UNIVERSITATEA „POLITEHNICA”DIN TIMIŞOARA// „POLITEHNICA” UNIVERSITY OF TIMISOARA

SYLABUS
for the course:
“INTEGRAREA FORMEI SI CONFIGURAREA SISTEMELOR MECATRONICE”// „SHAPE INTEGRATION AND MECHATRONIC SYSTEMS CONFIGURATION”

FACULTATEA DE MECANICĂ// FACULTY OF MECHANICAL ENGINEERING
DOMENIUL MECATRONICĂ ŞI ROBOTICĂ// MECHATRONICS AND ROBOTIC STUDY DOMAIN

Anul de studii// Study year: **(1)**
Semestrul// Semester: (2)

Titularul cursului: Prof. Dr. ing. Lia DOLGA
Colaboratori*:* **-**

Numar de ore/saptamana/Verificarea/Credite// Number of classes/ Assessment/ Credit points					
Curs	**Seminar**	**Laborator**	**Proiect**	**Examinare**	**Credite**
1	**0**	**1**	**2**	**E**	**8**

A. OBIECTIVELE CURSULUI/ COURSE GOALS

The development of the knowledge and of the skills in the integration of the shape design for mechanical parts and assemblies with the simulations and the development of the control system in order to lead to a more efficient design of complex and flexible mechatronic systems. The skill of working in parallel within three different software environments (3D shape modelling, kinematic- dynamic simulation, controller design) on closed loop systems. The aptitude of sharing and validating ideas and specific concepts and of correlating and correcting the results within each of these. The competence of applying functional simulations for systems that include both mechanical and electrical components. The simultaneous operation within CATIA/ CosmosMotion/ LabView is considered.

B. SUBIECTELE CURSULUI// COURSE TOPICS

Introduction: *From the serial design towards the parallel design. CAD- Simulation- Control design interfaces. Methods and resources.* ***Virtual prototyping:*** *Working principles, The creation of the integrated environment CAD-Motion simulation- Control design. Advantages.* ***Conceptual design visualization:*** *Electro-mechanical simulation, Use of the control logic for visualizing the running mode of the system, Visualisation of the logic control elements, Visualization of the motion paths, Closed loop simulations, Hybrid simulations.* ***Logical design of the digital control system:*** *Validation of the conceptual design, Validation of the logical diagram.* ***The design of the motion control system:*** *Multi-axial motion coordination, collision detection, Motor selection.* ***The PID loop design:*** *Optimization, Adjustment, Improvement of the PID systems based on functional simulations. Advanced feed-back techniques.* ***Automated control design:*** *The determination of the performance requirements for the mechatronic system, the detection of the mechanical resonance and the optimal control algorithms design. Hardware components implementation.*

C. SUBIECTELE APLICATIILOR (laborator)// APPLICATION SUBJECTS (laboratory classes)

Laboratory working subjects that concretize the taught subjects. Miniprojects to develop the creation aptitude and to improve the team working skills.

D. BIBLIOGRAFIE// REFERENCES

1. National Instruments: NIMotion şi LabView SoftMotion Development Module, sine.ni.com/motion
2. *** - www.ni.com/mechatronics/
3. Texas Instruments : www.ti.com
4. North Carolina State University : www.ncsu.edu
5. University of North Carolina : www.unc.edu

E. PROCEDURA DE EVALUARE// ASSESSMENT PROCEDURE

Final examination with applied subjects: blend model presented in public-0.3%, Distributed assessment with the following weights: Project I- 0.25%, Project II- 0.3%, Personal progress15%..

F.COMPATIBILITATE INTERNATIONALA

- *Vanderbilt University, Nashville, SUA,*
- *University of California, Berkeley, SUA,*
- *University of Florida, Gainsville, SUA,*
- *Royal Institute of technology, Stockholm, Suedia*.

Data: 05.01.2016

TITULAR DE DISCIPLINĂ, Prof. Dr. ing. Lia DOLGA