

PLAN DE ÎNVĂȚĂMÂNT

Pentru seria de studenți 2026-2028

Programul de studii univ. de masterat:

Automotive Electronic Systems

Tipul de masterat:

de cercetare

Domeniul fundamental (DFI):

Științe Inginerești

Ramura de știință (RSI):

Inginerie electrică, electronică și telecomunicații

Domeniul de licență (DL):

Electronică, Telecomunicații și Tehnologii Informaționale

Durata studiilor / Numărul de credite:

2 ani / 120 credite

Forma de învățământ:

IF - Invatamant cu frecventa

Domeniul de studii universitare de masterat (DSU_M):

Inginerie electronică, Telecomunicații și Tehnologii Informaționale

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Prof. univ. dr. ing. Cătălin CĂLEANU

Misiunea programului de studii:

The mission of the AES program, both as a teaching and research mission, falls within the mission of the field of Electronic Engineering, Telecommunications, and Information Technology, directly complementing the skills associated with engineers licensed in this field (MP1) with skills and competencies in the automotive field.

Obiectivele programului de studii:

Offering graduates a specialization dedicated to deepening their knowledge of Electronic Systems for the Automotive Industry (OP1). Providing skills related to the analysis, modeling, design, and implementation of complex automotive systems (OP2).

Competențele programului de studii:

Competențe profesionale:

- 1.Approves engineering projects
- 2.Conducts scientific research
3. Electronic systems designs
- 4.Prepare technical reports
- 5.Uses dedicated software for data analysis
6. Control systems designs
- 7.Tests sensors
- 8.Operates remote-control equipment
- 9.Synthesizes information
- 10.Presents analysis results
- 11.Engages professionally in research and professional environments
- 12.Designs power electronics systems
- 13.Tests power electronics systems
- 14.Models power electronics systems
- 15.Sensors designs
- 16.Prepare prototypes for production
- 17.Tests sensors

Competențe transversale:

1. Think innovatively
2. Operate digital hardware equipment
3. Use communication and collaboration software
4. Apply scientific, technological, and engineering knowledge
5. Work in teams

Rezultatele învățării specifice programului de studii:

For Internal Use - Internal	Competențe	Aptitudini	Responsabilitate și autonomie
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C1. The student/graduate demonstrates advanced knowledge of the categories of electronics, the principles of electricity and engineering, and the physics and mathematics required for the design and analysis of complex electronic systems. C2. The student/graduate explains concepts and methods of research and industrial development applicable to electronics, including applied mechanics, testing methods for electrical equipment, and procedures for testing electronic components and systems. C3. The student/graduate is familiar with regulations and legislation concerning environmental protection and the environmental risks associated with engineering processes, as well as requirements for battery management systems and sustainable technologies.	A1. The student/graduate approves engineering projects, applying quality standards, technical regulations, and sustainability criteria. A2. The student/graduate conducts scientific research in electronics, developing innovative methods and solutions for circuits, semiconductors, and advanced technological applications. A3. The student/graduate designs electronic systems, including circuits, equipment, and applications in fields such	RA1. The student/graduate assumes responsibility for coordinating and approving engineering projects, assessing the technical, economic, and environmental impact of proposed solutions. RA2. The student/graduate demonstrates autonomy in leading scientific research and making complex engineering decisions, coordinating multidisciplinary technical teams. RA3. The student/graduate ensures quality and professional ethics in the design and testing of electronic systems, in
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Rezultatele complementare ale învățării:

Cunoștințe	Aptitudini	Responsabilitate și autonomie
C1. The student/graduate describes concepts of ethics, academic integrity, and regulations regarding research. C2. The student/graduate identifies connections between electronic engineering and other fields (management, social sciences, software engineering). C3. The student/graduate explains advanced principles and methodologies for integrating hardware and software technologies into complex engineering systems.	A1. The student/graduate communicates results professionally, in the form of reports and scientific papers. A2. The student/graduate proposes and implements innovative solutions to technical problems in interdisciplinary contexts. A3. The student/graduate uses hardware and software communication tools and collaborates to solve complex and multidisciplinary tasks.	RA1. The student/graduate assumes responsibility for adhering to ethical standards and professional integrity. RA2. The student/graduate participates in the dissemination of knowledge through research activities and scientific communication. RA3. The student/graduate works effectively in multidisciplinary teams, promoting collaboration and shared responsibility in achieving objectives.

Finalități:

Absolvenții programului de studii universitare de masterat vor accesa următoarele ocupații posibile conform Clasificării Ocupațiilor din România ISCO-08:

2152.1 – Electronics Engineer
2152.1.3 – Industrial Monitoring Equipment Engineer
2152.1.10 – Microsystems Engineer
2152.1.12 – Power Electronics Engineer
2152.1.15 – Sensor Design Engineer

Domeniul de licență: **Electronică, Telecomunicații și Tehnologii Informaționale**
Programul de studii univ. de masterat de cercetare: **Automotive Electronic Systems**

Forma de învățământ: **IF - Învățământ cu frecvență**
Durata studiilor: **2 ani**

Domeniul fundamental (DFI): **Științe Inginerești**
Ramura de știință (RSI): **Inginerie electrică, electronică și telecomunicații**
Domeniul de studii universitare de masterat (DSU_M): **Inginerie electronică, Telecomunicații și Tehnologii Informaționale**

Cod DFI	Cod RSI	Cod DSU_M
20	20	10

ciclul	c1c2c3	a1a2
M	239	26

PLAN DE ÎNVĂȚĂMÂNT
Pentru seria de studenți 2026-2028
ANUL I (2026-2027)

	SEMESTRUL 1										SEMESTRUL 2									
1	Opțional 1 / Deep Neural Networks / Car to Car Communication/ Design and Research Methodology										Opțional 2 / Quality Management in the Automotive Industry/ Machine Learning / Architectures for Intelligent Data Processing									
	M239.26.01.F1-ij	5	V	28	0	28	0	0	DF	69	M239.26.02.F1-ij	6	E	28	0	14	0	0	DF	108
2	High Performance Computing, Memories and Smart Sensors										Microelectronics Systems Modelling and Design									
	M239.26.01.F2	5	E	28	0	0	28	0	DF	69	M239.26.02.S2	5	V	28	0	28	0	0	DS	69
3	Reliability and Functional Safety Elements of Microelectronics Systems										Thermal Design and Techniques to Minimize Disruptive Effects									
	M239.26.01.S3	5	E	28	0	14	14	0	DS	69	M239.26.02.S3	6	E	28	0	28	14	0	DS	80
4	Advances in Power Electronics Design										Automotive Communication Protocols									
	M239.26.01.S4	5	E	28	0	0	28	0	DS	69	M239.26.02.F4	5	E	28	0	28	0	0	DF	69
5	Academic Ethics and Integrity										Practica de Cercetare 2 (Research Practice 2)									
	M239.26.01.C5	2	V	14	7	0	0	0	DC	29	M239.26.02.S5	8	V	0	0	0	0	140	DS	60
6	Practica de Cercetare 1 (Research Practice 1)																			
	M239.26.01.S6	8	V	0	0	0	0	140	DS	60										
7																				
8																				
9																				
10																				
total / sem.	VAi:	245	VPI:							365	VAi:	224	VPI:							386
	VA (VAi+VAp):	385	VCA (VA+VPI):							750	VA (VAi+VAp):	364	VCA (VA+VPI):							750
	credite:	30	evaluări:							3E,3V,0C	credite:	30	evaluări:							3E,2V,0C
total / săpt.	VAi:	17,5	VPI:							26,1	VAi:	16,0	VPI:							27,6
	VA (VAi+VAp):	27,5	VCA (VA+VPI):							53,6	VA (VAi+VAp):	26,0	VCA (VA+VPI):							53,6
	din care:		9,0	0,5	3,0	5,0	10,0	(c, s, l, p, VAp)		din care:		8,0	0,0	7,0	1,0	10,0	(c, s, l, p, VAp)			

Observatii:

Pentru seria de studenti 2026-2028

ANUL II (2027-2028)

	SEMESTRUL 3										SEMESTRUL 4									
1	Opțional 3 Low Power Electronic Systems / Modern Programming Techniques										Practica de Cercetare 4 (Research Practice 4)									
	M239.26.03.F1-ij	5	V	28	0	28	0	0	DF	69	M239.26.04.S1	15	V	0	0	0	0	196	DS	179
2	Opțional 4 Elements of Artificial Intelligence / Optimization of Electronic Products for Series Production										Elaborarea lucrării de disertație Dissertation Thesis Preparation									
	M239.26.03.S2-ij	6	E	28	0	28	0	0	DS	94	M239.26.04.S2	15	C	0	0	0	196	0	DS	179
3	Digital Control of Electronic Power Converters										Examen de disertație Dissertation Exam									
	M239.26.03.F3	6	E	28	0	14	28	0	DF	80	M239.26.04.S3	10	E	0	0	0	0	0	DS	250
4	Analog Mixed IC Automated Testing																			
	M239.26.03.F4	5	E	28	0	28	0	0	DF	69										
5	Practica de Cercetare 3 (Research Practice 3)																			
	M239.26.03.S5	8	V	0	0	0	0	140	DS	60										
6																				
7																				
8																				
9																				
10																				
total / sem.	VAi:	238	VPI:							372	VAi:	196	VPI:							608
	VA (VAi+VAp):	378	VCA (VA+VPI):							750	VA (VAi+VAp):	392	VCA (VA+VPI):							1000
	credite:	30	evaluări:							3E,2V,0C	credite:	30+10*	evaluări:							1E,1V,1C
total / săptăm.	VAi:	17,0	VPI:							26,6	VAi:	14,0	VPI:							43,4
	VA (VAi+VAp):	27,0	VCA (VA+VPI):							53,6	VA (VAi+VAp):	28,0	VCA (VA+VPI):							71,4
	din care:		8,0	0,0	7,0	2,0	10,0	(c, s, l, p, VAp)			din care:		0,0	0,0	0,0	14,0	14,0	(c, s, l, p, VAp)		

* Credite suplimentare alocate Examenului de disertație

Observatii:

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DISCIPLINE OPTIONALE
Pentru seria de studenti 2026-2028

ANUL I (2026-2027)

	SEMESTRUL 1										SEMESTRUL 2									
01	Opțional 1 Deep Neural Networks										Opțional 2 Quality Management in the Automotive Industry									
	M239.26.01.F1-01	5	V	28	0	28	0	0	DF	69	M239.26.02.F1-01	6	E	28	0	14	0	0	DF	108
02	Opțional 1 Car to Car Communication										Opțional 2 Machine Learning									
	M239.26.01.F1-02	5	V	28	0	28	0	0	DF	69	M239.26.02.F1-02	6	E	28	0	14	0	0	DF	108
03	Opțional 1 Design and Research Methodology										Opțional 2 Architectures for Intelligent Data Processing									
	M239.26.01.F1-03	5	V	28	0	28	0	0	DF	69	M239.26.02.F1-03	6	E	28	0	14	0	0	DF	108
04																				
05																				
06																				
07																				
08																				
09																				
10																				

Observatii: (*)

DISCIPLINE OPTIONALE
Pentru seria de studenti 2026-2028

ANUL II (2027-2028)

	SEMESTRUL 3										SEMESTRUL 4									
01	Opțional 3 Low Power Electronic Systems																			
	M239.26.03.F1-01	5	V	28	0	28	0	0	DF	69										
02	Opțional 3 Modern Programming Techniques																			
	M239.26.03.F1-02	5	V	28	0	28	0	0	DF	69										
03	Opțional 4 Elements of Artificial Intelligence																			
	M239.26.03.S2-03	6	E	28	0	28	0	0	DS	94										
04	Opțional 4 Optimization of Electronic Products for Series Production																			
	M239.26.03.S2-04	6	E	28	0	28	0	0	DS	94										
05																				
06																				
07																				
08																				
09																				
10																				

Observatii: (*)

Legenda

Nume disciplina										
Cod	nc	FE	c	s	l	p	VAp	CF	VPI	

Cod = cod disciplina

nc = nr.credite transferabile

FE = forma de evaluare

FE ∈ {E, V, C}

E=examen

V=verificare

C=colocviu

c=nr.ore curs/semestru

s=nr.ore seminar

l=nr.ore laborator

p=nr.ore proiect

VAp- volum de ore necesar activitatilor partial asistate

Exemplu

Tehnologii avansate de măsurare										
M170.17.01.V1	8	E	28	0	28	0	49	DC	50	

CF=categorie formativa careia ii apartine disciplina

CF={DF, DS, DC}

DF - disciplina fundamentala

DS - disciplina de specializare

DC - disciplina complementara

VPI = volum de ore necesar pregatirii individuale pentru un semestru de 14 sept. plus 4 sept. de sesiune

VAi- volum de ore necesar activitatilor integral asistate=c+s+l+p

VA - volum de ore necesar activitatilor integral asistate si al celor asistate partial
=VAi+Vap

VCA - volum de ore cumulat al tuturor activitatilor = VA+VPI

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DISCIPLINE FACULTATIVE
Pentru seria de studenti 2026-2028
ANUL I (2026-2027)

	SEMESTRUL 1										SEMESTRUL 2									
01											Volunteer activity									
											M239.26.02.F10-01	2	C	0	0	0	28	0	F	22
02											Cross-disciplinary Course 1									
											M239.26.02.F10-02	4	V	28	28	0	0	0	F	44
03																				
04																				

Observatii:

DISCIPLINE FACULTATIVE
Pentru seria de studenti 2026-2028
ANUL II (2027-2028)

	SEMESTRUL 3										SEMESTRUL 4									
01	Cross-disciplinary Course 2										Volunteer activity									
	M239.26.03.F10-01	4	V	28	28	0	0	0	F	44	M239.26.04.F10-01	2	C	0	0	0	28	0	F	22
02																				
03																				
04																				

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