

# Transilvania University of Braşov, Romania

## Study program: Information Technology

Faculty: Electrical Engineering and Computer Science

Study period: 4 years (bachelor);

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Computer programming and programming languages III	CT0410	4	2		2	

**Course description (Syllabus):** Basic concepts. The data-information report. General concepts of data operation: concepts, rules, data models. Database query languages. SQL language. Data definition and manipulation languages (DDL and DML). The DML language. Use of aggregate clauses and functions in the process of searching and retrieving data. The DML language. Entering and extracting data. High-level languages that integrate SQL. The C ++ language. Data transport technologies. Model of object components. The C ++ language. Automation of program control. OLE, ActiveX. The C ++ language. Model of distributed object components. Scripting languages. Database connection technologies. ODBC, OLE DB, ADO, ADO.NET, JDBC. Visual programming environments. The .NET Framework platform.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Computer-assisted training	TI0807	4	2		2	1

**Course description (Syllabus):** Developing an electronic course material based on a methodology, practical guides and helpful tools made available by Advance Distance Learning organization, using IEEE 1484.12.1, IEEE 1484.12.3 standards. The project will be evaluated on the basis of an evaluation sheet and a required route. Methodology: identification of competences; the general objectives are determined based on the competences; based on the general objectives, the specific objectives and activities are determined; based on the activities, the measurable objectives are determined; based on the activities and measurable objectives associated with the activities, the contents are determined; based on the contents the previous knowledge needs are determined; the contents are in resources and presented using different learning methods (the most efficient ones are chosen according to the specificity of the contents); organizing the contents within the lessons / modules; organizing the contents within the courses; evaluation; remediation; Using tools like LMS, RELOAD

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Computer programming and programming languages II	CT0213	4	2		2	1

**Course description (Syllabus):** Introduction to Java; Characteristics of Java language; Creating a simple application; The lexical structure of Java; Data types; Objects and classes; Organizing files; Exceptions; Flows (Inputs / Outputs); Interfaces; Package; Collections; Serialization; Making web applications; Use of databases.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Computer-assisted graphics	CT0106	3			2	

**Course description (Syllabus):** Use of coordinates. Accurately make drawings using OSNAP modes. Making simple drawings with the arrangement of projections according to the norms of the technical graphics with the use of drawing commands. Realization of semi-complex graphical constructions by using editing techniques. Realization of

complex graphic constructions using the editing techniques and the UCS system. Creating writing styles. The representation of the sections. Hatch. Rating. Using quotation, editing and updating styles.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Introduction to computers and information technology	CT0102	4	1		2	

**Course description (Syllabus):** Computer structure; SW component; Internet; The e-mail service; WWW and FTP service; Internet security.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Physical Education	EF02	1		1		

**Course description (Syllabus):** Ball accommodation: Basic position: for attack and defense; Movement games for general physical education; Field movement for attack and defense; Ball management; Throwing at the gate on the spot and running; Drop at the gate with support on the ground; Throwing at the gate from the jump with the right momentum and from the ends; Slots - moving; poultry; throwing Removing the ball from the opponent; blocking the throw at the gate, blocking the opponent with the body.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Physical Education	EF01	1		1		

**Course description (Syllabus):** Actuators for coordinating and controlling the ball in different situations. Learning to catch - hold and pass the basketball on the spot, on the go, then on the run. Learning the steps in two and three from the easy run, followed by the two or three passes, in exchange for places. Learning dribbling with both right and left hand. Learning to throw baskets on the spot, from walking, then from light running. Technical actions with a ball (offensive actions). Bilateral game 3x3 or 5x5 all over the field.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
English II	LE02	2	1	1		

**Course description (Syllabus):** Occurrence of Passive Voice in the Technical Register; Passive Voice; Quasi-passive Constructions; Tenses in Passive Voice; Passive Tenses.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
English I	LE01	2	1	1		

**Course description (Syllabus):** Classification of verbs; Tenses of the indicative mood; Present Tenses; Past Tenses; Future Tenses; Unit 1. Electrical and electronics engineering; Unit 2. Careers in electronics; Unit 3. Electronics.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Physics	CT0212	6	3	1	1	

**Course description (Syllabus):** Inertial and non-inertial reference systems; The kinematics of the material point; Oscillations; Mechanical waves; Thermodynamics; Electrostatic; Electrokinetic; Magneto; Movement of electrically charged particles in electric and magnetic fields; Variable regime.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Probability Theory and Mathematical Statistics	CT0211	4	2	1		

**Course description (Syllabus):** Conditional probability and independence. The total probability formula. Probability schemes: binomial / multinomial, Poisson, hypergeometric. Random variables. Operations with random variables. Distribution function. Discrete random variables. Continuous random variables. Density function. Characteristics of random variables. Properties of the medium and dispersion. Classic distributions. Characteristic function. Fundamental inequalities in probability theory. The convergence of strings of random variables. The law of large numbers Central limit theorem Descriptive statistics.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Electrotechnics	CT0210	7	4	2		

**Course description (Syllabus):** Electrokinetics. Batteries and batteries. Solving DC circuits. Kirchoff's theorems. Balances of powers. Electrodynamics. AC circuits. Transient regime in electrical circuits. The study of three-phase networks. Industrial electrical installations - definitions, types, structure of electrical installations for consumers, load curves, load curve indicators. Electromagnetic field penetration into conductors.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Calculus	CT0209	6	3	2		

**Course description (Syllabus):** Scalar field; gradient; Vector field; divergent, rotor; operator Hamilton; Particular fields: conservative, solenoid, harmonic; Complex functions of real variable; Complex functions of complex variable; Complex Integral; Cauchy's formulas; Residues; the residue theorem; applications; Directly integrable equations. Linear and reducible equations to linear equations; Laplace Transform; properties.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Computer programming and programming languages I	CT0105	6	3		3	

**Course description (Syllabus):** Information representation. Structure of computers; Basic elements of the C / C ++ language; Pointers and tables of data; Functions; User defined data types: enumeration; data structures; bit fields; unions; The principles of object programming. Classes and objects. Functions and classes friendly to a class. Operators overdefinition. Inheritance. Derived classes.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Linear algebra, analytical and differential geometry	CT0104	6	3	2		

**Course description (Syllabus):** Elements of linear algebra and analytical geometry. The algebraic foundations of computing systems; Numbering bases. Elements of coding theory. Codifications used to represent integers in computing systems. Representation of the fractional numbers in the fixed comma and in the floating point. Binary linear codes. Generator arrays, coding application. Parity control matrices, standard table, syndrome-error table. Measurement and distance Hamming. Boolean algebra. Definition and properties. Inclusion relation, structure of latex. Boolean ring. Boolean algebra example. Algebra of sentences, logical operations. Boolean functions. Minterm, maxterm, disjunctive normal form, normal conjunctive form. Representation of graphs in computer memory.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Analysis	CT0103	6	3	2		

**Course description (Syllabus):** Numerical series; Strings and series of functions; Multiple variable functions; Inappropriate integral; Curvilinear integrals; Double and triple integrals; Surface integral.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Communication	CT0101	3	1	1		

**Course description (Syllabus):** Interpersonal perception; Communication - general aspects; Word communication; Nonverbal communication; Ethics and etiquette in communication. Plagiarism; Ethics and academic honesty Standards for indicating scientific references.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Systems theory	CT0301	5	3	2		

**Course description (Syllabus):** Performance of linear and continuous automatic systems; Analysis of linear and continuous automatic systems; Method of integrating differential equations; Method of transfer functions; Frequency methods; Method of state and phase variables; Stability of automatic systems; Discrete systems.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Electronic measurements	CT0302	6	1		3	

**Course description (Syllabus):** Electrical measurement as an experimental procedure; Mobile coil instruments; Continuously balanced and unbalanced current decks; Milivoltmeters and voltmeter of continuous current and alternatively, voltage measurement (peak, r.m.s., average); Structural and functional characteristics of the two analog oscilloscope channels; Impedance measurement; Measurement of voltage and current in continuous and alternating current; Measurement of power, energy and power factor; Measuring frequency, period, time interval and phase difference.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Electronic devices and analog electronics	CT0303	6	3	2		

**Course description (Syllabus):** Junction pn and diode based junction pn; The bipolar transistor; Field-effect transistor with junction grid (TEC-J); Other devices based on the junction pn; Metal-oxide-semiconductor (TEC-MOS) field effect transistor; Electronic power devices, metal-semiconductor contact; Technology for the manufacture of semiconductor devices.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Data structures and algorithms	CT0304	5	2		1	2

**Course description (Syllabus):** Data types; List; Trees; Graphs; Greedy heuristics. Backtracking; Search algorithms; Sorting algorithms; Path minimization algorithms. Dijkstra, Kruskal, Floyd, Prim; The two-component components; 3D simulation algorithms.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Signal processing	CT0305	6	3		2	

**Course description (Syllabus):** Fourier analysis of signals; Signal sampling (sampling theorem, Nyquist condition, sampling types); Discrete signal; Random variables; Signal quantization; Pairs of random variables; Random signals; Signal filtering; Statistical filtering of signals; Signal detection .

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Algorithm design	CT0407	4	2		2	

**Course description (Syllabus):** Analysis of the efficiency of the algorithms; Greedy algorithms I; Greedy algorithms II; Divide et Impera I; Divide et Impera II; Dynamic programming; Backtracking, math games; Search techniques in strings.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
DIGITAL ELECTRONICS	CT0408	5	4		2	

**Course description (Syllabus):** Logical gates: Logical formalism; Combinational logic circuits (CLC); Sequential logic circuits (CLS); Circuit support in design applications: Programmable connections; Full-Custom Design; Areas of gates: Standard cells; CPLD; FPGA.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Computer graphics elements	CT0409	5	2		2	1

**Course description (Syllabus):** 2D two-dimensional graphic transformations; Coordinate transformations; 3D three-dimensional transformations, 4.1 Complex transformations; 3D visualization systems; Cutting objects Cutting in plan; Cohen-Sutherland algorithm, Sutherland-Hodgman clipping algorithm; Elimination of hidden surfaces, in the image space; Modes of reflection and lighting; Synthesis of photorealistic images;. Texturing; Anti-aliasing.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Logical and functional programming	CT0411	2	1		1	

**Course description (Syllabus):** PROLOGUE; Basic syntax for writing Prolog code; Recursivity in Prolog; Prolog lists; Dynamic facts base in Prolog; Files in Prolog; HASKELL; The basic syntax for writing Haskell code; Recursivity in Haskell; Haskell lists; Classes and monads in Haskell; Files in Haskell.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Domain practise	CT0413	4				

**Course description (Syllabus):** Web Services: Defining Web services; Endpoint; Web service port; Introduction to XML. JAX-WS; JEE application server, domain management; Presentation of the life cycle of a web application.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
English III	LE03	2	1	1		

**Course description (Syllabus):** Articles; Nouns; Adjectives; Pronouns; Numerals; Adverbs; Prepositions and Conjunctions

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
English IV	LE04	2	1	1		

**Course description (Syllabus):** Non-factuality; Reported speech; Conditionals; Subjunctive; Non-Finite Verb Phrases; Modality; Idioms and Phrasal Verbs.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Physical education III	EF03	1		1		

**Course description (Syllabus):** Complex of exercises for developing balance and coordination. Complex of cardio exercises (Jumping - Jacks, running with knees up on the spot, plank, mountain climber, squat side kick, etc.). Complex of exercises with steppe (different types of jumps: on two legs up - down, alternative jumps, maintenance in different positions, etc.). Exercise complex on fitball balls (for the development of the abdominal muscles, and the back muscles.

Complex exercises for toning the muscles throughout the body. Stretching complex combined with TRX for whole body toning - upper and lower train. Complex of exercises with small dumbbells for toning the muscles of the arms.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Physical education IV	EF04	1		1		

**Course description (Syllabus):** Exercise structures to accommodate skis on a flat slope. Learning the technical elements for climbing a slope. Learning about specific turns and walking on skis. Learning the plow braking mechanism and the specific exercise structures. Learning the mechanism of the direct descent and the structures of specific exercises. Learning the mechanism of the oblique descent and the specific exercise structures. Learning the bypass mechanism in the plow. Tie two or four bypasses. The possibility of acquiring a slope with a slight degree of difficulty.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Object-oriented programming	CT0415	4	2		2	

**Course description (Syllabus):** Introducing C #; C # object oriented programming; Elements specific to the .NET platform and the C # language; Handling exceptions; Delegated functions and events; Applications with Windows Forms interface.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Data acquisition and processing	TI0609	4	2		2	1

**Course description (Syllabus):** Graphic Programming Language used for hardware description; Principles of achieving exemplary purchasing systems data; Purchase boards "plug-in"; External data acquisition systems; Real-time systems; Discrete tools; Hybrid data acquisition systems.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Computing systems architecture	AI0502	5	3		2	

**Course description (Syllabus):** Introduction to microprocessor architecture. Fundamentals regarding the organization and functioning of the microprocessor. The architecture of the instruction set. UCP control unit. The memory system. The input-output system.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Modeling and simulation	AI0503	6	3	1	1	

**Course description (Syllabus):** Introduction to systems identification Random processes and noise. Models of linear systems. Nonparametric identification methods. Methods of parametric identification. Choosing the structure and validating the model. Practical aspects of identification.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Operating systems	TI0504	5	2		2	

**Course description (Syllabus):** Introduction; Fundamentals; Processes; Memory management; Communication between processes; Process planning; Threads.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Databases	AI0510	5	2		2	

**Course description (Syllabus):** ANSI-SPARC architecture with 3 levels. Data models. The relational model of databases. Database management systems. Relational integrity. Relational languages. Relational algebra. The DBMS rules set by E. F. Codd. The lifecycle of database applications. Data normalization. The purpose of normalization. Normal shapes. SQL language. Objectives and importance. DDL and DML sublinks. Views. Creating and removing views. Advantages and disadvantages of using views. Data security in databases. The purpose of security. Hazards. Security control elements.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Computer networks	TI0606	4	2		3	

**Course description (Syllabus):** TCP / IP architecture; Physical level; Data link level; Network level; Transport level; Application level; Configuring computer networks; WAN networks; Design and troubleshooting of computer networks.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Microprocessor systems	TI0607	5	2		2	1

**Course description (Syllabus):** Input / output ports; The interruption system; Timer modules; Analog to digital converter; Communication systems; Design and development of applications with MC; Application - GT Robot.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Intelligent systems	AI0608	5	3		2	

**Course description (Syllabus):** Fuzzy inference methods. Mamdani type inference tables. Fuzzy logic control systems. Fuzzy regulators. Methods for designing fuzzy regulators. Adaptive fuzzy control systems. Use of neural networks in automatic systems. The adaptive neuro-fuzzy inference system (ANFIS).

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Parallel programming	AI0608	4	2		1	1

**Course description (Syllabus):** Parallel / distributed processing systems vs. traditional systems. Amdahl's law. Parallel processing using GPU based structures. The CUDA language. Processing in grid, cloud, cluster. Practical examples of using parallel / distributed processing: industry, medical, finance, etc.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Domain practise	TI0610	4				

**Course description (Syllabus):** Elements of advanced web application design; Web server installation; Project development of a complex web application; Establishing the interface and how to implement it; Development and implementation of the application in the real operating environment; Testing and maintaining the application; Presentation of the life cycle when developing a complex Web application.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
(O1) Robot steering systems	TI0511	5	2		2	

**Course description (Syllabus):** Integration of industrial robots into flexible manufacturing structures. Strategies for managing industrial robots integrated in a flexible manufacturing cell. Developing strategies for managing industrial robots integrated in a flexible manufacturing line. Cooperative control of robot systems. Navigation systems used in robotics. Planning the movement with the simultaneous observance of the geometric, kinematic and dynamic constraints. Learning programming of robots integrated in the manufacturing lines. Reproduction of motion

trajectories in space with constraints. Case Study. Motion control in space with continuous and / or intermittent constraints. Models of interaction of robots with the environment.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
(O1) Compilers	TI0512	5	2		2	

**Course description (Syllabus):** Lexical analysis; Syntactic analysis. Grammars; Top-down parsing and recursive offspring; Top-down parsing based on tables; The bottom-up parsing; Parser generators. The translation dictated by the syntax; Syntax type checking; Abstract data types.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
(O2) Image processing	TI0613	4	2		2	

**Course description (Syllabus):** Image processing operations. Types; Nonlinear contrast modification; Geometric operations; Compound geometric transformations; Neighborhood operations; Image filtering; Elements of mathematical morphology; Discrete Fourier Transform; Image compression techniques; Techniques for image improvement and restoration.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
(O2) Graphic processing	TI0614	4	2		2	

**Course description (Syllabus):** Free-form surfaces; Techniques for improving and restoring images; Frequency improvement and restoration techniques; Fourier transform; Border detection in images (Edge detection); Border extraction; Implementation of the Fourier transform; Polygonal approximation of borders; Free form curves division; Thinning and skeletonization.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
(O3) Web programming	TI0615	4	2		2	

**Course description (Syllabus):** Web applications with static content; Dynamic content web applications; Programming techniques for creating interactive web applications (AJAX-Asynchronous JavaScript and XML); Advanced concepts of web programming (Flash components; Microsoft ActiveX Components; Java Applet; Components; Security in web applications).

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
(O3) CAD/CASE Systems	TI0616	4	2		2	

**Course description (Syllabus):** Business and Analysis modeling. Graphical modeling tools. E.g., E/R modeling, object modeling, etc. Development. Design and construction phases of the life-cycle. Verification and validation. Analyze code and specifications for correctness, performance, etc. Configuration management. Metrics and measurement. Project management. Manage project plans, task assignments, scheduling.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Embedded systems	TI0701	6	2		2	

**Course description (Syllabus):** The architecture of the embedded systems; Programming embedded systems; Drivers; Development of applications for embedded systems; Wireless networks; WLAN devices; Antennas and accessories; Technologies used for data transmission; WLAN security.



Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Machine learning	TI0702	6	2	1	3	

**Course description (Syllabus):** The probabilistic representation of the regression and classification models; Naive Bayes Classifier; Representation of neural networks; Training of neural networks; Convolutional neural networks; Organizing data for machine learning; Machine learning models; Unsupervised learning. clustering; Analysis of the main components; Reinforcement learning.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Cryptography	TI0703	6	2		2	1

**Course description (Syllabus):** Classic figures; Symmetrical cryptosystems; Irreversible functions; Asymmetric cryptosystems; Hybrid cryptosystems; Digital signature; Steganography; Crypto-currencies and blockchain technology.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Artificial intelligence	TI0804	3	2		1	

**Course description (Syllabus):** Applications of fuzzy control systems and neural networks. Multitudes and fuzzy logic. Fuzzy reasoning. The basic elements of neuronal calculation. Perceptron. Architecture, function criterion. Training by minimizing quadratic errors. The training of the unidirectional networks with the method of back propagation of the error. Two-way neural networks.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Program engineering	TI0805	3	2		1	1

**Course description (Syllabus):** Software engineering elements; Verification, testing and maintenance; Distributed applications; Safety aspects in operation; Software security issues; Achieving security in Java technology.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Software project management	TI0806	3	2		2	

**Course description (Syllabus):** Structure and management of information systems. The context of project management. Organizational influences. Key skills of general management. Socio-economic influences. Standards and regulations. Internationalization. Cultural influences. Processes of project management. Areas of knowledge. Software project management. Rapid development.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Forms recognition systems	EG*809	3	2	1		

**Course description (Syllabus):** Artificial view systems. Definitions and classifications. The optics of artificial green systems. Two-dimensional information processing (2D). Three-dimensional (3D) data processing. Mathematical statistics in artificial vision. Design of artificial sight systems.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Elaboration of the diploma project	TI0819	4				

**Course description (Syllabus):** The study of digital computing systems and programming environments, including the hardware and software structure of the development packages. Development and implementation of algorithms and structures. Design and management of software applications. Use of dedicated software packages. Study of

processes subject. Study of algorithms and regulation laws . Developing software and / or hardware applications. Carrying out case studies on the specific issues of the unit in which the practice activity is carried out. Interpretation of experimental results and formulation of conclusions after testing. Drafting of the diploma project.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Practice for the diploma project	TI0808	6				

**Course description (Syllabus):** Norms of the technique of labor security. Conducting the practice activity. Conducting case studies on the specific issue of the unit in which the practice activity is carried out, including the preparation of the specifications. Interpretation of experimental results and formulation of conclusions after testing of automation equipment. Preparation of the documentation and the practice report.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
(O1) Virtual instrumentation	TI0709	3	2		2	

**Course description (Syllabus):** Graphic programming and automatic systems. The basic concepts of LabVIEW. LabVIEW environment. Data presentation: recorders and graphs. Continuous recording of the waveform. Recording single and multiple curves. Strings and I / O operations with files. Strings. File operations. Realization of Controls and Indicators of type table.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
(O1) Testing of computer systems	TI0709	3	2		2	

**Course description (Syllabus):** Risk assessment to plan and execute testing; Software categorization: Specific criteria and rationale; Validation plan and test plan requirements; Testing protocol and examples; Handling result deviations; Test documentation requirements; Requirements traceability matrix (RTM); Preparing a testing summary report; System acceptance and notification; Standard operating procedures and templates.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
(O2) Local networks	TI0709	3	2		2	

**Course description (Syllabus):** Performance sizes; Network device architecture; Architecture and possibilities of configuration of wireless sensor networks; Features of Wireless Communication; ZigBee communication protocol; Features and configuration of XBee radio modules; Configuration and programming of electronic devices; Examples of implementation of wireless sensor networks; Basic concepts regarding home automation systems; Characteristics of the KNX communication protocol.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
(O2) Input-output systems and peripheral equipment	TI0709	3	2		2	

**Course description (Syllabus):** Communication protocols; Satellites. Satellite Multicast; DVB; Error correction; Satellite Internet.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
(O3) Human-computer interaction	TI0709	4	2		2	

**Course description (Syllabus):** Introduction to the interception of human computer based on methods perceptual; Color image processing: Color models. Image segmentation color); Applications of color segmentation: hand detection and gesture recognition; Segmentation methods based on discontinuities. Detective points corner type interest;

Motion detection (optical flow and field of motion). Detection by eliminating the background; Matching and tracking features in image sequences; Detection and tracking of facial components; Biometric interface; Present detection. Detection of persons. Applications.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
(O3) User interface design	TI0709	4	2		2	

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
(O4) Information security	TI0709	4	2		2	

**Course description (Syllabus):** Presentation of multimedia components: text, images, sound, video sequences. In therapy. Multimedia data compression: Introduction to multimedia data issues. Image compression and processing: Introduction: human eye function, image digitization. Color patterns. Black and white image compression and gray tones (RLE, BTS, Huffman). Color image compression (TIFF, JPEG, JPEG2000). Image processing. Sound compression and processing. Compression and processing of video sequences: Methods and standards of compression of video sequences. H263, H264, MPEG1-7. Multimedia devices: Historical and evolutionary perspectives of multimedia devices. Media servers: Introduction, specific aspects compared to classic servers. Scheduling and disk access algorithms for media servers.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
(O4) Network design	TI0709	4	2		2	

**Course description (Syllabus):** Elements of linear convex analysis; Unrestricted optimization; Non-derivative methods; Unrestricted optimization algorithms; Simplex method; Optimization with restrictions; Evolutionary calculation methods; The barrier method algorithm. Method of section plans; Elements of Bayesian analysis.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
(O4) Fault tolerant systems	TI0709	4	2		2	

**Course description (Syllabus):** Defect analysis. Maintenance. Definition. Basic concepts of Software Systems Reliability Theory. Error flows. Quantitative characteristics of software reliability for different distributions of error time. The gain in reliability in the case of constantly linked reserves. Indicators of reliability of non-repairable elements. Models for increasing software reliability.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
(O4) Software reliability	TI0709	4	2		2	

**Course description (Syllabus):** Structural reliability. Analysis of errors in software systems. Error flows. Quantitative features of software reliability for different time distribution of errors. Diagnosis of software systems. Maintenance of software systems. Models for increasing software reliability. Reliability of databases. Network reliability.