

# Transilvania University of Braşov, Romania

## Study program: Applied Computer Science (in German)

Faculty: Mathematics and Computer Science

Study period: 3 years (bachelor)

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Mathematical Analysis	IAG11	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	IAG12	5	2	1	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)	IAG13	7	2		2	

**Course description (Syllabus):** Introduction. Advantage 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
Algorithms and Data Structures	IAG14	5	2	1	2	

**Course description (Syllabus):** Fundamental algorithms; Basic data structures: stacks, queues; Sorting: mergesort, quicksort, heap sort; Algorithm analysis; Greedy; Divide et Impera; Backtracking; Dynamic Programming; Trees and binary trees;

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Theory of Informatic Systems	IAG15	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
Sport 1	IAG16	1		1		

**Course description (Syllabus):** Stimulate students' interest for practicing systematic and independent the physical exercise in individually and in collectively way

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
English Language 1	IAGE17	2	1	1		

**Course description (Syllabus):** Knowing the fundamental notions of English at intermediate level. Ability to understand, read, edit and present oral a text in english of medium difficulty.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Algebraic Background of Informatics	IAG21	5	2	2		

**Course description (Syllabus):** Sets, functions, Relations, Binary operations, Semigroups, Finite Groups, Subgroups, Rings, Fields, Matrices, Vector spaces, Linear codes.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Architecture of Computer Systems	IAG22	5	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 the 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)	IAG23	6	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
Professional and scientific writing	IAG24	6	2		2	

**Course description (Syllabus):** Developing communication skills in German language; Developing cooperation skills for creation of Internet/Intranet software; Personality development towards utility applications

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Numerical Calculus	IAG25	6	2	1	1	

**Course description (Syllabus):** Learning basic notions of numerical calculus; Using specific software for numerical calculus problems

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Sport 2	IAG26	1		1		

**Course description (Syllabus):** Stimulate students' interest for practicing systematic and independent the physical exercise in individually and in collectively way

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
English Language 2	IAGE27	2		2		

**Course description (Syllabus):** Knowing the fundamental notions of English at intermediate level. Ability to understand, read, edit and present oral a text in English of medium difficulty.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Operating Systems	IAG31	5	2		2	

**Course description (Syllabus):** Assimilating 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 system.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Graph algorithms	IAG32	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 Automata Theory	IAG33	5	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++)	IAG34	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	IAGA13	6	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
Sport 3	IAG35	1		1		

**Course description (Syllabus):** Stimulate students' interest for practicing systematic and independent the physical exercise in individually and in collectively way

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
English Language 3	IAGE36	2	1	1		

**Course description (Syllabus):** Knowing the fundamental notions of English at advanced level. Ability to understand, read, edit and present oral a text in English of advanced difficulty.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Databases	IAG41	6	2		2	

**Course description (Syllabus):** Acquiring basic knowledge in databases; Acquiring skills in data bases logical and physical design

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Computer Graphics and Computational Geometry	IAG42	6	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	IAGO18	6	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	IAG44	6	2		2	

**Course description (Syllabus):** Assimilating 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	IAGA30	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
English Language 4	IAGE46	2	2		2	

**Course description (Syllabus):** Knowing the fundamental notions of English at advanced level. Ability to understand, read, edit and present oral a text in English of advanced difficulty

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Informatic Systems (SAP and ABAP Language)	IAG57	5	2		2	

**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
Security	IAG52	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 networks.

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Distributed Databases	IAG53	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 Programming	IAG54	5	2		2	

**Course description (Syllabus):** Webdesing 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+	IAG55	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 4	IAGA35	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
WEB Engineering	IAG56	6	2		1	

**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
Optional 5	IAGA70	5	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
Software Engineering	IAG51	5	2	1	1	

**Course description (Syllabus):** Developing skills for creating industrial software systems; Informational systems with IT support; Using CASE tools; UML modeling language; Using Visual Paradigm

Course title	Code	No. of credits	Number of hours per week			
			course	seminar	laboratory	project
Optional 6	IAGA46	3	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	IAGA51	3	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 8	IAGA61	3	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.