



Tempus

Development of Embedded System Courses with implementation
of Innovative Virtual approaches for integration of Research,
Education and Production in UA, GE, AM



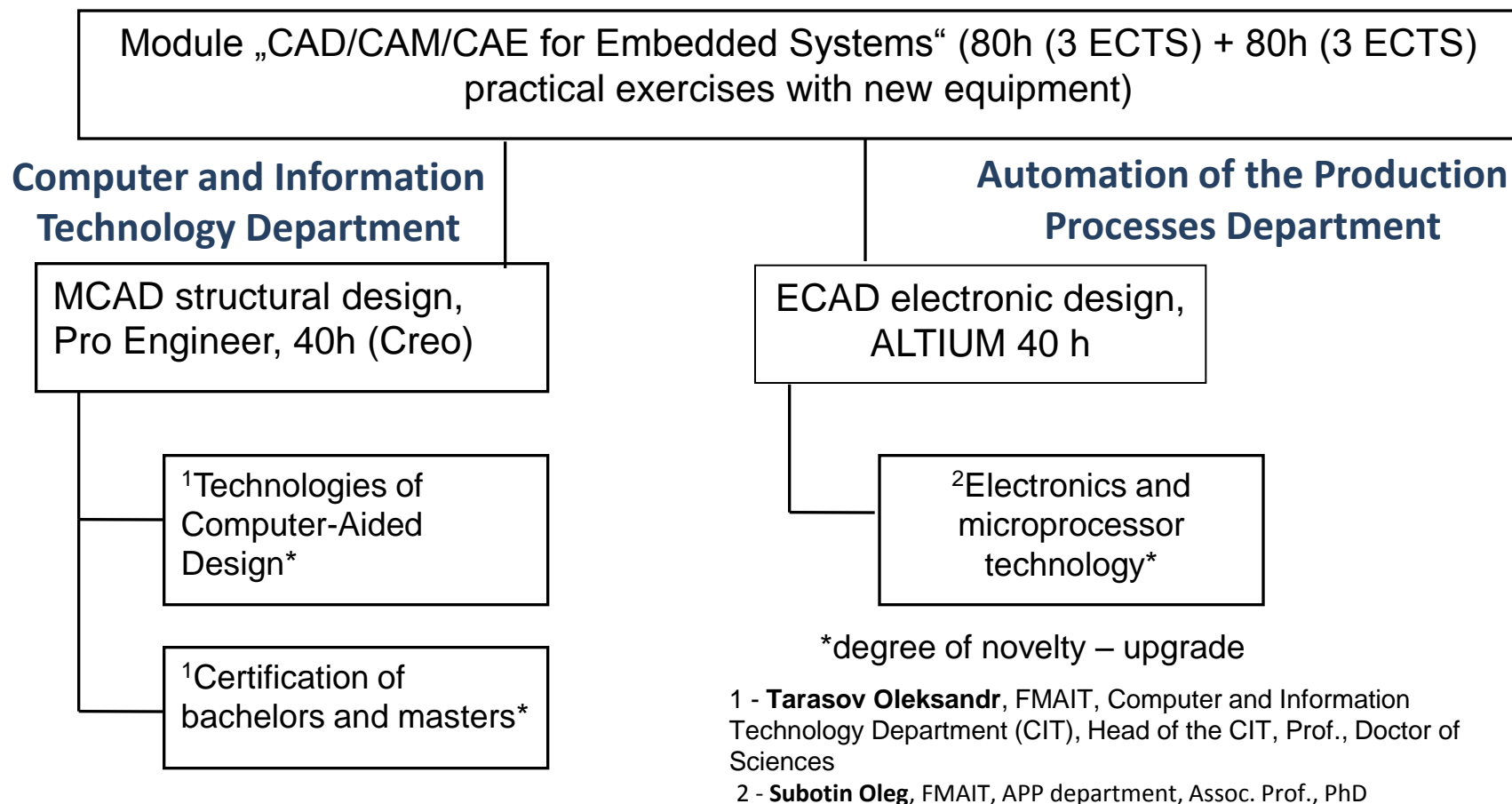
P06 Presentation of the Donbass State Engineering Academy (DSEA) Kramatorsk, Ukraine

28-29 October 2015

Oleksandr Tarasov

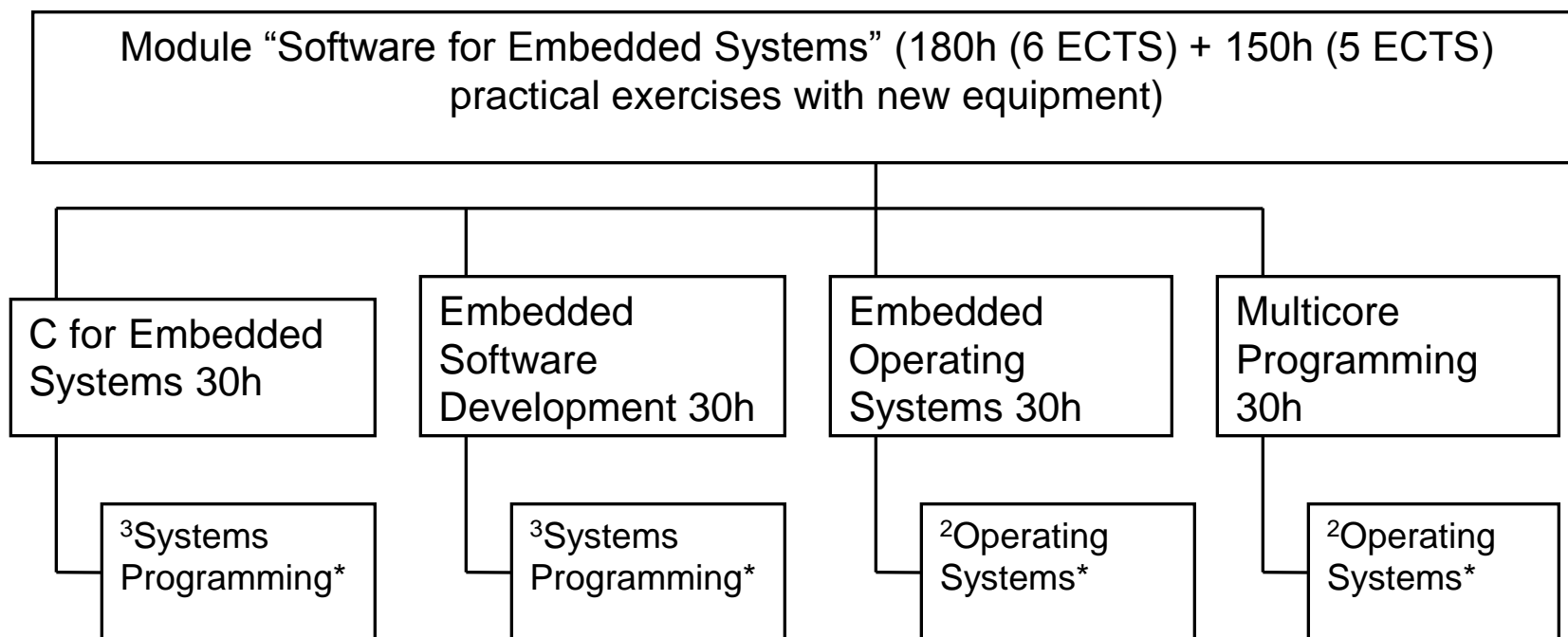


Distribution of modules studied within TEMPUS DesIRE by disciplines and distribution of disciplines among lecturers





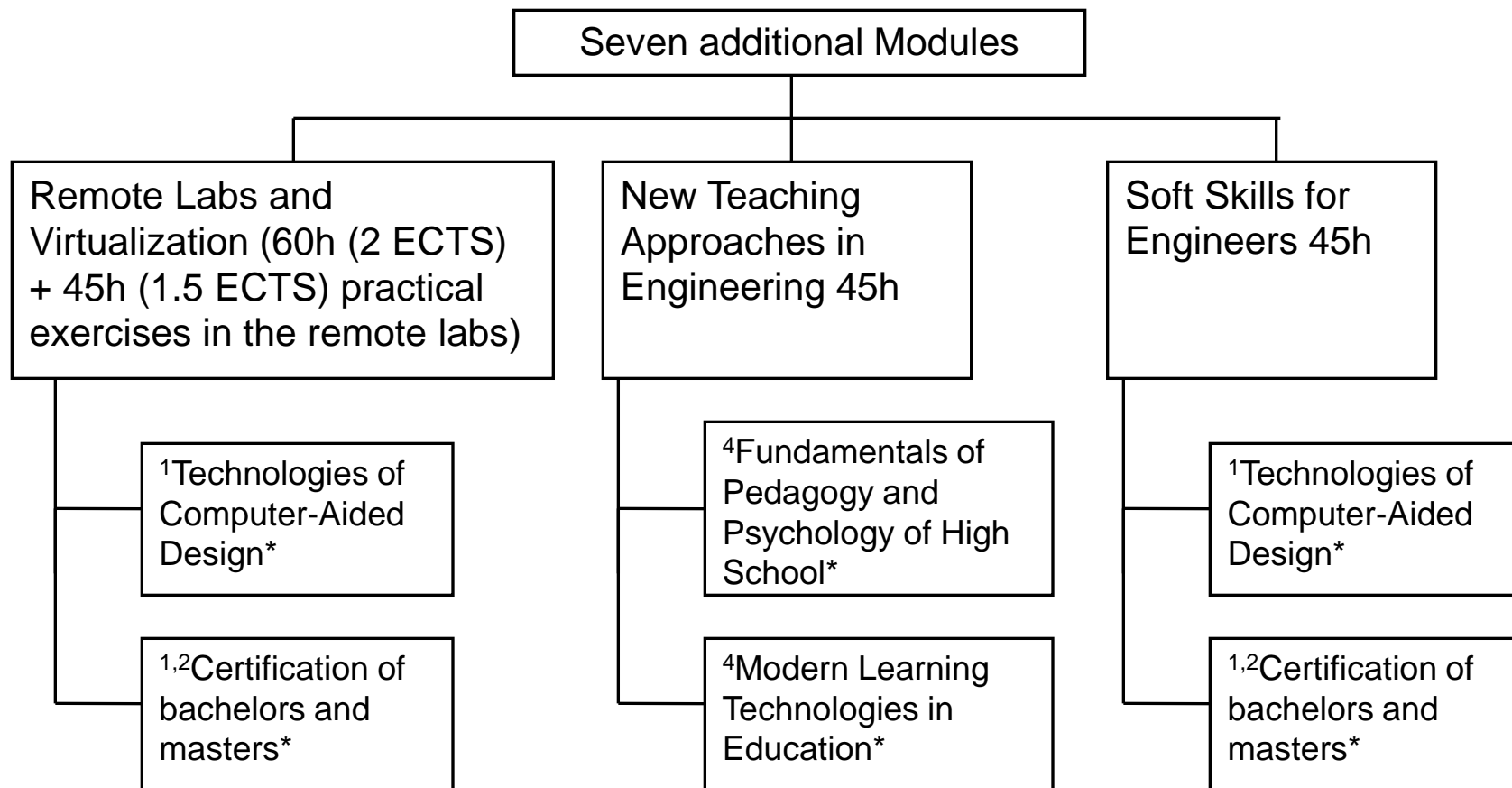
Distribution of modules studied within TEMPUS DesIRE by disciplines and distribution of disciplines among lecturers at the Computer and Information Technology Department



2 - **Sahaida Pavlo**, FMAIT, CIT department, Assoc. Prof., PhD.

3 - **Altuhov Oleksandr**, FMAIT, CIT department, senior lecturer

*degree of novelty – upgrade

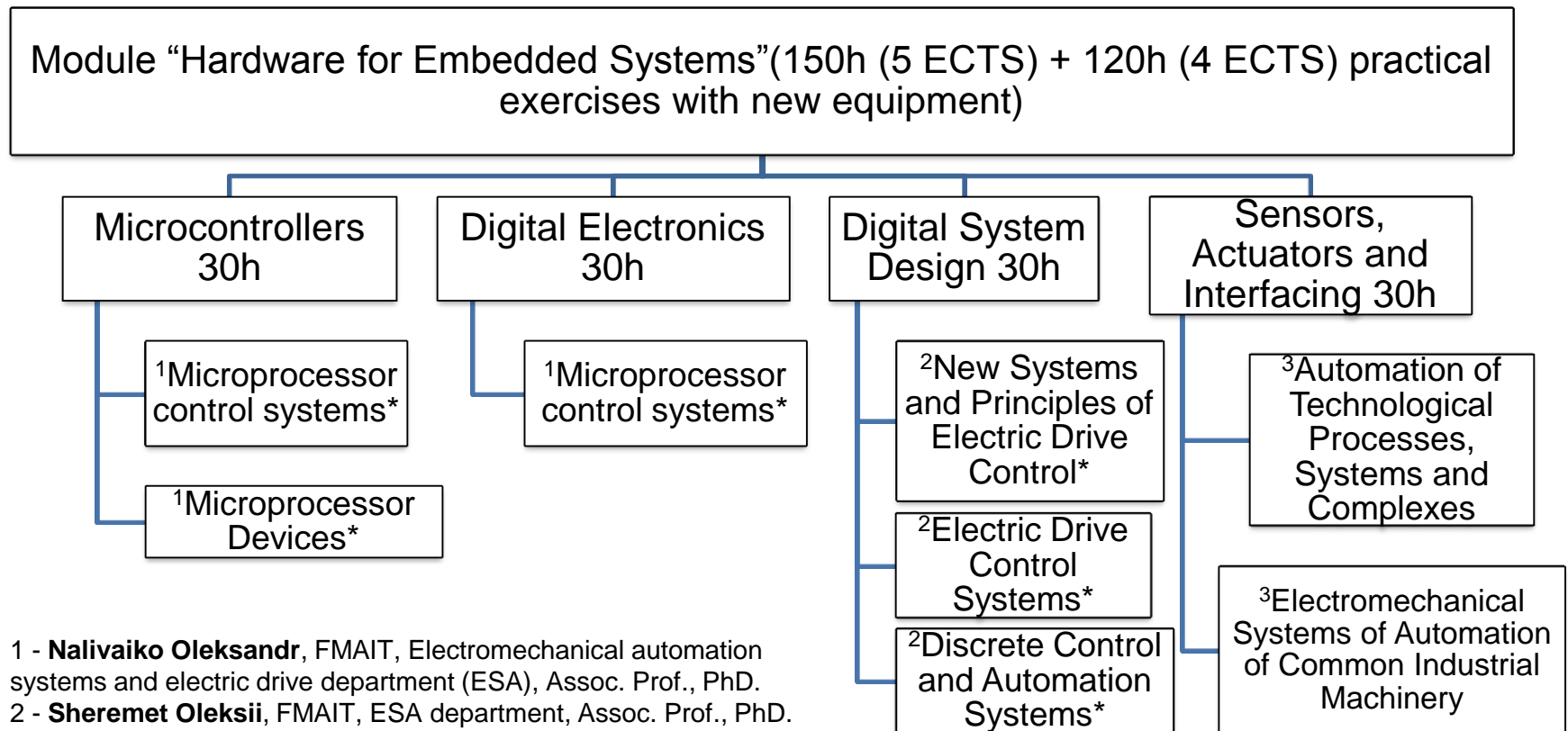


*degree of novelty – upgrade

- 1 - **Tarasov Oleksandr**, FMAIT, Computer and Information Technology Department (CIT), Head of the CIT, Prof., Doctor of Sciences
2 - **Sahaida Pavlo**, FMAIT, CIT department, Assoc. Prof., PhD.
4 - **Vlasenko Ekaterina**, Faculty of Mechanical Engineering, Prof. of Higher Mathematics Department, Prof., Doctor of Science



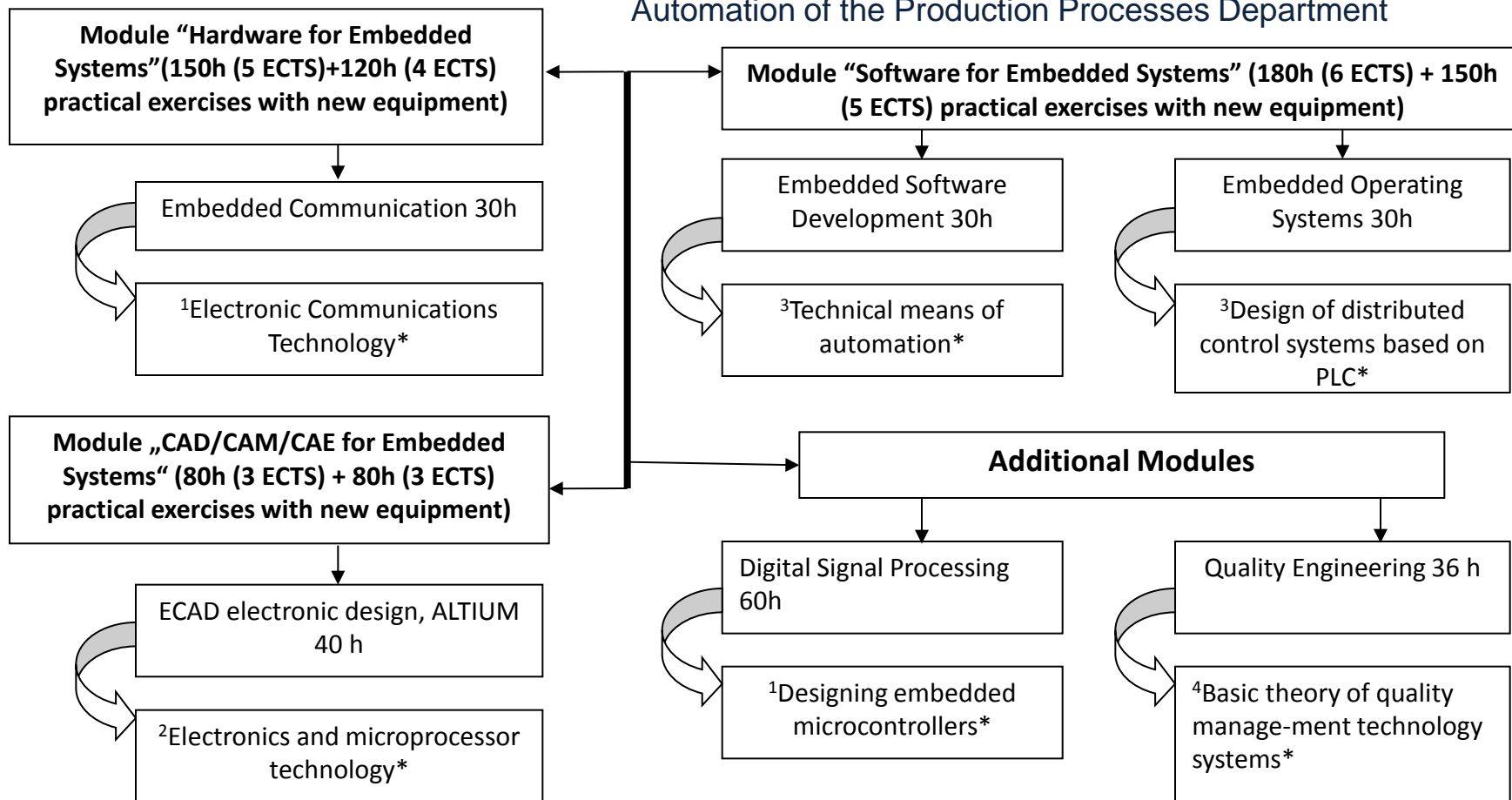
Distribution of modules studied within TEMPUS DesIRE by disciplines and distribution of disciplines among lecturers at the Electromechanical Systems of Automation Department



*degree of novelty – upgrade



Automation of the Production Processes Department



*degree of
novelty –
upgrade

- 1 - **Donchenko Evgeniy**, FMAIT, Automation of production processes (APP) department, senior Lecturer
- 2 - **Subotin Oleg**, FMAIT, APP department, Assoc. Prof., PhD
- 3 - **Razzhivin Aleksey**, FMAIT, APP department, Assoc. Prof., PhD
- 4 - **Klimenko Galina**, FMAIT, Head of the APP department, Prof., Doctor of Sciences



Restructuring: university management and governance

- ❏ License for retraining of teachers and employees of the enterprises was obtained in the field of computer-aided design with the following modules included:
 - CAD/CAE/CAM – Systems, ES
 - The use of remote laboratories
 - The use of e-learning technologies and others
- ❏ The first group of teachers and employees of the enterprises will defend the graduation projects in December, 2015





Academic co-ordination and administrative management

- ❏ Introduction of elements of e-learning in the DSEA begun. Moodle system is now installed on the new server
- ❏ At the Academic Council of the DSEA a report will be presented on the topic “The use of distance learning in the educational process of the DSEA” (29.10.15)
- ❏ English language courses for teachers of the DSEA will start to operate in November



Equipment installation

- ❏ Actions on the software installation of PTC Creo, Altium Design the laboratories of the CIT Department were taken
- ❏ The laboratories possess internet access, local computer network, Wi-Fi. Computers and ESD Laboratory will be installed in the laboratory of the CIT Department, Room 2221
- ❏ Remote Laboratory and the server are placed in Room 222a
- ❏ The server for Moodle is placed in Room 2216
- ❏ Article "Technical Upgrade Of Educational Process And Scientific Work Based On Embedded Computer Systems" is ready for publication





Work on the installation of equipment and software



To ensure the educational process room 2221 accommodates 5 computers received owing to the project. GOLDi technological cell server is installed in room 2222a



The second server is installed in room 2216. The DSEA is connected to the Internet and to the local network. Moodle installation is underway

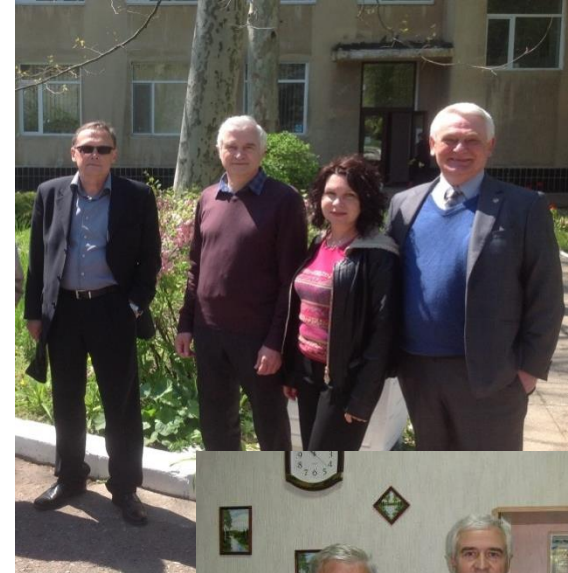




Meetings with professors

Provision of information about the Project:

- NTUU “KhPI” (Kharkiv)
 - ONMU, ONTU (Odesa)
 - KhNURE (Kharkiv)
 - NMAU (Dnipropetrovsk)
 - ONMU, ONTU (Odesa)
 - NTUU “KPI” (Kyiv)
- ❏ To expand the cooperation ties a Contract with Kharkiv National University of Radioelectronics (KhNURE) on cooperation in the field of information technology in education and research has been prepared for signing

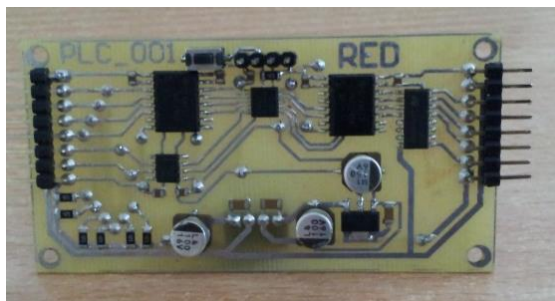




Meeting: “Altium Designer” in the DSEA (April 2015)



The development process of printed circuit boards (PCB)



Designed and manufactured PCB



Retraining of 12 teachers and 23 students (The basic level of training)

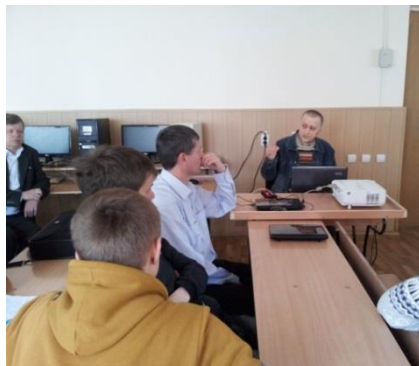
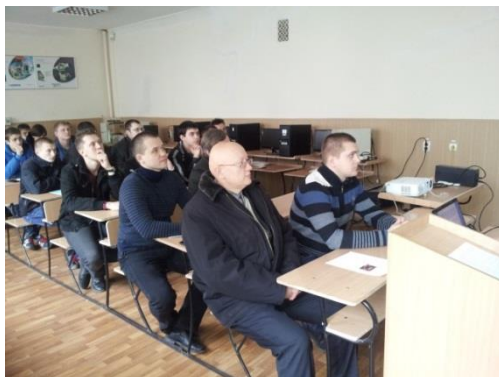


Seminar on Arduino programming (May 2015)

Seminar on Arduino programming was held in May, 2015



Report on the system of specialized training of engineers in the ITU, Germany



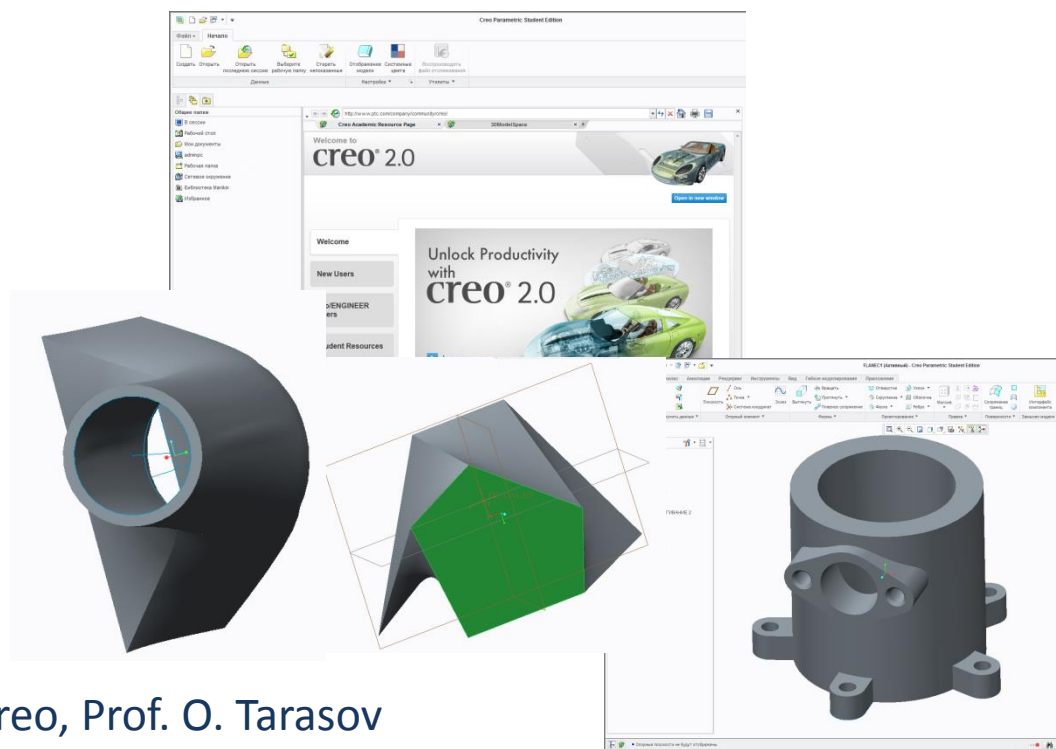
Retraining of 12 teachers and 23 students (The basic level of training)



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Master classes in Kyiv (May, 2015) and in Zaporizhia (October, 2015). Presentations by the DSEA team



Design with CAD Creo, Prof. O. Tarasov



Master class in Zaporizhia (October, 2015) Presentations by the DSEA team

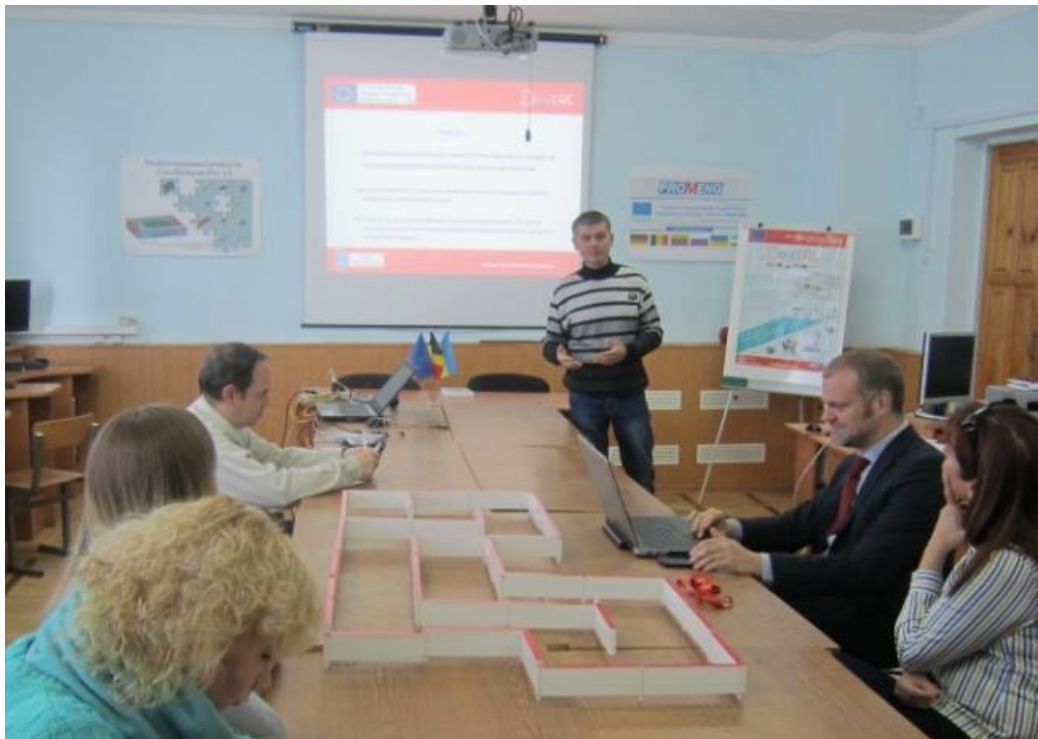


OS input/output system with the
use of Arduino and Raspberry Pi,
Assoc. Prof. P. Sahaida





Master class in Zaporizhia (October, 2015) Presentations by the DSEA team



Design and
assemble of
control system
for pendulum,
Assoc. Prof.
O. Subotin



To introduce individual modules or module sections additional teaching stuff is involved



Besh Andrii, FMAIT, Electromechanical automation systems and electric drive department, senior lecturer:
Microelectronics,
Microprocessor Devices



Perepelitsa Volodymyr, FMAIT, Electromechanical automation systems and electric drive department, postgraduate:
New Systems and Principles of
Electric Drive Control



Babash Andriy, FMAIT, Electromechanical automation systems and electric drive department, postgraduate:
Automation of Technological Processes,
Systems and Complexes

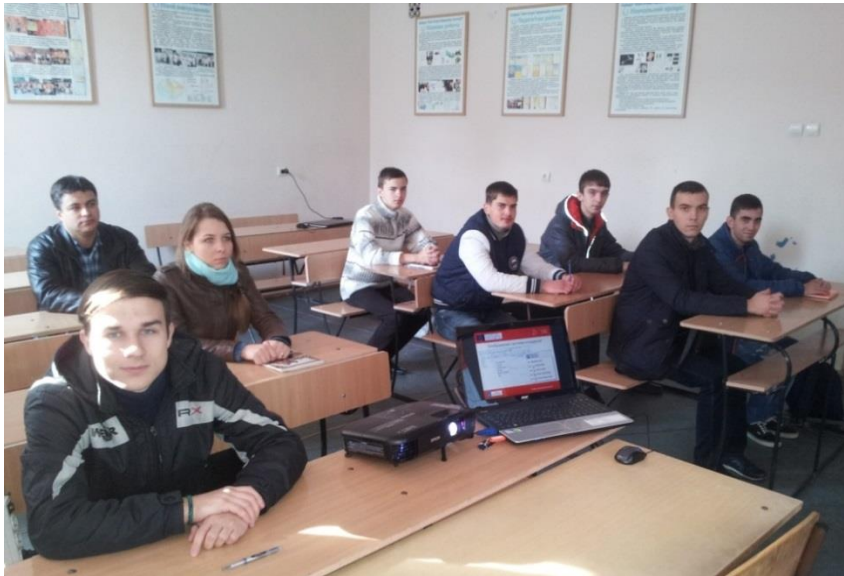


Dobryak Sergii, FMAIT, Computer and Information Technology Department, PhD, Software for Embedded Systems

Miheenko Denis, Computer and Information Technology Department, PhD, CAD/CAM/CAE for Embedded Systems



The educational process in the DSEA

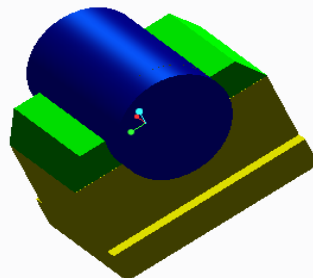
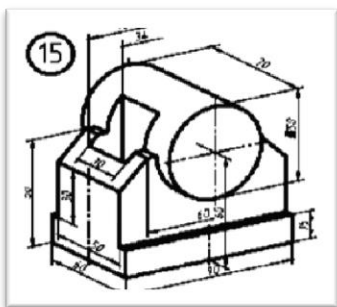
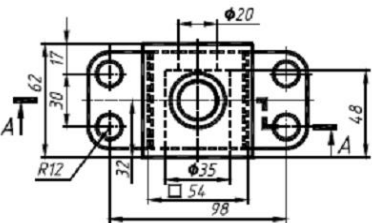


MCAD structural design - PTC Creo,
Kramatorsk (October 2015, IT-14t group)

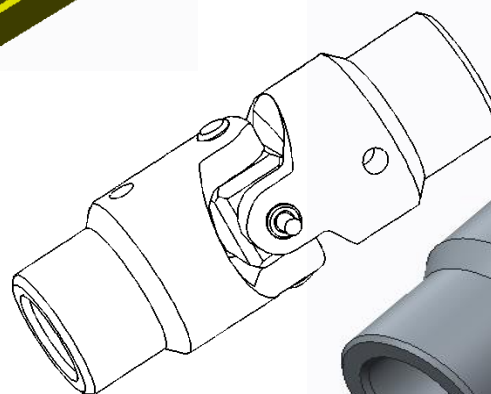
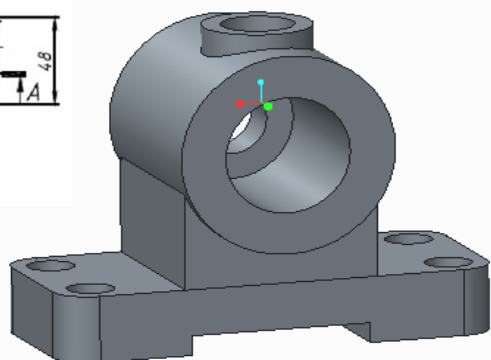




Introduction of CAD Creo into students' practical training



Tasks for practical training (38 students, CIT, April 2015)





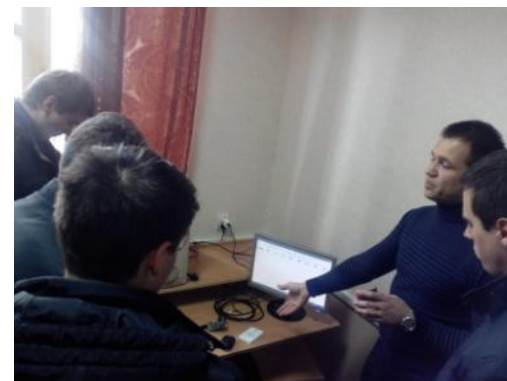
Use of the equipment in the educational process



Lecture in “Automation of Technological Processes, Systems And Complexes” on topic “Processing units for embedded systems” in ESA-12-1 group (21 students)



Raspberry Pi 2 is under consideration as a processing unit connected to an external screen and the periphery, the main functions of Embedded OS and applications





Use of the equipment in the educational process



Laboratory practical work on discipline “Automation of Technological Processes, Systems And Complexes” on the topic “Output device types” in ESA-12-1 group (21 students)



Microcontroller STM32F4 Discovery is used, output to external devices (LED)

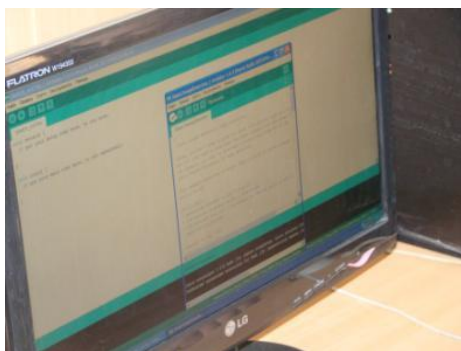




Use of the equipment in the educational process



Laboratory practical work on discipline
“Microprocessor control systems” on the
topic “Arduino programming” in ESA-13-1
group (9 students)



Embedded system Arduino
Mega 2560 with DANGER
Shield Kit is used





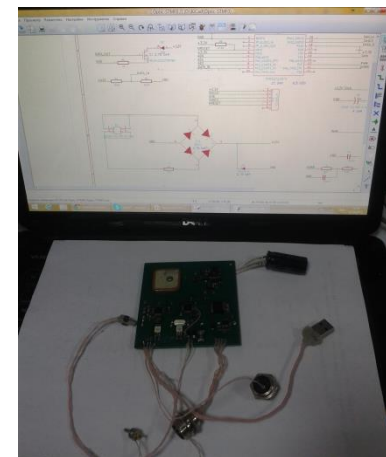
Embedded systems for diploma projects on control systems modernization



Yevhen Churilov, AVP-10-2
The project of modernization of control systems for seeding of cultivated crops to increase the reliability of the system



Akim Cherepiy, AVP-11-1
The project of automatic lighting of laboratory facilities in order to reduce power consumption



Daria Klovanyk, AVP-11-1
The project of modernization of automatic control of seeding of cultivated crops to improve the quality of seeding



Theses and projects performed in spring 2015

Таблица 2.18 Технические параметры 1N4148.

Параметр	Значение
Материал	кремний
Максимальное постоянное обратное напряжение, В	75
Максимальное импульсное обратное напряжение, В	120
Максимальный средний ток, А	0.2
Максимально допустимый прямой импульсный ток, А	0.45
Максимальный обратный ток, мкА	5
Максимальное время обратного восстановления, нс	0.004
Рабочая температура, °C	-65...150

А также для большей надежности на выходе схемы ставим стабилизатор напряжения на 3.3 В, чтобы на контроллер не поступало напряжение превышающее значение 3.3 В, что негативно скажется на его работе.

Таким образом полученная нами схема датчика тока и напряжения, собранная в программе ALTIUMDESIGNER показана на рисунке 2.16.

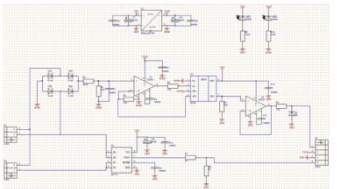


Рисунок 2.16 – Схема электрическая принципиальная датчика тока и напряжения

Имя	Лист	№ докум.	Полн.	Дата
ДП.09521977.0СА13-г.000 ПЗ				

При проектировании данной схемы в итоге мы получили монтажную схему, выполняемую на печатной плате, представленную на рисунке 2.17.

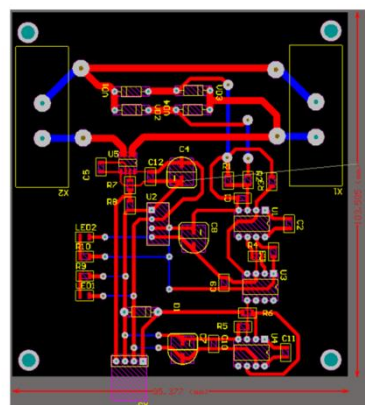
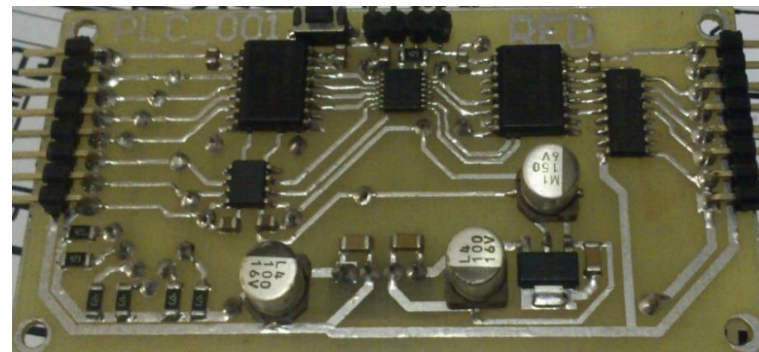
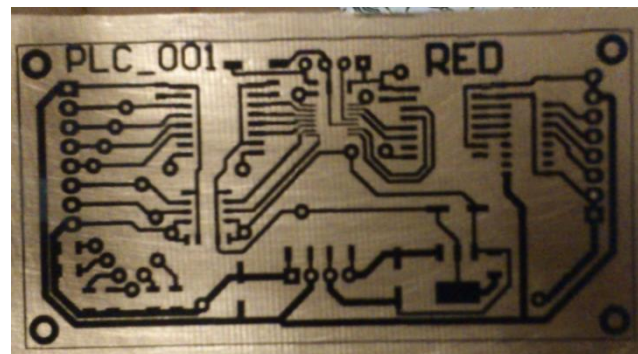


Рисунок 2.17 – Монтажная схема подключения датчика тока и напряжения

В результате промоделировав данную схему мы получили внешний вид нашей будущей печатной платы со всеми внесенными в нее элементами. Внешний вид схемы датчика тока и напряжения показан на рисунке 2.18.

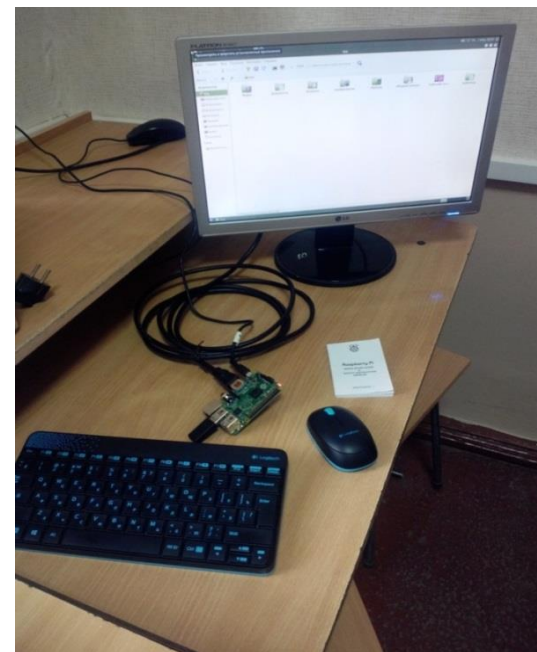
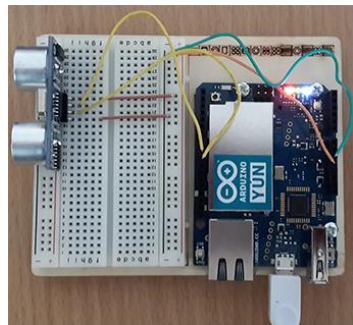
Имя	Лист	№ докум.	Полн.	Дата
ДП.09521977.0СА13-г.000 ПЗ				



From design to fabrication of PCB and devices using Altium Designer



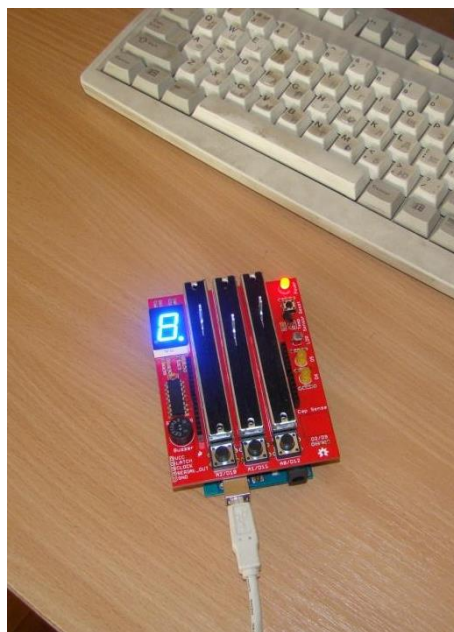
Postgraduate student V.Perepelitsa (ESA department) report



Thesis on "Improvement of automated electric drives for metalworking industrial plants with a view to performance optimization", where Raspberry PI is to be applied.



Work on the development of software and embedded systems in the framework of DesIRE continues



The equipment in the educational process



Tempus

DesIRE



Thank You
for Your Attention