

Correlation between Expected Learning Outcomes (ELO) and Program Disciplines (DISC)

University: Technical University of Cluj-Napoca

Faculty: Electronics, Telecommunications and Information Technology

Fundamental field: Engineering Sciences

Field of study: Electronic Engineering, Telecommunications, and Information Technologies

Study program: **TELECOMMUNICATIONS TECHNOLOGIES AND SYSTEMS**

No.	EXPECTED LEARNING OUTCOMES			Examples of subjects that can contribute to achieving learning outcomes
	Knowledge	Skills	Responsibility and autonomy	
1.	K1. The student/ graduate identifies and describes basic concepts, principles and methods in mathematics, physics, chemistry, technical drawing, economics and computer science.	S1. The student/ graduate solves mathematics, physics and chemistry problems with applicability in engineering and validates the solution obtained.	R1. The student/graduate applies the ethical and deontological values of the engineering profession. R2. The student/ graduate employs logical reasoning, evaluation, and self-assessment in decision-making. R3. The student/ graduate communicates effectively about engineering activities with a wide range of audiences.	- Analiză matematică - Algebră liniară, geometrie analitică și diferențială - Matematici speciale - Ecuații diferențiale - Fizică I și II - Programarea calculatoarelor și limbaje de programare I și II - Informatică aplicată - Limba străină I și II - Educație fizică și sport I și II - Grafică asistată de calculator - Prelucrarea numerică a imaginilor - Prelucrarea digitală a semnalelor - Educație antreprenorială - Etică și integritate academică - Managementul proiectelor - Managementul financiar al firmei - Marketing
2.		S2. The student/ graduate operates with basic concepts, principles and methods from mathematics, physics, chemistry, technical drawing, economics and computer science. S3. The student/ graduate performs engineering and economic calculations of medium complexity and associates them with graphical representations or specific computer-aided design. S4. The student/ graduate describes physical-chemical and economic phenomena and processes.	R4. The student/ graduate is engaged in lifelong learning to acquire and implement knowledge as needed, using appropriate learning strategies R5. The student/ graduate promotes dialogue, cooperation, respect for others and interculturality. R6. The student/ graduate works effectively as a team member or team leader. R7. The student/ graduate is fluent in at least one international language in technical	

3.	K2. The student/ graduate explains and interprets theoretical and experimental results from mathematics, physics, chemistry, economics, technical drawing and computer science.	S5. The student/ graduate applies evaluation criteria and methods to identify, model, experiment with, analyze, and qualitatively and quantitatively assess phenomena and processes specific to the fundamental field, including through the use of digital technologies. S6. The student/ graduate designs solutions—in compliance with relevant standards—for engineering problems of moderate complexity that meet specified needs, while adhering to requirements regarding public health, safety, well-being, the environment, sustainability, and economic factors, as well as other specific constraints.	communication	- Măsurări în electronică și telecomunicații - Circuite integrate digitale - Sisteme cu circuite integrate digitale - Semnale și sisteme - Inginerie software - Microunde - Retele de calculatoare - Sisteme de comutație și rutare - Teoria transmiției informației
4.		S7. The student/ graduate acquires and processes data, interprets theoretical and experimental results. S8. The student/ graduate develops technical execution and overall drawings in letter format or designed with computer assistance. S9. The student/ graduate applies modern project management techniques, economic techniques and decision-making techniques including in a multidisciplinary framework		- Grafică asistată de calculator - Tehnici CAD - Managementul proiectelor - Analiza și sinteza circuitelor - Dezvoltarea mediilor interactive 2D/3D - Tehnici digitale de analiza video - Procesoare de semnal - Tehnologii multimedia și medii virtuale - Managementul financiar al firmei - Marketing

5.	K3. The student/ graduate describes, identifies, summarizes concepts and elementary methods of signal acquisition, analysis and processing, implemented in systems with general-purpose processors or signal processors and their application	S10. The student/ graduate uses fundamental methods of measuring electrical quantities and estimates electronic devices and circuits, as well as linear and digital integrated circuits of low/medium complexity. S11. The student/ graduate designs, measures, evaluates performance, diagnoses and troubleshoots functional blocks composed of electronic devices and/or circuits of low/medium complexity.	R8. The student/ graduate carries out processes in the management of electronics, telecommunications and information technology projects, taking on different roles in the team and clearly and concisely describing the results, verbally and in writing.	- Analiza și sinteza circuitelor - Măsurări în electronică și telecomunicații - Bazele electrotehnicii I și II - Materiale pentru electronică - Circuite electronice fundamentale - Circuite integrate digitale - Sisteme cu circuite integrate digitale - Circuite integrate analogice - Sisteme cu circuite integrate analogice - Componente și circuite pasive - Dispozitive electronice
6.	in concrete problems.	S12. The student/ graduate designs electronic circuits of low/medium complexity and implements them using CAD techniques.		- Grafică asistată de calculator - Tehnici CAD

7.	K4. The student/ graduate describes, identifies, summarizes concepts and elementary methods of signal acquisition, analysis and processing, implemented in systems with general-purpose processors or signal processors and their application in concrete problems.	S13. The student/ graduate uses specific methods and tools for the characterization of signals in the time domain and in the frequency domain, performs the acquisition, analysis and digital processing of analog signals. S14. The student/ graduate designs, measures, evaluates the performance, diagnoses and troubleshoots functional blocks of low/medium complexity for digital signal analysis and processing, using dedicated simulation environments (Matlab, Python, etc.). S15. Develop and plan ICT networks, such as a wide area network and a local area network, that connect equipment via wired or wireless connections and allow them to exchange data and assess their capacity requirements.	R9. The student/ graduate demonstrates initiative and takes action to update their professional, economic, and organizational culture knowledge.	- Semnale și sisteme - Optoelectronică - Teoria transducerii informației - Televiziune - Decizie și estimare în prelucrarea informației - Tehnici de modulații - Telefonie - Sisteme de comutație și rutare - Radiocomunicații - Radiocomunicații celulare - Comunicații mobile
8.		S16. The student/ graduate designs functional blocks of low/medium complexity for digital signal analysis and processing and implements them on signal processors, microcontrollers or dedicated processors.		- Arhitectura microprocesoarelor - Sisteme cu microprocesoare - Proiect – Sisteme IoT - Prelucrarea numerică a imaginilor - Prelucrarea semnalului vocal - Procesoare de semnal - Electronica aplicată - Sisteme optoelectronice în telecomunicații - Prelucrarea digitală a semnalelor

9.	K5. The student/graduate describes, identifies, summarizes elementary concepts and methods regarding the architecture of computer systems, microcontrollers, programming languages and techniques and their application in concrete problems	S17. The student/graduate evaluates, based on specific performance criteria, the type of computing system, its architecture and the way of use necessary for an efficient solution of concrete problems. S18. The student/graduate specifies requirements, develops programs in general-purpose programming languages (C, etc.) and/or object-oriented (C++, Java, etc.), executes, debugs and interprets the results of the programs developed to solve a concrete problem. S19. Modify the scope of an information and communications technology (ICT) system by adding or reallocating additional ICT system components, such as network components, servers, or storage media to meet capacity demands.	R10. The student/ graduate has honorable, responsible, and ethical behavior, in accordance with the law to ensure the reputation of the profession.	- Arhitectura microprocesoarelor - Sisteme cu microprocesoare - Programarea calculatoarelor și limbaje de programare I și II - Inginerie software - Tehnologii web si baze de date - Proiect – Sisteme IoT - Protocoale pentru Internet - Retele de calculatoare - Sisteme de comutatie si rutare
10.		S20. The student/graduate carries out projects of low/medium complexity that involve the simultaneous use of hardware components (microprocessors or microcontrollers) and software components (related programs)		- Sisteme cu microprocesoare - Informatică aplicată - Proiect – Sisteme IoT - Procesoare de semnal

Responsible for B.Sc. in Telecommunications Technologies and Systems

Professor Virgil Dobrota, Ph.D.