

Transilvania University of Brasov, Romania

Study program: Applied Computer Science (in German language)

Faculty: Mathematics and Computer Science

Study period: 3 years (bachelor)

1st Year

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Mathematical Analysis	ANM1	6	2	2	-	-

Course description (Syllabus): Using mathematical relationships; Using axiomatic properties of the set \mathbb{R} ; Establish the nature of the series of real functions; Calculating the radius of convergence and convergence set of power series; Using the Taylor developments; Using the continuity and differentiability of functions of several variables calculate partial derivatives; Study extremes of the real differentiable functions of several variables; Establish the nature and calculation of improper integrals; Calculation of integrals depending on a parameter; Calculation of line integrals; Calculation of multiple integrals.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Birotics	BIR1	5	2		2	-

Course description (Syllabus): Text editors; Tabular calculus; Image processing using GIMP; Creating tutorials with Viewlet Builder.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Programming I (Java)	PRJ1	6	2		3	-

Course description (Syllabus): Introduction. Advantages of using Java; Procedural programming; Java syntax; Data types; Developing simple programs unit; OOP with Java; Polymorphism; Interfaces, abstract classes and methods; Developing complex programs unit.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Fundamental Algorithms	IAP1	5	2	1	2	-

Course description (Syllabus): Understand the structured programming principles; Using the principal algorithms and methods: Divide et Impera, Backtracking, Greedy; Data structures: stacks, trees, etc

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
English Language 1	LSE1		1	1		

Course description (Syllabus): Verb Tenses 1, Verb Tenses 2, The Passive Voice, Modal Verbs 1, Modal Verbs 2, Relative Clauses, Pronouns and Determiners.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Theory of Informatic Systems	TSI1	5	2		1	-

Course description (Syllabus): Logic design of informatic subsystems; Accounting subsystem; Marketing subsystem; Production subsystem; Human resources subsystem; DSS and EIS.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Algebraic Fundamentals of Computers	FAI2	5	2	2	-	-

Course description (Syllabus): Using the theoretical foundations of computer science and formal models; Gaining necessary algebraic knowledge.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Computer Architecture	ASC2	6	2		2	-

Course description (Syllabus): Use of theoretical computer science fundamentals for describing the modern computers' structure and organization, in order to efficient value the hardware characteristics in the software programming solutions ; Familiarize the students with the introductory concepts in computer architecture; Understand the basic concepts in modern computer architecture; Identify and distinguish between the hardware and software components of a given computer system; Understand the inner-workings of modern computer systems, their evolution and the present aspects about the hardware-software interface; Enable students to design and recognize the structure of a basic computer system, including the design of the I/O subsystem, the memory system and the processor data path and control; Present how a personal computer system operates. Appropriate working with the specific concepts of computer architecture; Develop a set of basic assembly language programs for the specific model of processor in use.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Object Oriented Programming (Java)	POO2	7	2		2	-

Course description (Syllabus): Existing software applications using abstracting levels (architecture, classes, methods); Developing and testing programs units; Using German language in programming; Developing complex OOP applications.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Numerical calculus	CAN2	6	3	1	1	-

Course description (Syllabus): Examples, floating point computing, types of errors, propagation of errors, vector and matrix computations, special type matrices; Errors in numerical computations. Conditioning, stability; Substitution methods for triangular systems of equations. Gauss elimination algorithm; LU and QR Decompositions; Methods for solving the eigenproblem: QR type methods. Methods for approximating the eigenvalues/eigenvectors: power and inverse iteration methods, Hessenberg form.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Academic Integrity and Ethics I	RCS2	2	1		2	-

Course description (Syllabus): Learning techniques for professional and scientific writing; Using LATEX as a tool for professional writing.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
English Language 2	LSE02	2	1	1	-	-

Course description (Syllabus): Flomes1, Our Land is Your Land 1, Never lost for Words 1, Celebrity 1, Newspeak 1, The Body Beautiful 1, The Medial.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Physical Education and Sport 1	EFS2	1	-	1	-	-

Course description (Syllabus): Education / develop basic motor skills and specific of branches / sports events ; Formation of a system of motion skills and general (basic and specific application or utility samples / sports branches) ; Appropriation of means and structures for learning exercises , strengthening and improving the technical elements specific sports games ; To acquire notions on the drives methodical approach in the learning , strengthening and improving sports gaming elements.

2nd Year

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Operating Systems	SO3	6	2	-	2	-

Course description (Syllabus): Understanding the basic concepts of operating systems; Knowledge of theoretical concepts of operating systems Windows and Linux; Knowledge of interface elements of operating systems; Developing the skills to use resources provided by operating systems in applications development; To use MSDOS, Windows and Linux Interfaces; To write command files / scripts under MSDOS / Linux; To develop applications in C that use the resources offered by operating systems; To use specific algorithms of operating systems.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Graph Algorithms	AGR3	6	2	1	1	-

Course description (Syllabus): The students must learn how to use the basic knowledge about graph algorithms that are necessary for studying other disciplines and practical applying after graduation; Modeling practical problems using graph algorithms.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Formal Languages and Compilers	LFC3	6	2	1	1	

Course description (Syllabus): Learning topics about theory of formalization and automata for understanding the compilation of the programming languages, for construction of a text editor, for modeling of the neural nets, etc.; Development of the skills regarding the work with formal elements typical for theoretical computer science.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Programming II (C++)	PII3	6	2	-	2	-

Course description (Syllabus): Programming notions in C++; Developing applications using object-oriented paradigms.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Optional 1	6	3	2	-	2	-

Course description (Syllabus): Various courses are proposed by members from the Department and by the professors from the partner universities from Germany or England; after an election process, the most popular choice is taught.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Physical Education and Sport 1	EFS3	1	-	1	-	-

Course description (Syllabus): Education / develop basic motor skills and specific of branches / sports events ; Formation of a system of motion skills and general (basic and specific application or utility samples / sports branches) ;

Appropriation of means and structures for learning exercises , strengthening and improving the technical elements specific sports games ; To acquire notions on the drives methodical approach in the learning , strengthening and improving sports gaming elements.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
English Language 3	LSE03	2	1	1	-	-

Course description (Syllabus): Flomes1, Our Land is Your Land 1, Never lost for Words 1, Celebrity 1, Newspeak 1, The Body Beautiful 1, The Medial.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Databases	BD4	6	2	-	2	-

Course description (Syllabus): Using systems projects of methodology of systems with databases by specific methods; Using Entities-Relations schemes, using normalizations, physics projections in Access and Appex- Oracle.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Computer Graphics and Computational Geometry	GCG4	7	2	-	2	-

Course description (Syllabus): Introduction in computer graphics. Linear algebra; AWT and SWING – Library in Java; Graphic algorithms; Introduction in VRML1 and VRML2; Rendering and OpenGL; Vertex Operation; Project in Java, in VRML and OpenGL.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Optional 2	TAP4	4	2	-	2	-

Course description (Syllabus): Various courses are proposed by members from the Department and by the professors from the partner universities from Germany or England; after an election process, the most popular choice is taught.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Computer Networks	RC4	6	2	-	2	-

Course description (Syllabus): Learning the basic concepts on which the computer networks; Learning some basic notions on current network technologies; Acquisition of necessary knowledge for distributed programming; Formation of required skills for computers network administration; Using Windows commands to manage computer networks; IP and MAC addresses; Using and programming various algorithms for computer networks; To establish a local network and an inter-network.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Optional 3	DM4	4	2	-	2	-

Course description (Syllabus): Various courses are proposed by members from the Department and by the professors from the partner universities from Germany or England; after an election process, the most popular choice is taught.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Physical Education and Sport 2	EFS4	1	-	2	-	-

Course description (Syllabus): Education / develop basic motor skills and specific of branches / sports events; Formation of a system of motion skills and general (basic and specific application or utility samples / sports branches); Appropriation of means and structures for learning exercises, strengthening and improving the technical elements specific sports games; To acquire notions on the drives methodical approach in the learning , strengthening and improving sports gaming elements and specific procedures; Capacity building for the implementation of the bilateral learn in the game.

3rd Year

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Informatic Systems (SAP and ABAP Language)	SI5	5	2	1	1	-

Course description (Syllabus): Decision of using an information system; General view about SAP processes; Technologies, databases and Net Weaver platform.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Computer Systems Security	SSI5	5	2	-	2	-

Course description (Syllabus): Training skills needed to define security policies and security audit for IT systems; Develop of the ability to secure, manage and maintain software systems and computer network.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Distributed Databases	BBD5	5	2	-	2	-

Course description (Syllabus): DDBSM architectures; Developing of distributed databases; **Developing** of skills related to implementation, developing, maintaining of distributed databases.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Web Technologies	TW5	5	2	-	2	-

Course description (Syllabus): Web design principles; MVC principle; Design and animation with Photoshop; HTML5, CSS rules; JavaScript language; Bootstrap and AngularJS; Canvas in HTML5.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Practical Placement/ Practical Placement Erasmus +	PS5	5	-	-	-	8

Course description (Syllabus): Placing students in real situations of software development ; Qualified company personal attendance to student's practical training; Practicing the competences regarding human relations within working conditions; Increasing students' motivation regarding their theoretical and practical preparation by offering them a better knowledge about their future profession; Preparing young graduates for the work market, by acquiring practical experience during the period of university studies; Supervising and validation of the students activity both by the university mentor and the person appointed by the company.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Optional 4	DRI5	5	2	-	2	-

Course description (Syllabus): Various courses are proposed by members from the Department and by the professors from the partner universities from Germany or England; after an election process, the most popular choice is taught.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Design UI/UX for Web Applications and	WE6	6	2	1	2	-

Course description (Syllabus): PHP and MySQL; Bootstrap and AngularJS; Spring framework; Developing complex projects with an indicated topic.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Project Management for Computer Science	MPI6	6	2	1	2	-

Course description (Syllabus): Learning the process of planning, organizing and delineating responsibility for the completion of an organizations' specific information technology (IT) goals.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Practical Coordination for Bachelor Thesis	PRL6	5	-	-	-	4

Course description (Syllabus):Improvement of the didactic activities and the students' vocational training by placing students in real situations of software development and by practicing the basic competences regarding human relations within working conditions ; Placing students in real situations of software development ; Qualified company personal attendance to student's practical training; Practicing the competences regarding human relations within working conditions; Increasing students' motivation regarding their theoretical and practical preparation by offering them a better knowledge about their future profession; Preparing young graduates for the work market, by acquiring practical experience during the period of university studies; Supervising and validation of the students activity both by the university mentor and the person appointed by the company; Providing detailed and reliable information regarding the future students profession.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Optional 5	KEA6	5	2	-	2	-

Course description (Syllabus): Various courses are proposed by members from the Department and by the professors from the partner universities from Germany or England; after an election process, the most popular choice is taught.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Optional 6	IAC6	4	2	-	1	-

Course description (Syllabus): Various courses are proposed by members from the Department and by the professors from the partner universities from Germany or England; after an election process, the most popular choice is taught.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Optional 7	DJC6	4	2	-	1	-

Course description (Syllabus): Various courses are proposed by members from the Department and by the professors from the partner universities from Germany or England; after an election process, the most popular choice is taught.