

## FIȘA DISCIPLINEI

Denumirea disciplinei :		<b>Embedded Systems Architecture</b>			
Codul disciplinei:					
Programul de studii:		Embedded Systems			
Catedra:		Computer Science and Automatic Control			
Facultatea:		"Hermann Oberth" Faculty of Engineering			
Universitatea:		„Lucian Blaga” University of Sibiu			
Anul de studiu:	1	Semestrul	2	Tipul de evaluare finală	Exam
Regimul disciplinei (DI=obligatorie/ DO=opțională/DF=liber aleasă):			DI	Numărul de credite:	10
Categorია formativă a disciplinei (DF=fundamentală.; DI=ingineresci; DS=specialitate; DC=complementară)					DS
Total ore din planul de învățământ	<b>70</b>			Total ore pe semestru:	70
Titularul disciplinei: Conf. dr. ing. Ioan Z. MIHU					

Numărul total de ore (pe semestru) din planul de învățământ					
Total ore/ semestru	C	S	L	P	Total
	<b>42</b>	-	<b>28</b>	-	<b>70</b>

<b>Obiective:</b>	The goal of this course is studying the Embedded Systems Architecture and Embedded Applications. The strategies of designing the Embedded Systems are presented and representative Embedded Applications are described.
<b>Competențe specifice disciplinei</b>	<b>1. Knowledge and understanding:</b> <ul style="list-style-type: none"> <li>• knowledge and understanding the general principles for the subject</li> <li>• knowledge and proper operation of discipline-specific advanced concepts</li> <li>• ability to integrate knowledge gained from other areas</li> <li>• ability to integrate specific sources of information</li> </ul>
	<b>2. Explication and interpretation:</b> <ul style="list-style-type: none"> <li>• critical analysis of theoretical models, ideas and traditional approaches</li> <li>• skills to develop a project and complete a report on it</li> <li>• improving teamwork</li> </ul>
	<b>3. Instrumental – applicative</b> <ul style="list-style-type: none"> <li>• knowledge of and proficiency in state-of-the-art tools</li> <li>• application design on different levels</li> <li>• usage of a variety of strategies, methods, techniques for design, implementation and evaluation</li> </ul>
	<b>4. Attitudinal:</b> <ul style="list-style-type: none"> <li>• developing of a positive attitude towards research</li> <li>• appreciation of teamwork, responsibility for the team’s results</li> <li>• developing of a positive attitude towards (the need for validation of the theoretical aspects by) a practical application</li> <li>• awareness of the need to participate in their own professional and scientific development</li> </ul>

Conținutul tematic (descriptori)	<b>Analytical program of the course</b>		
	<b>No.</b>	<b>Subject</b>	<b>Time</b>
	1.	A Systems Engineering approach to Embedded Systems design.	3 hours
	2.	Embedded Hardware.	3 hours
	3.	Embedded Processors	6 hours
	4.	Memory in Embedded Systems.	6 hours
	5.	Input/Output in Embedded Systems.	3 hours
	6.	Embedded Software.	6 hours
	7.	Embedded Operating Systems	3 hours
	8.	Middleware and Application Software	3 hours
	9.	Designing and developing a Embedded System Architecture	6 hours
	10.	The final step: Implementation and testing of the Embedded System	3 hours
	<b>Analytical program of the laboratory</b>		
	1.	Software tools for embedded applications. Dave, Tasking, Flashtools (MCU C161k)	2 hours
	2.	Parallel ports programming	2 hours
	3.	Timers programming and utilization	4 hours
	4.	Synchronous/asynchronous serial interface programming	4 hours
	5.	External interrupts handling	2 hours
	6.	Analog-digital converter programming	2 hours
	7.	CCP interface (Capture, Compare, PWM)	4 hours
8.	SPI and I2C interfaces	4 hours	
9.	Watch-dog timer programming	2 hours	
10.	Final evaluation	2 hours	

Metode de predare / seminarizare	Lectures, explanations, conversations, demonstrations, case studies, exercises, debates.
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Stabilirea notei finale (procentaje)	- Final exam	40%
	- Evaluations during the semester	-
	- Activity developed at laboratory	30%
	- Activity developed at project	30%
	- Homework	-
	- Other activities	-
	- TOTAL	100%

Final evaluation will consist in written exam (descriptive subjects and problems).

**Requirement for note 5:**

- Knowing based notions from Neural Systems.
- Understanding elementary Neural Networks theory.
- Minimum grade 5.00 at labs
- Minimum grade 5.00 at project

**Cerințe pentru nota 10**

- Capacity to demonstrate deepens knowledge at final exam.
- Capacity to perform an excellent activity at labs.
- Capacity to build an excellent project.

**TOTAL ore studiu individual (pe semestru) = 65**

<b>Bibliografia</b>	<p><b>Minimală obligatorie:</b></p> <ul style="list-style-type: none"> <li>• T. Noergaard, <i>Embedded Systems Architecture. A Comprehensive Guide for Engineers and Programmers</i>, Elsevier, 2005.</li> <li>• K. Arnold, <i>Embedded Controller Hardware Dwsigns</i>, LLH Technology, Publishing, 2000.</li> <li>• J. Ganssle, <i>Embedded Systems. World Class Designs</i>, Newnes,</li> <li>• R. Zurawski, <i>Embedded Systems Handbook</i>, Taylor&amp;Francis Group, 2006.</li> <li>• J. A. Fisher, P. Faraboschi, C. Young, <i>Embedded Computing</i>, Elsevier, 2005</li> </ul> <p><b>Complementară:</b></p> <ul style="list-style-type: none"> <li>• M Predko, <i>Programming and Customizing the PIC Microcontroller</i>, McGraw Hill, 2008.</li> <li>• J. Sanchez, M. P. Canton, <i>Microcontroller Programming. The Microcip PIC</i>, CRC Press, 2007.</li> <li>• H. W. Huang, <i>PIC Microcontroller. An Introduction to Software &amp;Hardware Interfacing</i>, Thomson Delmar Learning, 2005.</li> </ul>
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List of didactical material used in teaching process:

- Course notes, bibliographic list, video projector, computer network

Coordonator de Disciplină	Grad didactic, titlul, prenume, numele	Semnătura
	Conf. dr. ing. Ioan Z. MIHU	