SYLLABUS

1. Information about the program

1.1 Higher education institution	Universitatea Politehnica Timișoara
1.2 Faculty[1] / Department[2]	Electronics Telecommunications and Information Technologies/ Communications
1.3 Field of study (name/code[3])	Electronics Telecommunications and Information Technologies Engineering / 20.20.10
1.4 Study cycle	Master
1.5 Study program (name/code/qualification)	Communications Networks Engineering / 20.20.10 / 2153

2. Information about discipline

2.1a Name of discipline/The educational classe[4]	Internet of Things Systems /DS						
2.1b Name of discipline in Romanian							
2.2 Coordinator (holder) of course activities	Assoc.prof.dr.eng. Mugurași Mocofan						
2.3 Coordinator (holder) of applied activities[5]	Assoc.prof.dr.eng. Mugurași Mocofan						
2.4 Year of study[6]	2	**2.5** Semester	3	**2.6** Type of evaluation	E	**2.7** Regime of discipline[7]	DOB

3. Total estimated time (direct activities (fully assisted), partially assisted activities and unassisted activities[8])

3.1 Number of hours fully assisted/week	4 ,of which:	course	2	seminar/laboratory/project			0/1/1
3.1* Total number of hours fully assisted/sem.	56 ,of which:	course	28	seminar/laboratory/project			0/14/14
3.2 Number of on-line hours fully assisted/sem	12 ,of which:	course	8	seminar/laboratory/project			4
3.3 Number of hours partially assisted/week	,of which:	project, research		training		hours designing M.A. dissertation	
3.3* Number of hours partially assisted/ semester	,of which:	project of research		training		hours designing M.A. dissertation	
3.4 Number of hours of unassisted activities/ week	4.93 ,of which:	Additional documentation in the library, on specialized electronic platforms, and on the field					2
		Study using a manual, course materials, bibliography and lecture notes					1.93
		Preparation of seminars/ laboratories, homework, assignments, portfolios, and essays					1
3.4* Total number of hours of unasssited asctivities/ semester	69 ,of which:	Additional documentation in the library, on specialized electronic platforms, and on the field					28
		Study using a manual, course materials, bibliography and lecture notes					27
		Preparation of seminars/ laboratories, homework, assignments, portfolios, and essays					14
3.5 Total hrs./week[9]	8.93						
3.5* Total hrs./semester	125						
3.6 No. of credits	5						

4. Prerequisites (where applicable)

4.1 Curriculum	• -
4.2 Learning outcomes	• Basic skills in using and programming computers. • Basic skills about sensors and actuators

5. Conditions (where applicable)

5.1 of the course	• Room with projector and blackboard

5.2 to conduct practical activities	• Computer lab with enough computers for the number of students, measuring devices, IoT devices.

6. Learning outcomes acquired through this discipline

Knowledge	• C2. The student/graduate understands the principles of electronic circuits and architectures • C5. The student/graduate knows concepts and methodologies from several fields. • C11. The student/graduate knows communication technologies and protocols.
Skills	• A2. The student/graduate develops schematics and integrates hardware/software components. • A10. The Student/Graduate assesses network needs and optimizes resources • A11. The student/graduate selects and applies communication methods appropriate to the context
Responsibility and autonomy	• RA9 The Student/Graduate coordinates and supports collaboration between different fields. • RA10 The Student/Graduate proposes solutions to streamline traffic and manages resources. • RA11 The Student/Graduate is responsible for the correct and efficient transmission of information. • RA12 The Student/Graduate is responsible for the stability and performance of managed systems.

7. Objectives of the discipline (based on the grid of learning outcomes acquired)

- The discipline aims to consolidate and expand knowledge with the specific application of the IoT concept in applications in the fields of: smart homes, health, transport, smart city, agriculture, creative industries, industrial applications, etc.
- Students can design and implement complex applications that incorporate smart sensors, data collection and interpretation, and their use for the benefit of the individual and/or society.

8. Content

8.1 Course	Number of hours	Of which online	Teaching methods
Internet of Things (IoT) definitions and evolution.	2	2	Participatory courses based on PPT materials, use of video projector, use of online resources. Interactivity with students. All educational resources are available in advance on the UPT Virtual Campus. Consultations via electronic platforms (email, Microsoft Teams).
IoT Components: Sensors and Actuators	2		
IoT components for connectivity, protocols and transmission media	2		
IoT components: dedicated processors and microcontrollers	2		
IoT technologies for smart homes / cities	2		
IoT technologies for transport systems	2		
IoT technologies for infrastructure development	2		
IoT technologies for the automotive industry	2		
IoT technologies for individual and global health systems	2		
IoT technologies for the fashion industry (wearable technologies)	2	2	
VR and AR technologies	2		
Tourism applications using IoT and AR	2	2	
Applications for culture using IoT and AR	2	2	
The impact of IoT on society and the educational system	2		

	Bibliography[10] 1. Adrian McEwen, Hakim Cassimally, Designing the Internet of Things, John Wiley and Sons, 2014 2. Arshdeep Bahga, Vijay Madisetti, Internet of Things. A Hands-On Approach, 2014 3. UK Government Office for Science, The Internet of Things: making the most of the Second Digital Revolution, disponibilă la: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/409774/14-1230-internet-of-things-review.pdf (accesat la 10 septembrie 2025) 4. Nokia, An Internet of Things blueprint for a Smarter World, Strategic white Paper, 2023

8.2 Applied activities[11]	Number of hours	Of which online	Teaching methods
Senzori si actuatori IOT	6		Case studies, application presentations existing, development of small projects
Microcontrolere și conectivitate	6		
Tehnologii IoT pentru case inteligente	2		
Tehnologii IoT pentru sistemele de transport	2		
Tehnologii IoT pentru sistemele de sănătate	2		
Wearable technologies	2		
Tehnologii de realitate virtuală AR & VR	4		
Aplicații mobile pentru turism	2	2	
Aplicații mobile pentru cultură	2	2	
	Bibliography[12] 1.J. Holdowsky, M. Mahto, M. Raynor, M. Cotteleer, Inside the Internet of Things (IoT), Deloitte University Press, 2015 2. Cisco, An Introduction to the Internet of Things (IoT), disponibilă la: https://www.cisco.com/site/us/en/learn/topics/industrial-iot/what-is-industrial-iot.html accesat 10.09.2025 3.Agus. Kurniawan, Intelligent IoT Projects in 7 Days, Birmingham, Packt Publishing Limited, 2017 4.C. Banerjee, A. Ghosh, R. Chakraborty, A. Elngar, Fog Computing for Intelligent Cloud IoT Systems, Scrivener Publishing LLC, 9781394174614, 2024 5. Nokia, An Internet of Things blueprint for a Smarter World, Strategic white Paper 2023			

9. Evaluation

Type of activity	**9.1** Evaluation criteria[13]	**9.2** Evaluation methods	**9.3** Share of the final grade
9.4 Course	Knowledge of the fundamental notions and concepts presented in the course and laboratory	Evaluare cunoștințelor se realizează prin examen de tip grilă. Implementarea evaluării se realizează în format electronic prin intermediul platformei Campus Virtual.	50%
9.5 Applied activities	**S:**		
	L: Applying knowledge to solve problems. Solving requirements using IoT devices.	Assessment of knowledge on how to implement an IoT solution. In addition, a short evaluation is carried out at the end of some laboratories through grid tests implemented in the Campus Virtual platform.	25%
	P: Realization of a practical project in the field of IOT	Checking the functionality and implementation of a practical project in the field of IOT	25%
	Pr:		
	Tc-R[14]:		
9.6 Minimum performance standard (minimum amount of knowledge necessary to pass the discipline and the way in which this knowledge is verified[15]			
• Writing syntax-free code for an IoT microcontroller. It is checked during the practical tests. • Correct choice of hardware configurations to solve specific problems. It is verified through practical activities. • Recognize the component parts of an IoT system and their role with a code sequence of medium complexity. It is checked by exam.			

Date of completion 25.09.2025	**Course coordinator** **(signature)**	**Coordinator of applied activities** **(signature)**
Head of Department **(signature)**	**Date of approval in the Faculty Council** [16] 07.10.2025	**Dean** **(signature)**