3-Electronics and Electrical Communications Engineering Department

Department Vision	We aim to provide an engineering educational environment that helps our graduates to gain high-quality engineering skills in the area of telecommunications and electronics, and to excel as responsible members of the society at the national and regional levels for the service of their country through a high sense of belonging

Scientific Specializations	1	Communications
	2	Electronics
	3	Electromagnetic Waves
	4	Computer Electronics and Communications
	5	Control

Research Fields for Each Specialization	1	**1- Communications** - Channel Coding - Cognitive Radio Systems - Communications and Information Security - Communications Quality and Reliability - Communications Software - Communications Switching and Routing - Communications Systems Integration and Modeling - Communication Theory - Digital Image Processing - Digital Signal Processing - High-Speed Networking - Information Infrastructure and Networking - Multimedia Communications - Network Operations and Management

Research Fields for Each Specialization	1	- Optical Networking - Pattern Recognition - Radio Communications - Tactical Communications and Operations - Transmission, Access, and Optical Systems - Free space optics (FSO) - Artificial Intelligence in communications (VLC) - Machine learning in communications - 6G communication systems - Intelligent Wireless sensor networks - Internet of things - Cellular networks optimization - Mobile Communication Systems - Power Line Communications - Satellite and Space Communications - Digital twining - Blockchaining in Wireless Communication - Massive machine-type communications - Massive MIMO and mmWave Communication - TeraHertz Communication - Self-Organizing Networks - Intelligent Radio Access Networks - Unmanned Aerial Vehicle Networks - Reconfigurable Intelligent Surfaces - Inter-technology Spectrum Sharing - Vehicle to everything Communication - Wireless Power Transfer and Energy Harvesting - Intelligent Green Communication - Integrated Sensing and Communication - Generative AI applications in Telecommunication

	2	**2- Electronics** - Analog Integrated Circuit Design - Digital Integrated Circuit Design - Microwave and RF Circuits and Systems - Biomedical Circuits and Systems - Nano-electronics and Applications - Computer-Aided Design (CAD) - Embedded Systems - Testing and Verification - Electronic Device Modeling and Characterization - Nonlinear Circuits and Systems - Circuits and Systems for Communications - Multimedia Systems and Applications - Neural Networks and Applications - Power Management and Energy Circuits and Systems - Sensors and Actuators

Research Fields for Each Specialization	3	**3- Electromagnetic Waves** - Antennas - Computer-Aided Design - Computational Electromagnetics, Metamaterial Media, and Transmission Lines. - Electromagnetic Measurements - Filters and Passive Components - HF-VHF-UHF Technology - Lasers and Photon Detection - Microwave Acoustics - Microwave and Millimeter-Wave Integrated Circuits - Microwave and Millimeter-Wave Packaging and Manufacturing - Microwave and Millimeter-Wave Solid State Devices - Microwave Ferrites and Ferroelectrics - Microwave Field Theory - Microwave High-Power Techniques - Microwave Imaging - Microwave Low-Noise Techniques - Microwave Measurements - Microwave Photonics - Microwave Superconductivity - Microwave Systems - Plasma Waves - Propagation - Remote Sensing - RF Accelerators - RF MEMS - RF Nanotechnology - RFIC - RFID Technologies - Signal Generation and Frequency Conversion - Terahertz Technology and Applications - Wireless Communications Propagation

	4	**4- Computer Electronics and Communications** - Pattern Recognition Techniques and Machine Learning Application in Image and Speech Recognition - Optimized Neural Networks Architectures - Computer Architecture and Computer Arithmetic - Object Tracking Hardware - Software-Hardware Co-design for Embedded Systems and Embedded Processor Design - Optimized Embedded Protocol Stacks - Network Performance Analysis - Radio Resource Management in 4G/5G Systems - Internet Congestion Control and Routing - Protocols for Internet of Things Systems - Wireless Ad hoc and Sensor Networks - Software Defined Radio (SDR) and Software Defined Networks (SDN) - Network and System Security - Cryptographic and Watermarking Techniques - Using new technologies in agricultural applications such as embedded systems and artificial intelligence
	5	**5- Control** - Adaptive Control Systems - Automotive Controls - Behavioral Systems and Control Theory - Computational Aspects of Control System Design - Digital Control Systems - Discrete Event Systems - Distributed Parameter Systems - Fuzzy Logic and Fuzzy Control Systems - Hybrid Systems - Industrial Process Control - Intelligent Control

		- Manufacturing Automation and Robotic Control - Nonlinear Systems and Controls - Optimal Control Systems - Optimization Techniques - Power Generation - Robotics - Smart Grids - Stochastic Control Systems - Systems Biology - System Identification and Adaptive Control - Systems with Uncertainty - Variable Structure and Sliding Mode Control