Transilvania University of Braşov, Romania

Study program: Electronic and Communication Integrated Systems

Faculty: Electrical Engineering and Computer Science
Study period: 2 years (master)

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Software technologies for systems testing	SECI101	6	1	-	-	2

Course description (Syllabus): The course gives an overview of software testing methodologies, the various strategies or approaches used to test an application to ensure it behaves and looks as expected. The course offers an understanding of the theoretical principles and methodologies of automatic testing, the learning of a programming language (Python) and the practice of the theoretical knowledge on testing practical examples from different areas: telecommunications networks, embedded systems, integrated circuits, web applications.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Distributed and real-time systems	SECI102	6	2	-	-	2

Course description (Syllabus): Introduction in distributed and real-time embedded systems; Wireless sensor networks, architecture, synchronization, resource localization, distributed processing, sensor network security; Embedded automotive systems networks, trends, CANs, FlexRay technology, LIN, standardized software system for automotive applications; Distributed embedded systems in industrial automation, Fieldbus, Real-Time Ethernet, network for production control systems; Distributed embedded systems in building control and automation, key requirements, data communications for distributed automation in buildings; Real-time operating systems, introduction to RTOS, FreeRTOS, OSEK / VDX Autosar, Embedded Linux, Linux and RT; Implementation of an application on the ATmega128 development system using the FreeRTOS operating system.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Packet processors	SECI103	6	2	-	-	-

Course description (Syllabus): Introduction on packet processors, Architecture of several packet processors, Read-Out Controller for the ATLAS Experiment at CERN, Data Transport Mechanisms, Queueing Theory Elements, Scheduling Algorithms, Policy and Shaping, Quality of Service, Quality of Experience, Traffic Generators, Computer Networks Emulators.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Data communications	SECI104	6	1	-	2	1

Course description (Syllabus): Errors correction in data communications (Waveform coding, Types of error control, Structured sequences); Linear block codes and cyclic codes (generator matrix, syndrome testing, erasure correction); Reed-Solomon coding (RS Error probability, Performances, RS encoding and decoding); Convolutional codes (representation modes, properties, decoding algorithms); Interleaving and concatenated codes (Block interleaving, Convolutional interleaving, Concatenated codes); Turbo Codes (Turbo Code concepts, Encoding with RSC, Feedback decoder, The MAP decoding algorithm and examples); Coded modulations (Trellis-Coded Modulation, TCM Encoding, TCM Decoding, Multi-Dimensional TCM).

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Ethics and academic integrity	SECI105	4	1	-	-	-

Course description (Syllabus): Basic concepts for respecting the ethics and academic integrity in the scientific activity. Developing creativity and knowledge about intellectual property by patenting new solutions. Knowledge of the factors that develop creativity; Knowledge of legislation, patent procedures and documentation; Knowledge of the rules of ethics and integrity in scientific and patent activity. Knowledge of the ways of drafting a scientific paper and a patent application.

Thoroughgoing Study Direction: Digital communication networks

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Digital signal processors	SECI207	6	2	-	-	1

Course description (Syllabus):

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Industrial control and data transmission networks	SECI208	6	1	-	-	2

Course description (Syllabus): The GPIB interface: IEEE488.1 protocol, Equipment polling, IEEE488.2 standard, the capabilities of IEEE488.2 equipment, alternative implementations, improvements; The VXI System: cabled backplane chassis, VXI mechanical and electrical specifications, HW registers of VXI modules, Register-based control, Message controlled instruments, Module 0 (resource management function), SW interface (VXI drivers), MXI bus, PXI system, LXI system; Programming languages for instrumentation: SCPI standard, the SCPI model of a programmable instrument, Commands for control a sub-system's functions; Interchangeable Virtual Instruments (IVI): the IVI foundation and its objectives, IVI context, IVI usefulness, classes of instruments, architecture of SW interfaces (IVI drivers), behavioral models associated to classes of instruments; Mobile computing and remote control: Internet publishing of experimental resources, programming telematics applications in the Cloud, Webserver/workbench server hierarchy; Remote measurement methods based on mobile communication systems; Industrial communication systems: M2M communications, vehicle to vehicle communications based on social concepts (IoT, cognitive networks), Industrial control and measurement systems, case studies: Smart Grid and Transportation.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Quality of Services and computer networks security	SECI209	7	1	-	-	2

Course description (Syllabus): Information security: basic components; Privacy: the principles of cryptography; Ensuring the integrity of communications, authenticating messages; Digital signatures and certificates; SSL protocol; Network level security: IPSec and VPNs; Operational security: firewalls and intrusion detection systems; Delays, packet loss and data transfer rate in packet switched networks; Multimedia applications; Ensuring multiple service classes.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Communication networks modelling	SECI211	4	1	-	-	1

Course description (Syllabus): Network simulation software: OPNET IT GURU and OPNET Modeler (Riverbed), Cisco Packet Tracer; Modelling ZigBee radio networks: Topologies, LR-WPAN architecture, IEEE 802.15.4 Physical and MAC layers, PPDU format, data frames and signaling, connection setup; Bluetooth radio networks: utilization models, network architecture, hard and soft architecture, protocols; 802.11 WiFi radio network: the standard, models and

network topologies, layers, authentication, association, roaming, maintaining synchronization, power saving, frame types, interference with similar networks; Migrating current networks to NGN: the networks' structure before NGN, migration of transit exchanges and local exchanges from PSTN/ISDN to NGN, xDSL and PBX access in NGN environments, QoS assurance for new applications.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Protocols for interconnecting hybrid networks	SECI212	4	1	-	-	1

Course description (Syllabus): Network simulation software: OPNET IT GURU and OPNET Modeler (Riverbed), Cisco Packet Tracer; The IP network: VoIP implementation, protocols used (RTP, RTCP, BGP, OSPF, IGRP, RIP), the parameters of the VoIP technology; Voice compression: H323 protocol set, H323 terminals, SIP, MGCP; MPLS networks; Interconnection of IP networks at the level of routing protocols. BGP Protocol - Study with simulation software; Ensuring redundancy in distribution and transport networks; Level 2 redundancy (HSRP / VRRP, Etherchannel); Spanning-tree (MTS) protocol Load-balancing, multiple connection methods in various RAN (multi-homing) radio networks; Notions of quality assurance of services (QoS) in end-to-end transport networks; Traffic Engineering; Audit and monitoring of transport networks (BackBone) - Case study, audit plan.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Physical layer of communication networks and switching techniques	SECI213	6	2	-	-	1

Course description (Syllabus): Introduction in SEAMCAT (Spectrum Engineering Advanced Monte Carlo Analysis Tool); OFDMA and SC-FDMA used in communications networks; MIMO (Including MU-MIMO and massive MIMO); IoT fundamentals, physical layer, transition to 5G; Introduction to switching: packet switching (datagrams), virtual circuits, architecture and elements of a VoIP network; The IP network: VoIP implementation, protocols used (RTP, RTCP), the parameters of the VoIP technology; Voice compression: the H323 protocol set, H323 terminals, SIP, MGCP; MPLS networks.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Smart antennas for mobile communications systems	SECI214	6	2	-	-	1

Course description (Syllabus): Introduction in SEAMCAT (Spectrum Engineering Advanced Monte Carlo Analysis Tool); OFDMA and SC-FDMA used in communications networks; MIMO (Including MU-MIMO and massive MIMO); Advanced Antenna Technology - Introduction, antenna types, classifications: adaptive array, MIMO antennas, reconfigurable beam antennas, active antenna systems; Adaptive beam reconfiguration techniques used in smart antennas for mobile communications; Mathematical models used to describe intelligent antennas; Implications of introducing smart antennas into cellular communication systems. Comparison with radar technology.

Thoroughgoing Study Direction: Embedded systems

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Modern architectures of processors and microcontrollers	SECI216	6	1	-	-	2

Course description (Syllabus): Introductory aspects, place, role and generalized structure in a dedicated ("embedded") system. The brief recapitulation of some mathematical notions and the theoretical care of systems are close to the modeling and solving of deterministic systems; Which are the main characteristic features, as well as the parameters that take care of the illustrations, can be carried out on microprocessor and microcontroller based systems; Can this

be a current platform? Component elements and methodology to pass; Microcontroller platforms for "integrated systems": MCS51 - Implementation example; Microcontroller platforms on "embedded" systems: PIC16C / Fxx, AVR8 - Implementation example; Microcontroller platforms for "embedded systems": ATXmega - Implementation example; Microcontroller platforms for "embedded systems": PIC24 and DSP - Implementation example; Exemplifying the analysis processes and designing a complex of systems, as well as analyzing and deciding on the implementation solutions. The analysis implements "standalone" and "distributed" changes Parallel and distributed processing for information

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Hardware Description Languages	SECI217	6	1	-	-	2

Course description (Syllabus): Essential digital electronics elements; Essential HDL elements; Advanced Verilog modelling.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Analog Interfacing and Conditioning Systems	SECI218	6	1	-	-	2

Course description (Syllabus): Operational amplifier - basic device used in analog signal processing, Signal conditioning circuits, Sensors, Output control methods, Solenoids, relays, and other analog outputs, Motors, Electromagnetic interference, High-precision applications

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Network on Chip	SECI219	6	1	-	-	2

Course description (Syllabus): Introduction to the NoC (Network on Chip) field; Types of networks – general concepts; Types of networks specific for NoC; Arbitration methods used for NoC; VLSI design methods; Presenting the design topic for NoC; Defining the requirements for NoC; Designing a NoC – part 1; Designing a NoC – peripherals; Designing a NoC – performance

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Industrial control and data transmission networks	SECI220	5	1	-	-	1

Course description (Syllabus): GPIB IEEE488 interface: mechanical and electrical specifications, functional specifications, IEEE488.1 protocol, GPIB addresses, IEEE488.1 commands, Serial equipment querying, IEEE488.2 standard, the capabilities of IEEE488.2 equipment, alternative implementations, improvements; The VXI System: cabled backplane chassis, VXI mechanical and electrical specifications, HW registers of VXI modules, Register-based control, Message controlled instruments, Module 0 (resource management function), SW interface (VXI drivers), MXI bus, PXI system, LXI system; Programming languages for instrumentation: SCPI standard, the SCPI model of a programmable instrument, Commands for control a sub-system's functions; Interchangeable Virtual Instruments (IVI): the IVI foundation and its objectives, IVI context, IVI usefulness, classes of instruments, architecture of SW interfaces (IVI drivers), behavioral models associated to classes of instruments; Mobile computing and remote control: Internet publishing of experimental resources, programming telematics applications, Webserver/workbench server hierarchy; Remote measurement methods based on mobile communication systems; Industrial communication systems: M2M communications, vehicle to vehicle communications based on social concepts (IoT, cognitive networks), Industrial control and measurement systems, case studies: Smart Grid and transportation (GSM-R signaling and control system).

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
VLSI testing technologies and reliability	SECI221	5	1	-	-	1

Course description (Syllabus): Introduction: evolution of integrated circuits, manufacturing technology, types of defects that can affect integrated circuits, integrated circuits testing theory; Measures for quantifying the testability of integrated circuits; Chained scanning structures for testing the combinational and sequential logic inside the IC-DFT; Structure of algorithms used for the logical simulation of integrated circuits; Structure of algorithms used for introducing and simulating defects of integrated circuits; Automatic deterministic test pattern generation; Automatic random test pattern generation; Logic Built-in self-test: test pattern generator; Logic Built-in self-test: response analyzer and interconnection; Tests and testing algorithm for RAM storage structures.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Interfacing standards for embedded systems	SECI222	5	2	-	-	1

Course description (Syllabus): Digital interfacing terminology and concepts; Electrical aspects related to digital interfacing; System buses: system bus interface; Parallel interfaces, serial interfaces, transfer protocols; CAN interface, interfacing examples; Wireless interfaces; Interfacing with intelligent sensors.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Systems on chip security	SECI223	5	2	-	-	1

Course description (Syllabus): The course provides an awareness of the security issues affecting microcontroller-based embedded systems and teaches approaches to protect against them. It offers an understanding of the theoretical principles regarding the security of the Embedded Systems or Systems on Chip and the practice of theoretical knowledge on practical implementations such as: identifying the main security threats and vulnerabilities for an embedded system, use common encryption and decryption standards for data-at-rest and data-in-motion, writing secure C code and embedded system hardware features for security.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Programmable logic systems	SECI224	5	2	-	-	1

Course description (Syllabus): Introduction: General concepts and performance evaluation criteria of digital circuits, applications of FPGA circuits, Introduction to the programmable logic circuits field; The VHDL language; Complex programmable logic circuits: the XC9500 family and CoolRunner; The architecture of FPGA circuits: the XC400 family, the Spartan family; Introduction to the Virtex circuits.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Microcontroller and DSP programming	SECI225	6	2	-	-	1

Course description (Syllabus): Definition of hardware and software design methodologies ("embedded design") for a dedicated system: analytical / application processing, specific generation, solutions for analyzing implementation possibilities (EMS); Exemplifying the methodology of project use (EMS); Application-specific hardware and software (EMS) design platforms; Designing, testing, validating the design for dedicated systems (EMS)

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Neural networks	SECI226	6	2	-	-	1

Course description (Syllabus): Introduction in machine learning; Image classification; Loss functions and optimization; Introduction in neural networks; Convolutional neural networks; Neural network training; Software environments for

neural networks training; Convolutional neural network architectures; Object detection and image segmentation; Recurrent neural networks.

Thoroughgoing Study Direction: Digital communication networks

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Intelligent communication networks	SECI301	5	1	-	-	2

Course description (Syllabus): Introduction to intelligent networks: IN standards (ITU/ETSI: INAP, CAMEL), partners in intelligent networks: operators, service providers, calling and called subscribers; Services: pre-paid services (billing, charging), reverse charge calls, virtual private networks, number translation, location-based services, tele-voting, broadcast calls, agreement, services based on the Signaling System 7, IP-based services; Service Control Point (SCP): service control function, execution and charging control, statistics, call-dependent and call-independent functions, functions of service data bases (profiles, announcements, prices, organization), overload protection (in the signaling system, in the network, in the databases), handling alarms and errors, restarting, monitoring, interception, roaming, number portability; Service Management Point (SMP): access management, authorization, users and groups of users, flexible access logic and the associated data and object models; Service Creation Environment (SCE): advanced service definition (creation, assignment, checking, transfer, testing), service customization; Interfacing SCP/SMP/SCE: user interfaces at the SMP level (administration, operation, service creation).

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Mobile communications and mobile computing	SECI302	7	2	-	1	1

Course description (Syllabus): HSDPA principles; HSUPA fundamentals; HSPA+; LTE – System's architecture: introduction, the SAE system from the 3GPP standard, system architecture for the e-UTRAN radio access network, interfaces, protocols and roaming; LTE – physical downlink and uplink layer; LTE – EPS procedures; LTE – Interfaces for the e-UTRAN network (S1 and X2); WiMAX: introduction, comparison to other standards, physical layer, symbols' structure, sub-channels and sub-carriers allocation schemes, structure of the OFDMA frame, intelligent antenna system, MAC layer, convergence sub-layer, PHS, building and sending the MAC-PDU, bandwidth request and allocation, initialization and joining the network, mobility management, network layer architecture; IP mobility in heterogeneous networks: mobility domains, IPv6, advantages and vulnerabilities of MIPv6, future development, localized mobility management.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Distributed databases for telecommunications	SECI304	6	1	-	1	1

Course description (Syllabus): Fundamental concepts for centralized databases: data independency, objectives of a database, database management system, database architecture, database languages, data models and conceptual modelling, functions and software components of a database management system; Distributed database management systems: fundamental concepts, homogeneous and heterogeneous distributed systems, functions and reference architectures, designing distributed relational databases, allocation and fragmentation, transparency in a distributed database management system; Distributed database management systems – advanced concepts: transaction management, distributed concurrency control, distributed database recovery; Distributed transactions: management of distributed transactions, the preparation and execution phases, session tree; Mobile databases: concepts regarding the development of mobile databases, mobile databases implementation techniques.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Radio channel modelling	SECl305	6	1	-	1	1

Course description (Syllabus): Channel characterization in mobile communication systems (Large-scale propagation models, Small-scale propagation models); Multipath propagation models for broadband wireless systems (Narrowband, wideband and directional channel modeling, Modeling methods for multipath channels); Modeling and Estimation of Mobile Channels (Time-Variant and Time-Invriant Channels, Channel Estimation), Equalization and diversity (Fundamentals of equalizations, Equalizers in communications receiver, Survey of equalization techniques, Linear and nonlinear equalizers, Algorithms for adaptive equalization, Diversity techniques, RAKE receiver).

Course title	Code	No.of credits	Number of hours per week			
			course	seminar	laboratory	project
Design and testing of digital communication networks	SECl306	6	2	-	1	1

Course description (Syllabus): First design steps for fixed and mobile telecommunications networks. Identification and testing of equipment used to forge digital telecommunication networks which some network operators are currently using. Design of optimal domains of digital networks for real placing in crowded urban areas. Design of optimal placement of communication nodes. Access domains marking, taking into account the distribution of requests from a certain geographical area. Designing of necessary means of transmission when the traffic distribution changes because of subscriber migration in other areas which are handled by other communication nodes. Network traffic redistribution when new switches are set up, which are fracturing the current access domains. Radio networks design, which are using different frequencies and are made up of a variable number of units with the scope of covering certain geographical areas. The design will take into account the base stations'emission power, receiver sesitivity, maximum line attenuation, antenna gain, antenna height, etc. Mobile network configuration, setting the real coverage domain on the map, setting up the real positions for eNodeBs, definition or mobile network properties and parameters, and setting up the used frequencies for emission and reception. Designing of a radio link, on minilink level, for digital streams between two real cities, using a given frequency band, taking into account the geographical terrain type, antenna height, antenna gain, feeder attenuation and the visible horizon between base stations and minimum emission power.

Course title	Code	No.of credits	Number of hours per week			
			course	seminar	laboratory	project
Multimedia streams in IP networks	SECl307	6	2	-	1	1

Course description (Syllabus): Media streams data types. Network architectures designed for multimedia transmission. Access technologies, transmission mediums, band necessities. Bandwidth and storage spaces. Concepts and functionality means. Coding and decoding methods. Compressions. Scalable video coding. IPTV P2P technologies. Protocols in use for digital streams in multimedia networks. Signaling and control protocols. Quality parameters for multimedia streams. Impact of delays, packet loss and jitter. Audio and video streams. Web-based video. IPTV applications. IPTV in private networks. Multimedia streams protection. Threat sources. Unauthorized access. Confidentiality breaches. Access network equipment. Securing of binary throughput at the user end.

Thoroughgoing Study Direction: Embedded systems

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Systems remote control	SECl309	6	1	-	1	1

Course description (Syllabus): The concept of remote control; Platforms for online management (Moodle, Joomla, ...); LabVIEW programming; Remote control in LabVIEW (TCP/IP, DataSocket, Shared Variables, M2M communication - OPC UA); Web programming and services based on Virtual Instrumentation. Technologies used for remote laboratories implementation; Mobile applications for remote control (Data Dashboard for LabVIEW, MIT App Inventor, ...)

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Virtual instrumentation in embedded systems	SECI310	6	1	-	1	1

Course description (Syllabus): The concept of graphical instrumentation and graphical system design; Virtual Instrumentation in LabVIEW; Data acquisition in LabVIEW; Building instruments drivers in LabVIEW; Simulations in LabVIEW and Multisim; LabVIEW programing of FPGA platforms (using myRIO and cRIO platforms); The hardware in the loop and software in the loop concepts; Multithreading in LabVIEW; Algorithms for systems control (On/Off; PID; Fuzzy Logic).

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Industrial and consumer microcontroller-based applications	SECI311	6	1	-	-	2

Course description (Syllabus): Designing industrial applications, V-model, design for testing; Peripherals used in typical industry applications: serial lines with high interference immunity, analog interfaces; Design issues regarding electromagnetic compatibility, PCB design, high frequency simulation, EMC testing; Power management and battery operation; Examples of industrial applications, specific requirement, design issues in industrial environment; Examples of automotive applications, safety critical operation, MISRA coding, specific interfaces and code stacks; Examples of consumer applications, specific requirements, cost analysis; UX design.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
ASIC Design	SECI312	6	1	-	-	2

Course description (Syllabus): Building an ASIC (CMOS Technology), ASIC design methodology, From the specifications to the HDL model, ASIC design rules, FPGA-ASIC comparison, HDL coding rules for ASIC

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Low-power intelligent sensor networks	SECI313	6	2		1	1

Course description (Syllabus): Passing from common sensors to sensors with low power consumption energy and batteryless; Solar cells used as energy sources for sensor networks. Applications; Thermoelectric generators used as energy sources for sensors; Piezoelectric generators and RF antennas used as energy sources for sensor networks; Low power sensor networks for smart homes; Low power sensor networks for applications in agriculture; Low power sensor networks used for monitoring (tracking containers, animal monitoring, security borders, etc.).

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Energy management of embedded electronics and communications systems	SECI314	6	2		1	1

Course description (Syllabus): Introduction to energy management; Methods for increasing the efficiency of photovoltaic and wind systems; Methods and circuits for MPPT (maximum power point tracking) for PV; Methods and circuits for MPPT (maximum power point tracking) for wind turbines; Methods to reduce the energy consumed by eliminating components; Energy management of storage systems; Energy management in hybrid cars; Zero energy houses and smart homes.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Applications in telecommunications, domotics and medical electronics	SECI315	6	2	-	-	2

Course description (Syllabus): On the home automation systems, the communication networks in buildings as well as the personal ones for monitoring the biophysical and biochemical parameters of the people; Basic structures for wireless sensors. Acquisition of temperature, humidity and vital signs of patients; Wireless transceivers and communication; Sensors used in the domains tackled by course; Sensing of vital signs of house inhabitants and remote monitoring

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Automotive control systems	SECI316	6	2	-	-	2

Course description (Syllabus): Control systems structure; Main automotive control systems: traction, chassis and safety, body and comfort, infotainment; Subsystems of every main control system: goals, structure, operation, features; Network in automotive.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Computer-aided design in electronics	SECI317	6	2	-	-	2

Course description (Syllabus): EDA technologies; Digital circuits and their models; EDA fundamentals; Circuit modelling in EDA: design, optimal design criteria and optimization procedures; Combinational and sequential logic circuits; Technological implementation.

Thoroughgoing Study Direction: All directions

Course title	Code	No.of credits	Number of hours per week			
			course	seminar	laboratory	project
Research Projects Management	SECI401	4	1	-	-	-

Course description (Syllabus): Introduction to research project management and competitions for research funding, Research Activity, Human resources, Research Infrastructure, Time Management, Research Output, Intellectual Property.