

Name of the course: Programming	Total credits: 2+2+1=5
IPM-AUTEPROGEG	
Type: Optional	
Total hours per semester: lecture: 26 practice: 26 consultation: 13 Other: project	
Type of testing: exam Other: project	
Semester: 1, 2, 3, 4th	
Description	
This course establishes the necessary entry-level programming skills for the curriculum. Students with a BSc in Computer Science or Computer Engineering can acquire exemption. Program structure. Arithmetic and expression evaluation. Control structures in imperative and functional programming. Exception handling. Parameter passing. Pointers and memory management. Abstract data types. Object-oriented programming and inheritance. Generic programming. Concurrency. Comments and documentation. Aggregation-based and linked implementation of data structures. Code quality. Testing and debugging. Coding style and best coding practices. Refactoring.	
Literature	
Compulsory - Brian Kernighan, Rob Pike: The Practice of Programming. Addison-Wesley Professional Computing Series, 1999, ISBN-13: 978-0201615869 Recommended - Bjarne Stroustrup: Programming: Principles and Practice Using C++. Addison-Wesley Professional, 2 edition, 2014. ISBN-13: 978-0321992789 - Alan A. A. Donovan and Brian W. Kernighan: The Go Programming Language. Addison-Wesley Professional Computing Series, 2015, ISBN-13: 978-0134190440	
Competencies	
Knowledge - Possession of complex and up-to-date knowledge in software technology, regarding the design, implementation, operation and maintenance of software, in the following areas: Programming structure of imperative, functional and object-oriented programs. Generic technologies of modern software design and implementation. Implementing basic data structures and algorithms. - Detailed knowledge of the technical terms and expressions of computer science in English. Competencies - Ability to write well-functioning programs using the known programming languages. - Ability to implement algorithms and well-known data structures. - Ability to formalize simpler technical problems, to analyze theoretical and practical	

background, and to provide adequate solutions.

- Expertise in design, development, operation and management tasks in the domain of complex software systems and database management systems.
- Skills for cooperation and team work, and ability to take leading role.
- Ability for written and oral communication in English, using the technical terms and expressions of computer science. Ability to argue, to prepare reports, to read, understand and exploit scientific and technical material (e.g. books and papers).
- Expertise in utilizing sources of technical information, their critical interpretation and evaluation, and the extraction of information relevant to the solution of a specific problem.
- Ability to perform supervised scientific research, and skills required for post-graduate studies.

Attitude

- Attends professional, technological development related to their qualification.
- Commitment to critical feedback and self-assessment.
- Commitment to lifelong learning and receptivity to new IT competencies.
- Adopts and coordinates the ethical principles of work, organizational culture and research.
- Shares professional knowledge, mediates professional results.
- Mediates and implements eco-conscious behavior and social responsibility, helping them with IT tools.
- Commitment to quality standards and its IT tools.
- Open to initiate collaboration with IT and other specialists.

Autonomy and responsibility

- Takes responsibility for his professional decisions taken during his professional activities.
- Takes responsibility for observing and enforcing deadlines.
- Takes responsibility for own and fellow workers' work.
- In the case of operational critical IT systems, he/she can be assigned responsibility for development and operation, according to his/her professional competencies.