions with representatives of companies, students from these two programs.

In the 2nd year of study they have the possibility to select a free choice discipline **In-company training** (120 hours).

Starting with 3rd year of study they will have the opportunity to choose one of two ways to continue their studies: dual or classic.

Students from both study forms will also have common disciplines they will attend during two days of study.

Students who choose the classic form of study will continue with the courses according to the curriculum, and students who will select DHEM will leave for three days at the company, where they will have the opportunity to receive practice vocational training or work experience.

	N. of weeks	Structure for the study in the university		Structure for the in-company training study		Total hours
		Hours/days per week	%	Hours/days per week	%	
1. Semester	15	15	100	0	0	900
2. Semester	15	15	100	0	0	900
3. Semester	15	15	100	0	0	900
4. Semester	15	15	100	0	0	900
5. Semester	15	300/2 days	33,3	600/3 days	66,7	900
6. Semester	15	355/2 days	39.4	545/3 days	60,6	900
7. Semester	15	310/2 days	34,4	590/3 days	65,6	900
8. Semester	15	100	11,1	800	88,9	900
Total		4565	62,7	2775	37,3	7680

PARTNER COMPANIES

The faculty team developed the dual education model in consultation with specialists in the fields of electrical and electronic engineering, computer science, information technology, automation and mechanical engineering:

Arobs Software,
Inther Software Development,
Mechatronics Innovation Center,
ICG Engineering,
EFES,
LED Market

Also, teachers, graduates and students participated in various surveys. The implementation team studied their opinions.

2ND COOPERA EXPERT WORKSHOP
CHISINAU, MOLDOVA, 3-4 NOVEMBER 2022

BACHELOR'S DEGREE PROGRAMS WITH DUAL STUDY AT TUM

The **Robotics and Mechatronics** study program aims to train industrial and research engineers in robotics and mechatronics, adapt to new labour market conditions, and develop the necessary skills in four essential areas of engineering: automation, computers, electronics and mechanics.

The **Automatics and Informatics** study program provides training and education for specialists in Electronics and Automation. A specialist in Automatics intends to show an integrated set of knowledge, skills and abilities necessary to develop industrial equipment, control systems, communications and information systems for process management in different sectors of human activity.

Both are bachelor's degree programs in interdisciplinary science and technology, which integrate with a systematic conception of such fields as Automation, Informatics, Electronics, Computers, Communications, Robotics, industrial, technological and manufacturing processes.

2ND COOPERA EXPERT WORKSHOP
CHISINAU, MOLDOVA, 3-4 NOVEMBER 2022

BACHELOR'S DEGREE PROGRAMS WITH DUAL STUDY AT TUM

Several factors influenced the selection of these two undergraduate programs:

1. Continuous automation and robotisation of technological and production processes in the Republic of Moldova;

2. The internships at companies, the direct interaction with complex equipment, state-of-the-art automatic, robotic and mechatronic systems, the possibility to learn from professionals will allow the acquisition of the necessary competencies for future engineers;

3. The need to develop new methods and technologies for the design and production of automated and robotic systems leads to the creation of favourable conditions for the development of dual education in the field of Automatics and Robotics.

IN-COMPANY TRAINING

The students of the 2nd year of studies from the RM and AI undergraduate programs are currently involved in 2 trainings organized by the companies AROBS Software and ISD (Inther Software Development).

Several working visits to partner companies are planned.

Negotiations are underway with several companies in order to sign agreements.

COURSE EMBEDDED C PROGRAMMING (AROBS SOFTWARE)

1. 60 hours of theory and practice

2. Equipment provided by the company

3. Projects developed by teams

4. Prizes and scholarships granted by the company

**2ND COOPERA EXPERT WORKSHOP
CHISINAU, MOLDOVA, 3-4 NOVEMBER 2022**
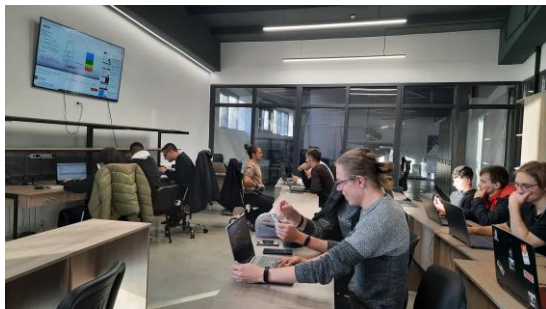
TRAINING COURSE "PROGRAMMING PLC"

In this course taught by PLC engineer - Victor Dropeț, students are introduced to: PLC programming techniques, hardware and software configuration of PLCs, communication protocols with PLC, configuration and activation of communication with external equipment or I/O extension.
Duration of the course – 6 weeks
All participants will receive certificates and possibility to continue internships at company.

2ND COOPERA EXPERT WORKSHOP
CHISINAU, MOLDOVA, 3-4 NOVEMBER 2022
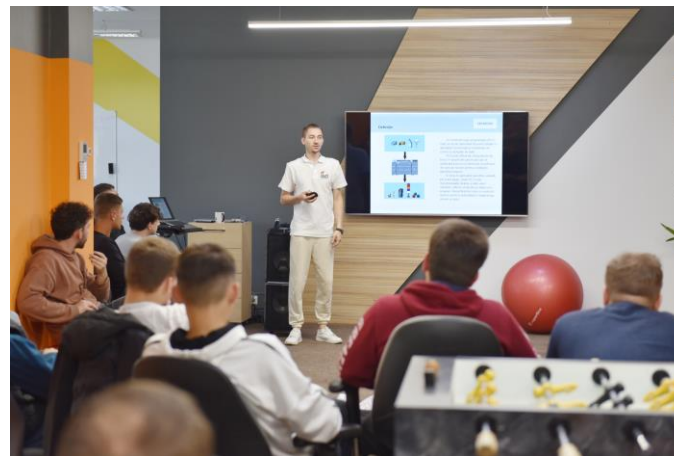
PROMOTION OF DUAL EDUCATION   AT   TUM

Flyers

Spot UTM inv dual Fin

Advertising spot

Roll ups

Advertising materials also had a great importance in the promotion of dual education.
In addition to the dissemination on social networks, the websites of TUM and the
faculty, flyers, advertising spots, and banners were also developed.

THE INFRASTRUCTURE DEVELOPED WITHIN THE PROJECT

Spaces for equipped laboratories

- Budget : EUR 35 000

- Spaces: 80 m2

- The spaces for dual education are under renovation

- Almost all the equipment has already been delivered

**2ND COOPERA EXPERT WORKSHOP
CHISINAU, MOLDOVA, 3-4 NOVEMBER 2022**

FINAL REMARKS

- Dual education in higher school represents an alternative form of study that places a significant emphasis on the formation of practical skills of students in the professional environment;

- Implementing dual education for the bachelor's degree programs in Robotics and Mechatronics and Automatics and Informatics at TUM will increase interest in these two programs;

- The proposed dual education model imposes a close collaboration with the companies, which must be actively involved in this process;

- The advantages for students: an excellent opportunity to test their capabilities in the chosen career, financial independence (during the internship, the student receives a salary), trainers both from the university and from companies, and the experience gained during the training will be helpful for the future career;

- Companies also benefit from this study method: partner companies can notice selected students' talent in advance, access to people with potential and interest in industry; professional training according to the real needs of the company.